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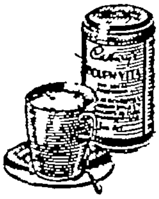

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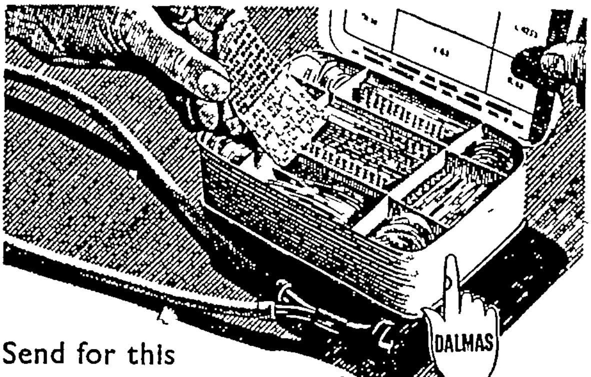

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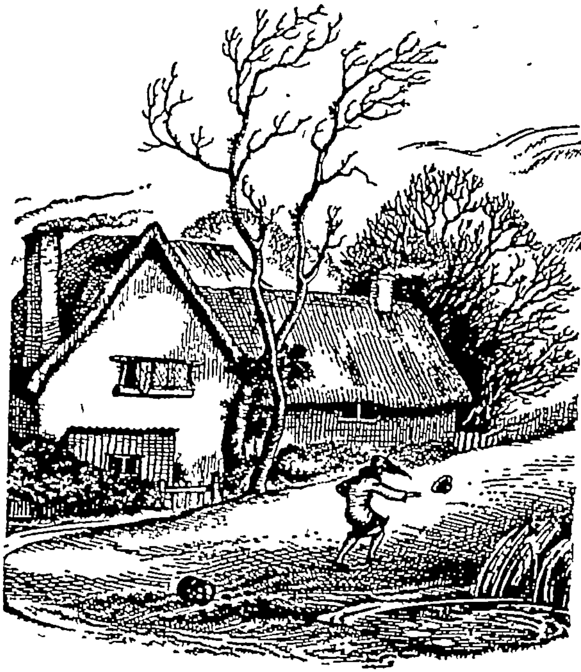

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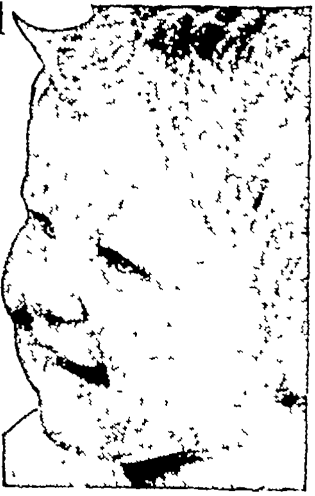

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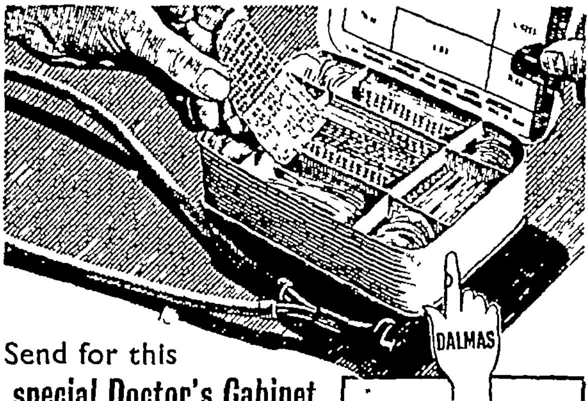

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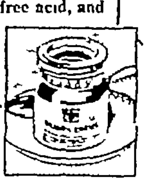

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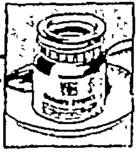

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THE MEANING OF NORMAL

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PROFESSOR OF SOCIAL MEDICINE IN THE UNIVERSITY OF OXFORD; CONSULTING PHYSICIAN TO GUY'S HOSPITAL, LONDON, AND THE RADCLIFFE INFIRMARY, OXFORD

> "No two individuals of the same race are quite alike. We may compare millions of faces, and each will be distinct. There is an equally great amount of diversity in the proportions and dimensions of the various parts of the body."
>
> —DARWIN, *The Descent of Man.*

IN medicine and the medical sciences the word "normal" is in constant use but, as a rule, without a proper clarification of its meaning. Whether in respect of the whole or parts of the body, it is commonly held to be synonymous with "healthy," but health too awaits a better definition and a closer study, in the course of which the establishment of more trustworthy standards would have value. It is, in fact, an old and just criticism of physicians that they have considered the symptoms, signs, causes, and measurements of disease without sufficient reference to the symptoms, signs, causes, and measurements of health; that they have refined their methods of detecting departures from the "normal" without first reviewing the idea of normal or discussing its limitations. In the Oxford English Dictionary normal is defined as the "average" or "mean" or "not deviating or differing from a type or standard"; but that the normal, in biological usage, is something other than a mean or fixed standard can scarcely be disputed. In man, as in all animals, variation is so constantly at work that no rigid pattern—whether anatomical, physiological, psychological, or immunological—is possible.

In consequence of the neglect of the study of "healthy" populations and of what may best be described as "normal variability," a number of physical findings due to clinical and associated methods have been accounted abnormal (in the sense of pathological) with quite inadequate justification and often for long periods. Inaccurate diagnoses, faulty treatments, and unnecessary invalidism have again and again been traced to this failure in essential discipline. Certain clinical signs wrongly regarded as having diagnostic value have long retained a place in the literature. Myotatic irritability of the pectoral muscles is one of these. It has been particularly (if not emphatically) associated with pulmonary tuberculosis, but Martin (1946) has recently shown that it is only another example of the familiar stretch-reflex, that it can be demonstrated in a variety of other conditions and in healthy persons, and that it is, as might be expected, more readily obtained in thin subjects.

The same author (personal communication) has shown that palpable epitrochlear glands, at times as large as a cherry-stone, are demonstrable in about 40% of all adult males and in the absence of syphilis and other generalised disease of the lymph-nodes. Unless additional features—e.g., consistence, mobility, tenderness—are taken into account, the finding cannot be regarded as pathological, much less as pathognomonic of syphilis, as it was sometimes reputed to be.

Many a new diagnostic instrument or technique capable of adding a greater precision to medicine has at first been abused in the same way and has added to the tale of clinical error. The stethoscope, through misinterpretations of natural sounds or of innocent murmurs, at one time created its thousands of cardiac invalids. With the introduction of chest radiography, the diagnosis of "hilar tuberculosis"—based on misinterpretations of the normal root shadows—was once dangerously fashionable. The barium meal led to diagnoses of "dropped stomach" and "dropped bowel" and to the prescription of expensive abdominal supports and unsound surgical procedures. The gastroscope exaggerated the frequency and importance of gastritis, because gastroscopists at first failed to recognise that the gastric mucosa, like the face, varied much in appearance and could blush or become more corrugated under the stress of emotion. Blood-pressure readings within the normal range have been accounted as evidence or signals of arterial disease. In each instance there was initial failure to appreciate the importance of examining a large series of sound and symptomless individuals before extending the clinical uses of the method. Other findings due to laboratory methods have been similarly liable to misconstruction.

NORMAL VARIABILITY

Some twenty-five years ago I was investigating the possibilities of the fractional method of gastric analysis with the late T. Izod Bennett. We decided that the reading of test-meal charts obtained from dyspeptics would be of doubtful value unless we first studied the variations of acidity, emptying time, mucus secretion, and bile regurgitation in a series of healthy subjects. We therefore examined 100 fit medical students, all free from dyspepsia, and obtained the variations illustrated in fig. 1 (Bennett and Ryle 1921). The series was later extended by Campbell and Conybeare (1924), who also examined their students radiographically and found a measure of correlation between gastric conformation, emptying-rate, and acidity. Though the acidity curves of 86% (combined series) occupied a broad median position, 10% showed what would previously have been regarded as a pathological hyperchlorhydria, such as is particularly associated with duodenal ulcer, and 4% showed a complete achlorhydria—at that time thought to suggest chronic gastritis, carcinoma ventriculi, or pernicious anæmia.

A similar variability, sometimes of greater and sometimes of less degree, may be considered as obtaining in respect of all measurable physiological activities and of other immeasurable physical, mental, and emotional states or processes. Organs and structures also have their variations in size, shape, or position. The resting pulse-rate, the resting blood-pressure, hæmoglobin, blood-sugar level, and sugar tolerance, and the basal metabolic rate (apart from variations due to age and sex) all show this variation about a mean. Lyon (1942) has suggested that these variations may best be thought of in terms of the Gaussian curve (see fig. 2), and that for medical purposes the range of normality is best expressed by M ± 2 S.D. In the course of elaborate investigations of "normal young men" at Harvard, the Grant Study (Heath et al. 1945) found, among many others, the variations shown in table I.

TABLE I—VARIATIONS FOUND IN NORMAL YOUNG MEN AT HARVARD

Factor	No. of cases	Range	Mean	Standard deviation
Pulse-rate (recumbent) ..	239	40–96	68·1	10·0
Systolic blood-pressure (recumbent)	265	98–146	114·9	9·5
Hæmoglobin %	255	85·4–107·8	97·4	4·6
Blood-sugar (resting) mg. per 100 c.cm.	147	84–125	100·0	7·7

We may demonstrate or assume the existence of similar variations among persons of like sex and age and accounted fit by history and physical examination in respect of their weight and height, body temperature, colouring, conformation of chest or pelvis, shape and position of stomach, speed of action, endurance, intelligence, and countless other characters. Those variations which can be measured are found to be numerous in their

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other questions bearing on the practical discrimination between the healthy, the unhealthy, and the borderline state ?

The practising physician is preoccupied with sick persons. He has no easy access to healthy controls nor, as a rule, spare time for their investigation. The pathology of the bedside is his primary concern. On the other hand, the physician responsible for groups or populations, for the health and health-examinations of large numbers of ostensibly fit persons—of men, women, and children not coming before him on account of sickness or disability—has special opportunities and other methods for improving clinical standards and advancing knowledge. He can help to develop the more intimate study of human health, of variability and adaptability in modern societies. The physician in charge of infant-welfare centres, the school medical officer, the Service medical officer, the physician with responsibility for student health in a university or medical school (where, incidentally, detailed periodic clinical examinations should have an educational value for the students themselves)—each of these has a contribution to make to human physiology and medicine. The academic student of social pathology and hygiology is more specifically concerned with the study of populations, large or small. In the samples selected for his surveys or experiments it is a part of his task to enumerate and compare the ostensibly healthy and the unhealthy and to consider them in relation to their social advantage or disadvantage —to their material and human environment, their nutrition, their work, or to other influences. Until extensive observations have been made on a great diversity of populations—whether determined by age, sex, or race, by occupation or geography—we shall, in fact, be lacking in information of a fundamental kind and calculated to implement physiological knowledge and to assist both individual and social medicine.

The methods used in the study of populations for these ends include somatometry, radiography, critical clinical assessments (using the familiar methods and instruments of the hospital ward), and parallel social and environmental studies, in conjunction with biostatistical planning and analyses. Recording systems must be carefully standardised on the basis of pilot surveys. Though no other periods of life need be excluded, the age-groups most worthy of study include the periods 0–5, 6–10, 11–15, and 16–20 years, since these cover the formative phase in which inborn variations may first be observed, reactions to infection and nutritional experience and to educational and emotional influences are first recognisable and often most pronounced, and induced local defects or disabilities begin to make their appearance. In English communities today no adults and very few adolescents will be found to be free from dental, ocular, cutaneous, postural, or other defects. In the protected period before the age of 5 years, provided maternal and infant nutrition have been good, defects are as yet relatively rare, although differences between child and child are manifest. In a current long-term study of the preschool child, undertaken by the Institute of Social Medicine at Oxford, Dr. F. H. Kemp and Miss Emrys-Roberts have revealed radiographically some early and unexpected variations in skeletal habit and development and in the appearance of the thoracic viscera. It is possible that some of the more pronounced of these may help to explain certain defects which only become apparent later.

The comparison of social class with social class in respect of height, weight, the routine clinical examination of systems, radiographic appearances, the common disabilities, and of mental and physical function tests in each of the four first quinquennia and in subsequent decades should have much to teach us. Had such group studies been undertaken in the past it is unlikely that we should have witnessed the frequent faults of interpretation accompanying new diagnostic methods; the sorry manufacture of cardiac and "blood-pressure" invalids; the widespread craze for tonsillectomy and other "trial-and-error" operations; the anxieties dependent upon such diagnoses as hilar tuberculosis; the wrong attribution and delayed treatment of some postural defects; and the general neglect of comprehensive ætiological inquiry, which have together marked the last three or four decades of medicine and stayed its rational advance.

The development of ætiological science must now be based more and more upon socio-medical investigation—upon the examination, that is to say, of societies or populations in relation to their own environments, their work and upbringing, their food, and special hazards. The examination of individuals in the later stages of illness and in the remote and unnatural surroundings of the hospital ward can illuminate pathology and advance treatment, but they can make little contribution to studies in causation and prevention. Records of health and sickness experience and physical findings in adequate samples of various populations, together with the necessary familial histories and social correlations, will have a different story to tell. In the course of such inquiries we can scarcely fail to modify our ideas of what we mean when we apply the word "normal" to any particular structure, state, function, or coördinated performance in the individual.

ORGANISM AND ENVIRONMENT

This reference to ætiological and environmental studies should remind us that local and general health and adaptability, like disease, can never be fully considered in detachment from work and opportunity. Organism and environment are indivisible. A bank clerk may be free from signs of disease, and his physical, mental, and emotional equipment may fall within the range of our standards of normal variability. By his qualities he may be well adapted to the work of the city office. Move him, however, to the environment, work, and hazards entailed by polar exploration or by the duties and discipline of the paratrooper, and he may break down in a variety of ways and despite appropriate training. The small stocky Durham miner—poor though his general physique may appear to be from the combined effects of heredity, malnutrition in childhood, and occupational stress in adolescence—is probably better adapted to underground work and life than would be the more favoured and robust candidate for the Metropolitan police force. In respect of "normality" as an index of fitness or adaptability we must always therefore ask the further question: "Fitness or adaptability for what ?"

THE THYROID GLAND

Let us conclude with a simple illustration of this problem of normal variability, selecting for consideration the state of a single organ in relation to a single environmental factor known to be necessary to it—a factor which varies quantitatively from one part of the world to another and from one part of our own country to another.

In 1943–45 the goitre subcommittee of the Medical Research Council (1944) undertook, as a part of its investigations, a survey of school-children aged 11–15 years in various parts of England and Scotland where adult goitre was known to be, or to have been, notably endemic or rare and the iodine content of the drinking-water had been for the first time accurately assessed. Surveys of developed goitre in adults would, for many reasons, have been impracticable. Surveys of thyroid size in school-children, on the other hand, can be readily organised. The general nutrition of the children had probably been better standardised by war-time rationing than at any previous time in our history. Sea fish, the other chief source of iodine (never easily obtainable in inland rural areas), was more scarce than usual in most of the regions visited. A standard method of examining lesser degrees and increasingly rare in their wider divergences from the mean. When a structural or functional variant is so pronounced as itself to occasion indisposition, or inconvenience (as in the case of the bronchial spasm of asthma, the vascular spasm of Raynaud's disease, cutaneous hypersensitivity to light, or gigantism), or when (with or without symptoms) it can be shown to have been further increased or actually induced by disadvantageous stimuli or habit (as in the case of hyperpiesia and obesity); then it may be said to fall within the realm of the pathological. There can be no sharp demarcation between the inborn variations of health and the induced variations of disease where bodily function is concerned. It may well be, however, that a structure or function showing an extreme degree of variation from the mean in health can provide or contribute to certain predispositions to disease or injury. A tall man is more likely to sustain a head injury in low doorways. A man with a native hyperchlorhydria and rapidly emptying stomach may be more liable, in the presence of certain stresses, to develop or retain a duodenal ulcer than a man with a less active organ and a low gastric acidity.* A man with a native achlorhydria may well be more liable to pernicious anæmia. A man with particular physical and immunity endowments may be more liable to pulmonary tuberculosis than others differently endowed. Conversely certain variations may predispose to exceptional muscular vigour or a high immunity to infection. In the words of Jonathan Hutchinson (1884) we still "neglect unwisely the study of those differences between man and man of which, for the most part, physiology takes no cognisance, but which may yet prove of much importance in modifying the processes of disease."

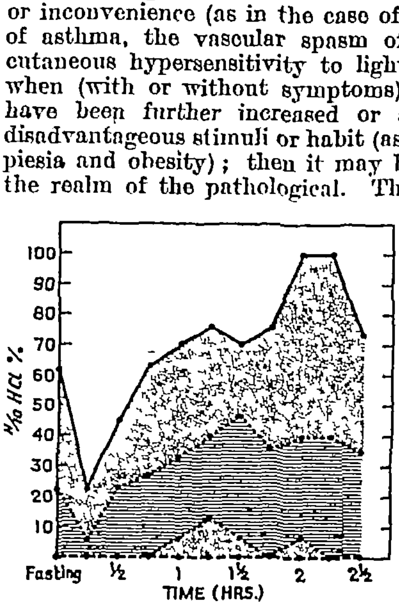

Fig. 1—Range of gastric acidity in healthy young men. Central shaded area includes 80% of the acidity curves.

In the more careful study of the normal we have (apart from its anthropological interest) four particular objectives. These are:

(1) To provide anatomical and physiological standards by which we may better recognise or measure departures from it in our dealings with sick persons.

(2) To provide standards to or towards which restoration may be directed in the case of sick or disabled persons by our immediate therapeutic measures and by rehabilitation, or to which it may be elevated by physical training and improved nutrition and education in the case of youthful and underprivileged members of society.

(3) To provide a refinement of standards for certain types of health examination and personnel selection.

(4) To provide examples and to discover the incidence of the more extreme normal variations which may lead us eventually to a better understanding of diathesis or predisposition to certain types of illness.

I have elsewhere suggested as a definition of diathesis that it should be regarded as "a variation in the structure or function of tissues which renders them peculiarly li
to react in a certain way to certain extrinsic stimu
(Ryle 1936). Variation in the Darwinian sense is l
implied.

TEMPORAL AND SPECIES VARIATIONS

When we speak of variability we must distingu
between variability in time and under differing conditi
of activity *in the individual* and variability under
conditions of age, sex, and activity *in the populatio*
species, although even temporal variability must dep
in part on native endowments. In the individual (ap
from the slower changes of growth, maturity,
senescence) functional variations or fluctuations—
respect, for instance, of pulse-rate, blood-press
body temperature, and tissue chemistry—are occur
from minute to minute. In an ever-changing at
sphere and environment they serve to maintain
equilibrium which is a feature and necessity of heal
living. In the population or species we find those va
tions about a mean which we have thus far b
discussing—variations which determine the "differen
between man and man," even under standard conditi
and in his healthiest moods and moments and in his m
favoured communities; variations which both serve
communities and help to explain the differing resistan
and susceptibilities to stress and strain and other harm
agencies in the individuals composing them. These, whet
in their major or their minor degrees, are the true inb
variations, although we must allow that they can also
given a plus or minus bias by environmental experien

A moment's thought will suggest that both types
variability are essential to survival. Without continu
and swift physicochemical variations in the individu
there could be no adaptation to such constantly changi
environmental conditions as heat and cold, or to
impositions of action and inaction, fasting and repleti
sleep and waking, or to the ebb and flow of emotio
stimuli. Without species variations there could ag
be no communal equilibrium or adaptability;
maintenance of a stock by the emergence of types bet
fitted for survival in a changing and exacting world
submergence of those less fitted: no natural distribut
of functions within the group; no slow adaptations
the environmental changes of climate, time, and pla
and, in the case of man, no scope for adjustment
changing occupations and social systems. In brie
alike in the individual and the community—there co
be no adaptability without variability. A complete standardisation would be incompatible with life. Physiological and biological constants are both unthinkable.

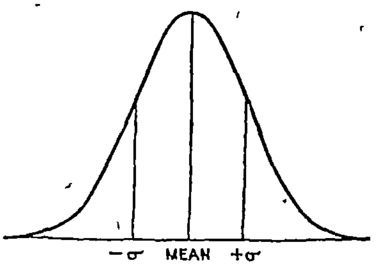

Fig. 2—Gaussian curve: horizontal sc expresses magnitude of factor measur vertical scale its frequency of occurren σ = standard deviation.

METHODS OF STUDY

As has been indicated, our chief difficulties in clinical medicine are encountered at the extremities of the ran
of natural variability. At what point, we may ask ou
selves, does a pulse-rate (under standard condition
cease to be a normal pulse-rate? Or—in the case
immeasurables such as the heart-sounds, the strength
the knee jerk, the size and other characters of the tonsil
the palpability of the different groups of superfici
lymph-nodes, or the state of the thyroid gland—at wh
point is normality passed and should we account th
organ, structure, or function as diseased? How
normality (local and constitutional) to be better assesse

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* In 1937 a postal follow-up of 120 of the students examined by Bennett and Ryle (1921) and Campbell and Conybeare (1924) was completed and put on record (Ryle and Bennett 1937). Of these men, now exposed to the stresses of practice or other responsible work, no less than 30 had developed a more than trivial and transitory dyspepsia, and of this group 15 had symptoms suggestive of a gastric or duodenal ulcer. Reinvestigation was not feasible, and with these small numbers, showing various combinations of acidity and motor activity at the

other questions bearing on the practical discrimination between the healthy, the unhealthy, and the borderline state?

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TABLE II—GOITRE SURVEY OF CHILDREN

Locality	No. of children	Mean percentage incidence of visible glands	Water-iodine (microgrammes per litre)
Okehampton (Devon)	298	26·0	1·1
N. Oxfordshire ..	451	17·5	1·9 (mean)
Windsor (Berkshire)	401	6 5	10·1
Maldon (Essex) ..	527	2·5	50·2

These correlations have definite statistical significance. In Maldon the children had also had sea fish with some regularity even during the war period. Where the percentage incidence of clinical thyroid hyperplasia was high (Okehampton and N. Oxfordshire) the boy-girl ratio was increased and a few cases of "firm" or "asymmetrical" glands were also seen. The total visible enlargements described also as soft, smooth, and symmetrical in the four groups numbered 167. There were 36 examples of visible "plus" enlargements or enlargements showing qualities suggesting more permanent structural change.

When, in communities such as those at Windsor and Maldon, the thyroid gland is invisible in upwards of 93% of cases, it seems reasonable to regard invisibility as "normal" and visibility as "abnormal." Having regard for the known high goitre endemicity in areas where *visible glands were recorded in as many as* 17·5% and 26% (N. Oxfordshire and Okehampton), it also seems reasonable to suggest that visibility of the gland in adolescence should be accepted as a true clinical sign of specific mineral deficiency. However, by no means all children with visible glands develop established goitres in later life—in fact in England only a minority do so. *It might therefore be argued* that clinical hyperplasia more usually represents a pronounced degree of adaptation—or physiological enlargement—rather than an early state of disease, or that it is a true example of a borderline condition which may either revert *to* "normality" or advance to "disease." We might further ask ourselves whether the thyroid glands or the iodine levels were abnormal in the two extreme examples of Maldon and Windsor; for, if the mean water-iodine level for the country as a whole were taken, it is probable that the figures for these places would diverge from it far more than those for N. Oxfordshire and Okehampton. We should then reach the conclusion that, where the environment in respect of its geological formations and water chemistry is most "abnormal," there the thyroid gland is most likely to be "normal." *Extending* the range of observation, we find from the anatomical studies of Sigurjónsson (1940) that in Iceland (as also in Japan), where the consumption of sea fish is high, thyroid size is notably smaller at all ages than in most European countries; whereas in parts of China up to 60% of the population are reputed to have goitres. If Sigurjónsson's careful studies were to be repeated, or if school surveys were conducted in other countries, national standards of "normality" would be found to differ widely. The argument serves at least to remind us that organism and environment can never be considered in dissociation, and that what we call normal or (better) normal variability in biology and medicine must always be related to the work required of the organism or its parts and *to the medium in which they have their being.*

The practical conclusions in the case of the thyroid gland are sufficiently apparent:

(1) The percentage incidence of visible glands *in an adolescent* population is a useful index of its iodine consumption and of the goitre hazard to which it is exposed in later life, whether we regard the clinical findings as an early sign of a specific deficiency—i.e., as *pathological*—or as expressing the more extreme limits of physiological *variation or adaptation.*

(2) Thyroid size (as has been amply demonstrated by others) receives a *plus or minus bias inversely proportionate to the availability of iodine*; but it is also genetically and sexually determined. In this country most adolescent enlargements can be regarded as slow temporal variants. But, since *among* children *of the same* age, living in the *same locality and drinking the same water, cases with* and without hyperplasia occur, we must also assume the operation of innate predisposing influences or species *variations.* The occurrence in English low-iodine areas of families without goitre and of other families with cases of goitre running through several consecutive *generations support this thesis.*

(3) Where the percentage incidence of clinical hyperplasia exceeds, say, 5–10%, there are good grounds for recommending the general use of iodised salt as a measure of social prophylaxis.

These conclusions—confirming in respect of the areas *surveyed much previous work elsewhere—could not have* been reached by the clinical study of established cases of goitre in hospital or clinic or by laboratory experiment but only by socio-medical studies; that is to say, by clinical surveys of ostensibly healthy populations determined by age and in particular relation to their environmental experience. In the process ideas concerning "normality," "abnormality," and "borderline" states and their insensible mergence with one another became subject to a more critical review. Similar considerations should govern the study of other nutritional measurements. Thus hæmoglobin standards should strictly be related, not only to age and sex, but also to geography and the nutritional opportunity of the populations used for fixing the standards.

SUMMARY AND CONCLUSIONS

For every organ and tissue, and in respect both of its *structure and its function, there is a natural range of* variability in any population studied and in the species as a whole. *Within this range efficient performance and* adaptation to common stresses may be recognised. The "normal," in biology and medicine, is better expressed in terms of this variability than as a hypothetical mean or standard.

Temporal variations (perhaps better described as "variants") in the individual, to allow of necessary *continuing adaptations, must be distinguished from the* species variations which establish "differences between man and man." Both have essential survival value. *Adaptability depends on variability.*

The study of human variability within the normal range is important (1) as a fundamental biological study; (2) as supplying necessary standards in medicine for the recognition of health and sickness and borderline states; and (3) because the extremes within the normal range of variability in respect of certain functions *may help to* explain certain innate resistances and predispositions to disease and to place the study of *diathesis* on a firmer footing.

Preoccupation with sick persons has generally detached the mind of the physician from those investigations of ostensibly *healthy populations upon* which alone a better understanding of normal variability can be based. Without this better understanding diagnostic precision and therapeutic judgment must be hampered. It is among the functions of those concerned with the advancement of social pathology and hygiology to establish, by their investigations of adequate population samples, acceptable standards of normal variability in man.

Studies of normal variations in the first four quinquennia of life should have special value, for in this formative period the early contributions, for good or ill, of nutritional, educational, and other experience are discernible, and the manifold and complex stresses and hazards of adulthood have not yet affixed their mark. At this stage, too, the possibilities of improvement by a change of conditions are greater.

Observed variations must always be considered in relation to environment. Social environment has been shown to have striking effects on mortality and morbidity. It will also be shown to have its effects on physical, mental, and emotional equipment and the predispositions to disease (or health) dependent on this equipment. True—i.e., inherited—variations—e.g., in height, weight, and longevity—may be given a plus or minus bias by environmental opportunity.

Some variations are measurable. Of such are certain external somatic characters, the pulse-rate, the body temperature, the hæmoglobin, and the basal metabolic rate, all of which in the study of a group must be recorded under standard conditions and with respect to age and sex. Other variations are immeasurable. Of such are the size and functional state of the tonsils, the state of the thyroid gland, the palpability of the superficial lymph-nodes, and certain postural characters. Critical studies of these in appropriate population samples, with a view to determining the incidence of departures from the apparently healthy state, or the relative frequency of states assessed as "healthy," "unhealthy," and "borderline"—given that due attention is also paid to clinical history and the social and nutritional opportunity of the individuals composing the sample—should in time assist clinical judgment and throw much-needed light upon certain problems in ætiology. Correlated variations (such as the physical and mental associations of duodenal ulcer, eye colour and psoriasis, physical habitus and some mental disorders, and the physique and temperament which accompany vigour, large appetite, and freedom from infection and neurosis in early life but seem later to predispose to heaviness and hyperpiesia) have long had their interest for the physician. They await a more critical investigation.

Variations, increased as they probably are in kind and degree by the racial crossings and other chances of our social evolution, are a fitting subject of inquiry for all students of man, and not least for the physician. In their wider ranges, while consistent with "ordinary well-being," they may predispose to exceptional vigour or a high immunity to infections; they may also invite disease. In their more frequent forms and more moderate degrees, while setting no certain barrier to outstanding performance or to sickness (for these depend partly on the quantity of external influence), they are the essence of biological "normality" and the companions of adaptability and health.

The term health (= "wholeness"), as affecting the individual, should embrace (besides those of sensory well-being and structural integrity) ideas of balance and adaptability; these in turn reflect the coördinated activity of component parts each functioning within its normal range.

Health and disease know no sharp boundary. They could only do so if it were possible for biology to adopt the dictionary definition of normality. But variability, both in time and in the species, is one of the most distinctive and necessary attributes of life, which thus admits no constant and no norm.

For some additions to older experience which prompted this paper I am indebted to my colleagues in the Institute of Social Medicine and the Bureau of Health and Sickness Records, at present engaged on studies of disease and health in various human groups and on the development of survey and recording methods.

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IMPENDING DEATH UNDER ANÆSTHESIA*

HAMILTON BAILEY
F.R.C.S., F.A.C.S., F.I.C.S.
SURGEON TO ROYAL NORTHERN HOSPITAL, LONDON

THE expectation of death under an anæsthetic is 1 per 1000 when calculated on a very large number of cases from five teaching hospitals on three continents (Waters and Gillespie 1944). Most emergency surgeons are removed from the facilities of a teaching hospital; their patients are often very ill and must be prepared for operation hastily. For these reasons an emergency surgeon comes face to face with impending death under anæsthesia relatively often.

My first introduction to this highly important subject was when, as an outpatient dresser, I was called on to help in an unavailing attempt to revive a girl who had collapsed under nitrous-oxide anæsthesia. Since that time I have often reflected how profitable it would be to have an organised drill to prepare us for these cases. Desirable as this would be, with a theatre staff constantly changing it is seldom practicable.

To take the trouble to procure a distinctive jar and place within it certain resuscitative agents (fig. 1), to seal it with adhesive tape, to label it *Anæsthetic Emergency Outfit*, and to know where it is kept in the operating-theatre is not asking much. It is worth while to overcome the inertia that alone prevents these agents from being at hand when they are required. To procrastinate will assuredly lead to regret.

Those who stop breathing and give rise to anxiety while under general anæsthesia can be segregated into two fundamental categories: blue asphyxia (primarily respiratory) and white asphyxia (primarily cardiac). It is to the far more serious condition of white asphyxia that I wish to direct special attention here.

White Asphyxia

Technique of Cardiac Massage.—With a sweep of the knife the upper abdomen is entered in the middle line immediately beneath the xiphisternum. The incision must be long enough to admit the hand. With counter-pressure exerted by the base of the left palm on the lower left costal margin, effective intermittent compression of the ventricles can be accomplished by the pulps of the fingers of the right hand beneath the diaphragm (fig. 2). For the first half-minute these movements should be quick and forcible. After half a minute, not to overtire the hand, the movements should become slower. Sometimes one cardiac contraction occurs, but the heart does not continue to beat. In nearly all such cases, with perseverance, the welcome response is not long delayed. In each of my successful cases subdiaphragmatic massage, just described, was used.

When the patient has a deformed thorax or a rigid costal margin (usually such patients are elderly), and as a consequence the operator is not satisfied that he is compressing the ventricles effectively, or when no response to the standard method has been obtained after a minute or a minute and a half, Nicholson's method should be *adopted*. Some surgeons use Nicholson's method from the start, and their argument for doing so is well founded.

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* An address delivered before the International College of Surgeons at Detroit on Oct. 23, 1946.

Nicholson's Method.—A button-hole incision is made immediately behind the base of the xiphisternum between the attachment of the two sides of the diaphragm. The thumb of the right hand is thrust through the opening (Nicholson 1942). The heart (within its pericardium) can then be compressed between the thumb above and the fingers beneath the diaphragm (fig. 3).

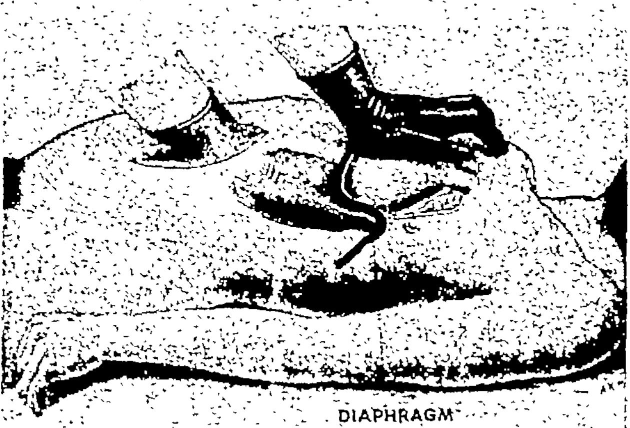

Fig. 2—Standard method of performing cardiac massage.

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On the third day the boy complained of dimness and double vision. On the fourth day he could only distinguish between light and darkness. There were other evidences of serious disturbance of the central nervous system, such as incoördination and some paresis. Obviously the vital centres had been left too long without a blood-supply, and during the period of blindness I wondered whether it would not have been better if the cardiac massage had failed. It was during this period that I became determined to advocate earlier cardiac massage.

By what I believe to be an unprecedented stroke of good fortune the patient's vision gradually returned and all other untoward signs disappeared. This patient was young, and it is reasonable to suppose that the unexpected restitution of function was attributable to his youth, for Swift Joly's patient, a man of 55, resuscitated under similar circumstances, never fully recovered (Vernon 1943).

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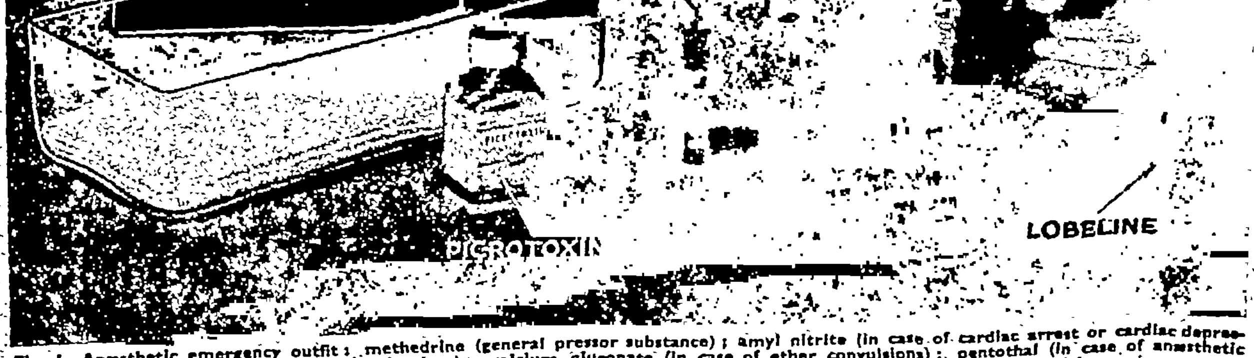
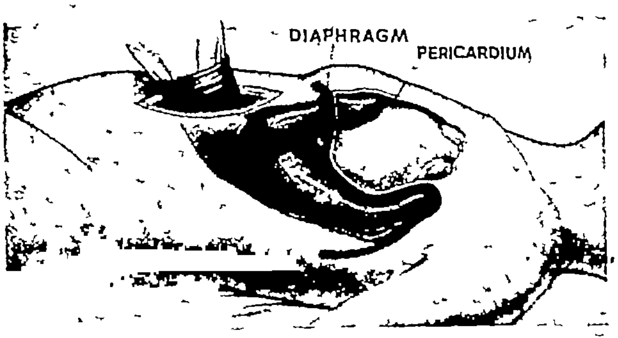


Fig. 1—Anæsthetic emergency outfit: methedrine (general pressor substance); amyl nitrite (in case of cardiac arrest or cardiac depression); lobeline (respiratory-centre stimulant); calcium gluconate (in case of ether convulsions); pentothal (in case of anæsthetic convulsions); picrotoxin (antidote to pentothal); and S-methylisothiourea (in case of collapse under spinal anæsthesia).



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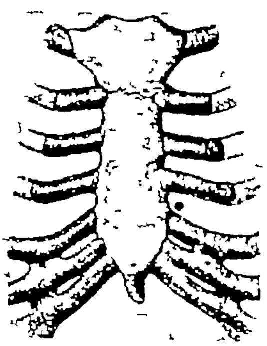

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During these 45 seconds the surgeon is not idle; he and the theatre-sister are sterilising the precordial and epigastric areas and arranging towels.

Pricking the Ventricle.—As soon as the area has been prepared the ventricular wall should be pricked with a needle (Morley 1946). The needle need not be a hypodermic one; a long fine skin needle, or even better a fine lumbar-puncture needle, is admirable for this purpose. The needle is thrust into the fourth left interspace at the upper rim of the fifth rib, close to the sternal border (fig. 4). The needle should be directed backwards and slightly medially to penetrate the right ventricle, according to Bodon's method (Bodon 1923, Bailey 1927). This can be accomplished in the twinkling of an eye.

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Repairing the Incision.—It is inadvisable to close the midline incision until it is certain that the patient is breathing without artificial aid. If the surgeon has time on his hands he can insert through-and-through sutures without tying them. Sulphanilamide powder is poured into the wound, which is closed rapidly. It is sufficient to close the upper midline incision with strong interrupted through-and-through sutures traversing all layers. If the button-hole incision in the diaphragm has been made, suture of this opening is unnecessary.

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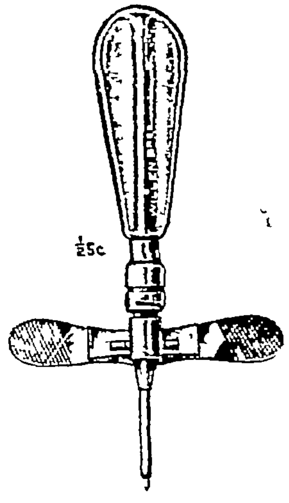

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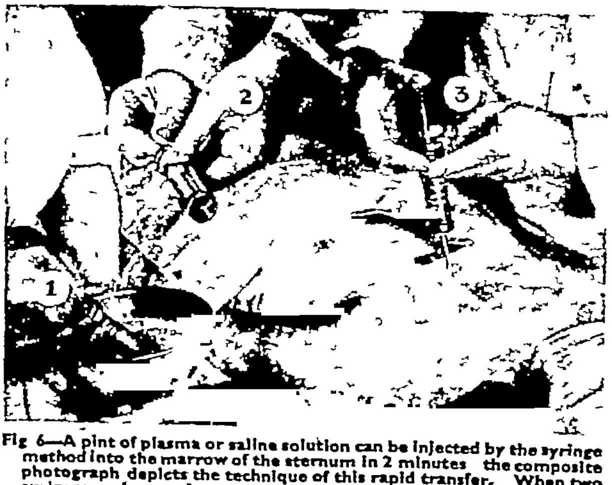

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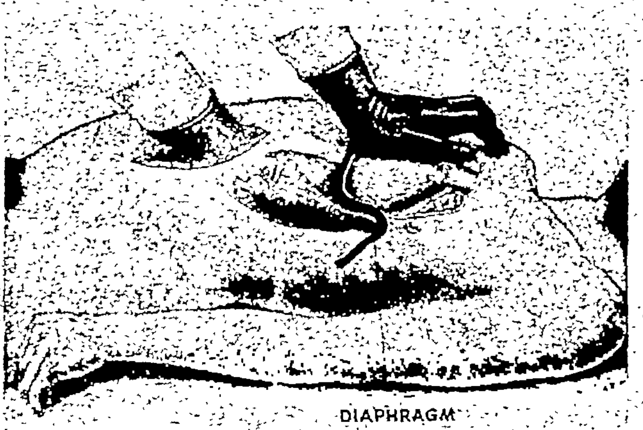

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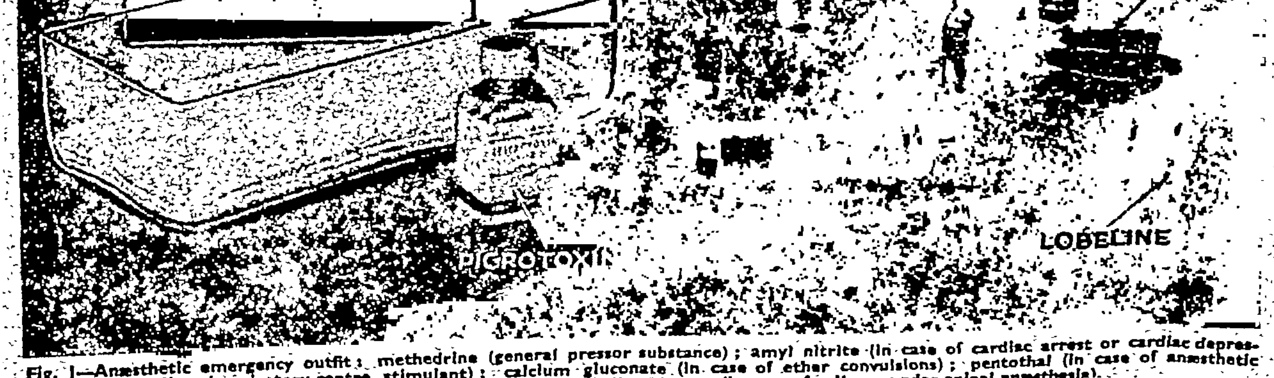

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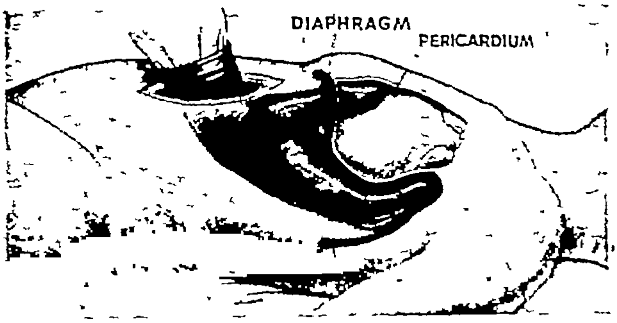

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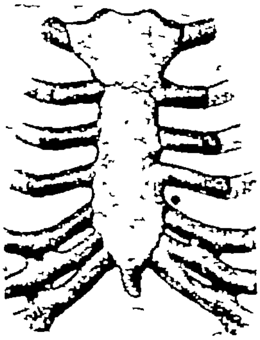

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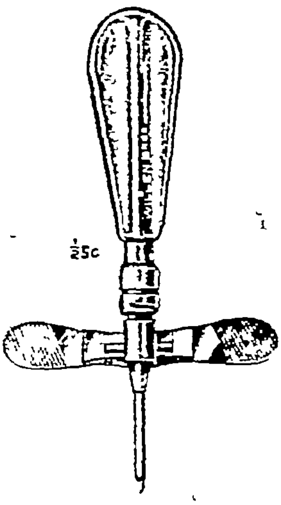

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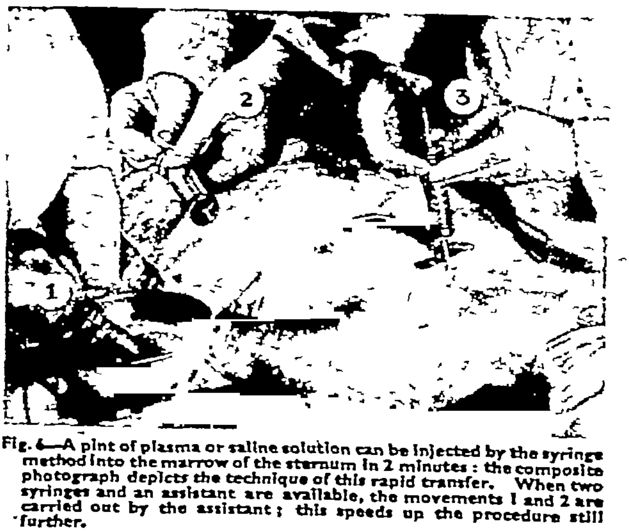

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where cardiac massage was continued for no less than 20 minutes before a response was obtained. The patient recovered.

Perhaps the most stimulating case is that recorded by Easton (1942), who courageously performed cardiac massage by Nicholson's method in circumstances which allowed only of using an unsterilised scalpel and with his hands unwashed. His patient was a woman of 25, whose heart stopped during chloroform anæsthesia for childbirth. Several hours after this ordeal the patient had recovered sufficiently for a general anæsthetic to be administered while her abdominal wall was sutured. She recovered uneventfully.

MacLeod's patient collapsed under spinal anæsthesia. Though the heart responded to cardiac massage after 2 minutes, it was 45 minutes before respiration became automatic. Throughout this period the surgeon and the assistant took turns in carrying out artificial respiration and keeping a hand beneath the diaphragm (MacLeod and Schnipelsky 1942).

Grimshaw's (1942) patient was a woman of 61, whose heart stopped during the administration of 'Pentothal.' Cardiac massage performed about 3 minutes later led to complete recovery.

These reports prove that cardiac massage can bring back to life those whose hearts have ceased to beat under any form of anæsthesia.

Blue Asphyxia

Little has been published on the possibilities of resuscitation in cases where the heart has ceased to beat after blue asphyxia. I have established in practice that the time-limit for successful cardiac massage is a great deal longer in blue asphyxia than in white, which is what we might expect from theoretical considerations. In blue asphyxia the cerebral mechanism is not deprived of blood—indeed, it is congested, and the cerebral cells therefore survive much longer.

CASE 2.—At 7.30 P.M. I was on my way to visit another patient when an agitated nurse ran out of a room saying, "He is very blue." I entered the room, and found a man of 28, from whom I had removed the left submaxillary salivary gland for calculus about three-quarters of an hour previously, lying quite still, with his face suffused and deeply cyanotic. I pulled his head and shoulders to the side of the bed, inserted a mouth gag which was on the table, put my right index finger down to the back of his throat, and attempted to perform artificial respiration by placing the base of my left hand over the xiphisternum. As soon as I had established an airway, I was surprised how effective was this method of getting some air in and out of the lungs. After about a dozen compressions he made one respiratory effort. This, the only sign of life, was not repeated.

I had sent the nurse to fetch sister and anyone else available. At last nurse returned with the news that sister was at dinner; she was accompanied by another nurse. I exhorted them to find someone. Possibly a minute later Dr. I. R. Marre, who was visiting another patient, appeared. He performed artificial respiration while I swabbed out the pharynx. After about 2 minutes we came to the conclusion that there were no signs of life, and I asked Dr. Marre to go to the theatre and fetch a scalpel. This he did, and returned after what seemed a very long time, but afterwards we estimated it was 5 minutes (the theatre was on another floor). During all this time I continued to perform artificial respiration.

The scalpel was in a bowl of spirit; and, having rinsed my hand, which was lacerated by the patient's teeth, in running water, I dipped my hands in the spirit and then poured some spirit on the patient's epigastrium. Having incised in the middle line, I started cardiac massage from beneath the diaphragm, and after about $1^1/_2$ *minutes there were*, as I have experienced before, a few beats followed by further cardiac cessation. After further massage for some seconds the heart sprang into activity, and shortly afterwards the patient began to breathe naturally. Sulphanilamide powder and the instruments for sewing up the abdomen were sent for (by this time numerous helpers had arrived), and the abdomen was closed.

By 8.30 P.M. the patient was breathing well, the pulse-rate was about 120 per minute and steady, the pupils were widely dilated and fixed, and the conjunctival reflex was absent. The face was still very suffused, and the purple tongue, which had been torn by my endeavour to draw it forward, continued to bleed; consequently the pharynx had to be swabbed out periodically. By midnight the pupils were smaller, but the conjunctival reflexes were still absent. The patient became restless at 12.30 A.M., and attacks of restlessness recurred during the night. At 4.30 A.M. he showed signs of cerebral irritation and had to be held in bed. Morphine gr. $^1/_4$ was given. By 5 A.M. the pulse-rate was again down to 120 per minute, but at 8 A.M. extreme restlessness returned. Morphine gr. $^1/_6$ was administered. At 10.30 A.M. there was generalised sweating. The blood-pressure was now 116/78 mm. Hg. The pupils were pin-point and equal, but there was no reaction to light.

The limbs were somewhat spastic; and, what was profoundly disappointing, there was no sign of return of consciousness. However, $13^1/_2$ hours after the cardiac massage the patient began to swallow, and from this time hope of a successful issue was entertained. He spoke to a nurse 17 hours after resuscitation.

He then continued to improve until the seventh day, when suddenly he experienced very severe pain in the left side of the abdomen. This turned out to be diaphragmatic pleurisy. A left pleural effusion and later an empyema developed, but the patient recovered.

The period of cardiac arrest in this case was at least 12 minutes; in all probability it was longer.

Sudden Vasomotor Collapse

In sudden cases of collapse where the pulse becomes almost imperceptible—crises where, to be of value, a pint or more of fluid must be put into circulation in the matter of minutes—injection of fluid into the bone-marrow by means of a syringe or syringes (*not* by gravity) is a method that has yet to be bettered (Bailey 1946b). With a sternal-puncture trocar and cannula (fig. 5) the bone-marrow can be entered with a swiftness and certainty far greater than by cannulisation of a radicle of the venous system. I have used this expedient (fig. 6) with unbounded satisfaction on several desperate occasions, of which the following is an instructive example.

CASE 3.—A very difficult operation had just been concluded—the removal of a fibroneuromyxoma the size of a cricket ball from the posterior cord of the brachial plexus. (In passing, attention is called to the marvellous access obtained by Fiolle and Delmas's incision to that deep, dark, and dangerous recess behind the clavicle.) The gap in the posterior cord of the brachial plexus being about 6 in. and the ends of the cord having been sutured together, it was decided to put the arm in a shoulder spica plaster. While the plaster was being applied the patient suddenly collapsed. The pulse was imperceptible.

After an unfortunate delay in getting ready the apparatus for infusion, it was found that saline solution would not run into the left saphenous vein. The house-surgeon therefore cut down on to the right saphenous vein, but the saline solution only gravitated at the rate of about twenty drops a minute. So collapsed was the patient (a woman of 33) that it was useless to expect replenishment of the circulating fluid by this route. I therefore ordered a sternal-puncture trocar and cannula to be sterilised rapidly, and forthwith cannulised the manubrium sterni. By this time plasma was available and $1^1/_4$ pints were injected in less than 2 minutes.

After the patient, who appeared moribund, had received a pint of plasma, the anæsthetist reported that the pulse was perceptible. It was not until she had received 2 pints of plasma via the bone-marrow that the cannula tied into the saphenous vein began to function adequately. By this time the patient was out of immediate danger.

Envoi

Impending death under anæsthesia is a subject of cardinal importance to every surgeon. Experience has taught me that cardiac arrest can occur in any patient, with any anæsthetic agent, and with any anæsthetist. For obvious reasons a general emergency surgeon must expect to hear the beating of the wings of the angel of death more often than do surgeons engaged in special branches of our art. Even so, let him who thinketh he standeth take heed lest he fall from unpreparedness. To prick the ventricle within three-quarters of a minute of ascertaining that the heart has ceased to beat, and, in the likely event of this simple procedure being ineffective, forthwith to massage the heart, will, I am sure, recall some of those whom Charon had started to ferry across the waters of the Styx.

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CLINICAL AND PHARMACOLOGICAL ASPECTS OF THE TOXICITY OF STREPTOMYCIN

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As pharmacological and clinical experience with streptomycin (Schatz et al. 1944) accumulates, the potential and actual toxicity of the antibiotic and its concentrates becomes apparent.

Already it is possible to indicate those intoxications due to the pure drug and those associated with known and unknown impurities. Thus, the fatty metamorphoses in the parenchymal cells of the liver, and to a lesser extent in the tubular epithelium of the kidneys, described by Molitor et al. (1946), are reversible changes produced in susceptible laboratory animals after the parenteral injection of pure streptomycin. We have observed these changes and the probably associated albuminuria in man.

On the other hand, the reactions reported by Hettig and Adcock (1946)—facial flushing, headache, and fal of blood-pressure, appearing promptly and lasting 10–60 min.—are attributed to histamine-like impurities by Molitor et al. (1946), who also reported the presence of an antidiuretic impurity. Most workers associate skin eruptions, rashes, and to some extent local pain with the presence of impurities. Whether the fever, invariably accompanied by myalgias and arthralgias in the temporomandibular joints and suboccipital region (Hettig and Adcock 1946), and the clinical evidence of toxic effects on the eighth nerve seen in 3 of 34 patients by Hinshaw and Feldman (1945), are due to streptomycin or its impurities is a subject for further inquiry.

We report here the results obtained from the examination in animals and man of the pharmacological effects of some seventeen batches of streptomycin. This material, though of varying purity, was free from histamine-like and other toxic substances, thus allowing large doses to be given intrathecally without incident. In well-marked contrast were the findings of Cairns et al. (1946), who recorded fatal reactions following injection of streptomycin of low dosage (Merck and Co. Inc., lots 200 and 213) in two out of seven infections.

It is evident that streptomycin concentrates, though of high purity, are persistently contaminated by histamine-like substances (Molitor et al. 1946); hence it is desirable that streptomycin should be subjected to biological control.

PHARMACOLOGY

The potencies of the batches of streptomycin from one source (W.F.) are described in terms of weight of pure streptomycin base $C_{21}H_{37}N_7O_{12}$ (M.W. 579) and have been derived from assay with a working standard of streptomycin sulphate, $1\frac{1}{2}$ H_2SO_4 (M.W. 726), of known potency. It follows that streptomycin sulphate contains 79·8% equivalence of base; in the accompanying graph this figure has been rounded off to 80%.

Assay.—Assessment in terms of the working standard by a dilution test, using a constant inoculum of a susceptible strain of *Bact. coli*, C.N. 1360, where the interval of each increment is 20%, yields an answer of potency ± S.D. 20%.

Chemotherapy.—The potency and therapeutic activity of the batches studied were controlled by assay, in terms of a working standard, in which three doses of test were compared with three doses of standard in groups of six mice infected with a number of lethal doses of a virulent strain of *Bact. coli*, C.N. 348.

Acute Toxicity in Mice.—The acute toxicity of streptomycin concentrates was studied after the intravenous injection of two doses into two groups each of ten animals weighing 18–20 g. The onset of symptoms was immediate in the case of toxic doses, and took the form of irregular breathing, dyspnœa, and apnœa. Arrest of the heart and death followed in three or four minutes and was due to asphyxia. There were no late deaths.

The slopes of the line relating the probits corresponding to the per cent. mortalities and the logarithms of the two doses are all of the same order and reveal no artefact. The average lethal doses (L.D.50), derived graphically, range from 1·05 g. to 0·27 g. per kg. and are remarkable for the lack of toxicity which they reflect. This fact is illustrated on the accompanying graph, which shows the simple relation between acute toxicity and potency for the seventeen batches (W.F.) we have examined. The least potent batch (W.F.11), of some 30% purity, is a fifth as toxic as pure streptomycin base, and the most potent batch, of some 80% purity, is two-thirds as toxic as pure streptomycin base.

For comparison the acute toxicities and potencies of twenty-eight lots of streptomycin from one source (Merck Research Laboratories) derived from the paper of Molitor et al. (1946) are included in the graph. Most of the batches, though varying in potency between a quarter and a third of the potency of pure streptomycin, are seen to be twice to four times as toxic. Molitor et al. attribute this toxicity mainly to the presence of a histamine-like impurity; an antidiuretic factor is also present. Included in the graph are the data on one sample of streptomycin sulphate from another source—Pfizer, lot 459.

Circulatory Effects.—When tested in cats anæsthetised with pentobarbitone sodium (30 mg. per kg. intraperitoneally), no significant effects on blood-pressure or respiration were recorded in any of the seventeen batches of streptomycin concentrates.

Antidiuretic Effects.—The acute effect of streptomycin concentrates on water diuresis was studied in groups of four rats. Food, but not water, was withdrawn on the previous night, and in the morning 5 ml. of tap water per 100 g. of body-weight was administered with a stomach-tube, and a dose of 250 mg. per kg. of streptomycin concentrate was given subcutaneously. Urine was measured at hourly intervals for six hours. With two exceptions, batches 20 and 15, the shape of the normal diuresis curve remained unaltered, except that the two-hour peak was a little flattened, but the total urinary excretion was not significantly different. In the case of batch 15 the shape of the curve was slightly modified, but the total excretion was not significantly different; with batch 20 there was retardation of diuresis for two hours, but thereafter it was normal, and the total urinary excretion was not significantly altered.

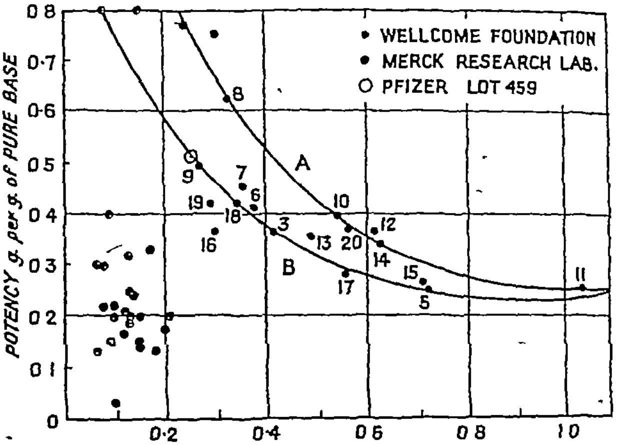
Intrathecal Injection in Rabbits.—Rabbits anæsthetised with pentobarbitone sodium (40 mg. per kg. i.p.) tolerate without detectable reaction 10 mg. per kg. equivalence of streptomycin base injected cisternally in 0·5 ml. of sterile distilled water following withdrawal of 0·5 ml. of cerebrospinal fluid. Under the same conditions two out of three rabbits did not survive the injection of 20 mg. per kg. equivalence of streptomycin base. Death followed in 10–15 min. from respiratory failure and was smooth and free from any other symptom.

STUDIES IN MAN

In the course of the evaluation of antituberculous chemotherapeutic drugs in this hospital the opportunity to evaluate the status of streptomycin in a side-by-side comparison with established sulphone chemotherapy presented itself in June, 1946. A limited supply was available from one source (W.F.) in the form of seventeen batches which had been subject to pharmacological control. The material was available, in sterile rubber-capped containers, in the form of a freeze-dried powder and contained the equivalent of 0·2 g. of pure streptomycin base, together with a supply of sterile pyrogen-free distilled water. The biological control of the material before it reached us included tests for sterility and freedom from pyrogens, freedom from histamine-like impurities, and, with one exception, from antidiuretic substances. The average lethal doses in an acute experiment for mice of these batches were less than that of pure streptomycin. On the occasion of intrathecal injection an additional tonicity test was made on the batches used for this purpose. However, the figures obtained subsequently proved to be average values for all batches, an isotonic solution being obtained when one container (0·2 g.) was dissolved in 18 ml. of distilled water. In practice one container was mixed with 2 ml. of distilled water, but even with such a hypertonic solution no acute toxic effects were encountered. The usual precautions were taken of withdrawing at least an equal volume of cerebrospinal fluid, the use of a narrow-bore lumbar-puncture needle, very slow injection, and subsequently raising the foot of the bed.

In the course of this trial every attempt was made to evaluate the toxic manifestations of streptomycin both clinically and biochemically. Fourteen patients, aged 2–60 years, served as subjects. The total doses of streptomycin varied from 0·4 g. given in 9 hours to 108 g. given in 90 days. All of the fourteen patients received streptomycin by intermittent intramuscular injection at four-hour intervals; in addition four of the fourteen patients received a daily dose of 0·2 g. intrathecally by the lumbar route, or into the cisterna magna. Preliminary intramuscular injection in one of us (G. B.) proved the streptomycin to be painful; hence at the start of the trial, and subsequently in those patients who complained of pain, streptomycin was administered in the presence of 0·5% procaine hydrochloride. Animal protein enzymic hydrolysate and glucose, of each 1 g. per kg. of body-weight, were given by mouth to all patients on streptomycin to reduce liability to renal and hepatic damage.

Most patients were so seriously ill as to preclude systematic pathological investigations, but in most cases complete blood-counts (including differential leucocyte counts), hæmoglobin estimations, and urine analysis were done at short intervals before, during, and after the experimental trial. The quantity of streptomycin circulating in the blood at four hours after the intramuscular injection of 0·2 g. of streptomycin was estimated from time to time throughout the trial by the slide technique (Fleming 1943) with a strain of *Bact. coli*, C.N.1360. Mean blood concentrations of 8 µg. per ml. (minimum 4, maximum 16) were found. In cerebrospinal fluid twenty-four hours after intrathecal injection of 0·2 g. (two specimens), the concentration was 3·2 and 6·4 µg. per ml.; after intramuscular injection alone no streptomycin could be detected in the cerebrospinal fluid.



Relation between potency and toxicity of batches of streptomycin from different sources. Wellcome Foundation batches fall on two curves, A and B.

No evidence of toxic effects on the hæmatopoietic system was observed, and the total and differential blood-counts revealed no fluctuations outside the normal limits. The urines of five subjects showed the presence of leucocytes and epithelial cells during the experimental period; hæmaturias were not seen, but red corpuscles were found in two cases. Albuminuria was recorded in one case. Casts were not found on any occasion.

No facial flushing or headache or any other evidence of histamine-like reaction, such as described by Hettig and Adcock (1946), was seen.

One observation was made which seemed to us to be associated with the toxicity of pure streptomycin. This took the form of an increase of the normal diurnal excursion of the temperature range relative to the pyrexia. It was clearly demonstrated in three of the fourteen cases and showed no obvious relationship to any particular batch. It was not associated with myalgia or arthralgia; nor did any symptom appear with it.

In one case of advanced miliary tuberculosis with peritonitis and meningitis which came to necropsy, a diffuse fatty degeneration of the liver was found. This may have been due to the tuberculosis or to the streptomycin. No dermatoses were encountered, except a transient papulo-squamous lesion on the dorsum of the hands of a Thailand railway worker ex-prisoner-of-war. It is doubtful if this condition was due to streptomycin. No toxic effects on the auditory nerve appeared.

On two occasions swelling and pain round the site of injection, with regional adenitis, developed after intramuscular injection but settled down with conservative treatment in three or four days.

DISCUSSION

The pharmacological and clinical study of seventeen batches of streptomycin from one source reveals several interesting differences between this material and that described elsewhere. The major differences are freedom from acute toxicity of an order greater than that of pure streptomycin, an effect associated to some extent with freedom from histamine-like and antidiuretic impurities. Clinically, ten patients, all seriously ill with tuberculosis, were treated with 1·2 g. daily for ninety days by intermittent intramuscular injection—a total of 108 g. of streptomycin drawn from several batches. Four patients were treated for shorter periods with 1·0 g. intramuscularly and 0·2 g. intrathecally daily. Our experiences were free from the hazards and perils which have characterised previously reported trials, and have convinced us that streptomycin, of the purity which we used, can be administered in safety at the dose levels which we adopted. Differences of this kind have come to be expected from concentrates of antibiotics of natural origin and are inherent in the method of preparation. The nature of the medium and the extraction procedure are only two of the many variables. Since it is clear that streptomycin of a purity closely approaching chemical purity may vary in its intravenous acute toxicity between one and four times (Molitor et al. 1946), it is evident that the control of individual batches by biological standardisation is a necessity.

It is desirable that streptomycin for parenteral use should be free from histamine-like substances and antidiuretic factors. However, it seems that streptomycin may be contaminated by an additional hitherto unidentified substance of greater toxicity but whose toxic effects are similar to the effect of toxic doses of streptomycin itself. The additional safeguards required of streptomycin for intrathecal use is that it should be free from pyrogens and *have an acute toxicity for mice not greater than the* pure streptomycin of L.D.50, 220 mg. per kg. In this connexion it is of interest to refer to the graph relating potency and toxicity of the batches we have examined. Six batches may be considered to fall on a smooth curve (curve A) with a point of origin at the L.D.50 of pure streptomycin (220 mg. per kg.). Eleven batches may be considered to fall on a smooth curve (curve B) with a point of origin corresponding to L.D.50, 100 mg. Should this be so, these batches may be considered to be mixtures consisting of streptomycin of L.D.50, 200 mg. per kg., and a compound of toxicity greater than L.D.50, 100 mg. per kg. Alternatively the batches may be considered to be impure concentrates of a second pure streptomycin having an L.D.50 of some 100 mg. per kg.

SUMMARY

Seventeen batches of streptomycin from one source (W.F.) have been examined pharmacologically and found to be free from histamine-like impurities and, with one exception, antidiuretic substances; moreover, a simple relation has been found between potency and toxicity.

This is in contrast with the observations previously published, which difference may be attributed to the biological variations which exist in the preparation of natural antibiotics. Important among these are the choice of medium and the method of extraction.

A graph relating toxicity and potency reveals the presence of a hitherto uncharacterised substance more toxic than pure streptomycin, of acute toxicity to mice corresponding to L.D.50, 220 mg. per kg. This may be a very toxic material present in low concentration or a second streptomycin of acute toxicity to mice, corresponding to L.D.50, 100 mg. per kg. or thereby.

Fourteen patients have been treated systematically with these batches. Eleven received 1·2 g. daily by intermittent intramuscular injection for ninety days, a total of 108 g. Four patients received 1·0 g. daily intramuscularly and 0·2 g. daily intrathecally for shorter periods. The toxic manifestations were trivial.

We are indebted to the Wellcome Foundation Ltd. for the supply of seventeen batches of streptomycin.

We wish to thank Mr. P. A. Young, Mr. M. Woodbine, and Mr. M. Cheeseman, of the Wellcome Research Laboratories, for the estimates of potency and toxicity, and Dr. J. Fine, of the County Hospital, Farnborough, Kent, for invaluable help with the biochemical and pathological aspect. The animal experiments were made by Dr. G. Brownlee and Mr. M. Woodbine.

NOTE

After this paper was prepared for publication we had access to the report of the National Research Council (1946), whose committee on chemotherapeutics attribute hypersensitive reactions, such as skin eruptions and fever, and neurological disturbances, such as vertigo, tinnitus, deafness, and paræsthesia, to the active substances and not to impurities. They further found that the incidence of reactions increased with the total daily dose. When the average daily dose was more than 1 g. there was a striking increase in reactions. Among patients receiving 3 g. a day 46% had reactions; and, when the daily dose was 4 g. or more, 60% had reactions. In our series of cases the average dose was 1·2 g. daily for ninety days, and such reactions, though diligently searched for, were not seen.

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CEREBRAL BERIBERI

(WERNICKE'S ENCEPHALOPATHY)

REVIEW OF 52 CASES IN A SINGAPORE PRISONER-OF-WAR HOSPITAL

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IN 1881 Wernicke described three fatal cases of ataxia, ophthalmoplegia, and clouding of consciousness, which he called acute superior hæmorrhagic polioencephalitis and believed to be inflammatory. Subsequent descriptions emphasised the association with alcohol. The necropsy findings of symmetrical vascular change and hæmorrhages, with glial proliferation and neuron degeneration in the paraventricular grey matter, usually best seen in the mammillary bodies, have often been described. From 1933 onwards a deficiency origin began to be suspected, and more recent clinical and experimental work has pointed to vitamin-B_1 deficiency as the principal factor. The disease in the past has been regarded as rare and chiefly diagnosed post mortem, and descriptions of the signs have been largely limited to those of the terminal stages with gross ocular and mental changes.

An opportunity for placing a large number of healthy adults simultaneously on a standardised deficient diet and observing the results over a period of years is one which the many workers on the vitamin-B complex must have coveted. To some extent the capitulation of Singapore supplied these conditions: some 32,000 troops (British alone are included) were within a very few days of Feb. 15, 1942, changed suddenly from normal British rations to a grossly unbalanced diet consisting mainly of polished rice. Largely owing to the efforts of Colonel J. Bennet, A.M.S., consulting physician, Malaya Command, the medical services were from the first alive to the opportunities of study likely to be presented. All severe cases were admitted to the Roberts Hospital, Changi. In spite of considerable departures from the strict standards of a formal deprivation experiment—e.g., the diet was not, especially at first, completely standardised, and a severe epidemic of bacillary dysentery complicated and intensified the picture—and in spite of manifold difficulties encountered—e.g., laboratory facilities were primitive, drugs for curative experiments in short supply or non-existent, paper for records almost unobtainable, and the medical officers concerned, who were themselves subjects of the experiment, never completely fit—many of the observations made may be worth recording.

A general account of the deficiency symptoms encountered in these men, with the biochemical findings, has already appeared (Burgess 1946, Cruickshank 1946); we present here a detailed description of 52 cases

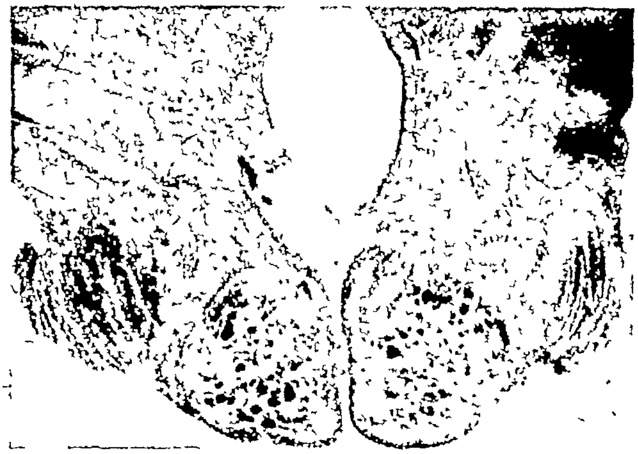

Fig. 1—Frozen section through mammillary bodies showing dilated vessels and hæmorrhages, and a smaller lesion in the wall of the 3rd ventricle. (Lepehne Pickworth, ×4½)

of Wernicke's encephalopathy, the largest series yet recorded. The fact that there were only 21 deaths should considerably change accepted ideas of the prognosis.

A few cases of neuritic beriberi occurred among alcoholics in the first weeks after the capitulation, but the main wave began in early April after the anticipated six weeks' interval. With this came cases of what was at first supposed to be some form of epidemic encephalitis, severe, often rapidly fatal, and of unfamiliar type. Sporadic cases of a virus encephalitis confused the picture, but clinical examination and the findings in the cerebrospinal fluid and at necropsy showed them to be distinct; and after a short period of doubt the diagnosis of Wernicke's encephalopathy was established by demonstration at necropsy of hæmorrhages in the mammillary bodies. A more thorough scrutiny of the clinical findings then showed that there was no real resemblance to any known form of infective encephalitis, and that the symptoms agreed closely with available descriptions of Wernicke's disease.

The response of the condition to injections of thiamine at once aroused further interest; medical officers became alert for the earliest signs, and every patient with severe loss of appetite, vomiting, nystagmus, and mental change was at once thoroughly investigated. The description of these early cases and the features whereby they may be diagnosed and so treated long before the onset of the classical and often fatal stages is the principal object of this paper. We hope also to show that these cases were the effects of a pure thiamine deficiency. It is in expression of this belief that we use the term "cerebral beriberi." Eponomy does not usually survive the solid establishment of ætiology—no-one now calls neuritic beriberi Brontius's disease—and to us it seems that the case for regarding this encephalopathy as merely one of the four manifestations of beriberi is at least as strong as that for the inclusion of the œdematous type.

The 52 cases described are selected only on the basis of adequacy of records and certainty of diagnosis. We have not included any of the sporadic cases which developed later in captivity, of which we know at least 8; these occurred in times of acute dietary insufficiency, and were usually associated with a wasting disease. Several cases similar to those described here occurred in patients convalescent from cholera and dysentery on the Thai-Burma railway; the specimen illustrated in figs. 1 and 2 was from one of these.

PREDISPOSING CAUSES

Cerebral beriberi was to be looked for in three main types of case:

(1) *Dysentery and Diarrhœa* (45 cases).—A protracted attack of dysentery, with three weeks or more of fluid diet (mainly tea and plain water), was the most common history. A few other fatal cases of dysentery lasting up to a week showed signs of Wernicke's encephalopathy as a terminal event.

(2) *Failure of Adaptation* (3 cases).—Owing to an individual exaggeration of the widespread difficulty of adaptation to rice, 3 men developed the disease after a period of semi-starvation, with no history of diarrhœa or other disease since becoming prisoners-of-war; 2 of these had difficulty in eating rice from the first day of their captivity, and the third ate well at first but subsequently developed anorexia, followed by cerebral beriberi.

(3) *Febrile Conditions* (4 cases).—The febrile group consisted of 3 cases of gunshot wounds with chronic sepsis and 1 case of long standing undiagnosed malignant tertian malaria.

Every case with diarrhœa and one of the other above predisposing causes has been placed in the dysentery and diarrhœa group.

CLINICAL PICTURE

Symptoms.—The first symptom in many cases was persistent anorexia after an attack of dysentery. A week or so later came vomiting and nystagmus; and one would note a progressive mental detachment from the environment, the early loss of interest in food being followed by loss of interest in the immediate past and finally in all surrounding events. The full picture was one of miserable inactivity, the patient being sleepless, disoriented, and uncooperative, with terminally, if untreated, the classical semi-coma and severe oculomotor palsies. There were considerable variations both in onset and in rate of progress, but the following analysis shows that the basic picture remains.

	No. of cases
Loss of appetite	46 (88%)
Eye symptoms:	33 (63%)
Wavering of fields of vision on looking to the side	24 (46%)
Diplopia	23 (44%)
Photophobia	3 (6%)
Nausea and vomiting	31 (57%)
Insomnia	20 (38%)
Giddiness	11 (21%)

Loss of appetite was the first symptom and was present *in all cases in which a history could be taken.* The patients blamed the food and demanded sweet things. *Nausea would follow, and then vomiting.* Vomiting was not necessarily associated with meals, sometimes occurring regularly on waking, and was seldom violent, unless associated with giddiness. The frequency of vomits ranged from two a day to short bouts of vomiting every half-hour; from four to five times a day was the average. In severe cases vomiting became less frequent in the terminal stages. After a varying time patients complained that everything wavered when they looked to the side, others found difficulty in reading, and some described frank diplopia in any direction but straight ahead. Diplopia was first noticed for distant objects. All these eye symptoms were more pronounced in the evening, and some patients claimed that they had no trouble until midday. In one case photophobia preceded all other symptoms by two weeks.

As the disease progressed, sleeplessness with anxiety became another common feature and accentuated the dream-like world into which the patients gradually lapsed. They described their surroundings as somehow different, the brightness and acuteness of life seemed lost, and human voices appeared toneless. They complained of difficulty in concentration, loss of memory for the immediate past, and, in one case, of having no conception of the time of day. Restless snatches of dreams when trying to sleep became part of reality, and a fear of the dark was not uncommon. In the early stages of mental symptoms the patients had great insight into their condition and, though worried about their mental abnormalities, were reluctant to mention them unless closely questioned.

Signs.—The following is an analysis of the signs.

	No. of cases
(a) Eye changes	52 (100%)
(b) Mental changes	41 (78%)
(c) C.N.S. disturbances other than those due to recognised forms of vitamin-B_1 deficiency	6 (11%)
(d) Signs of other forms of beriberi and of other vitamin deficiencies	47 (90%)

(a) The *eye changes* can be classified as follows:

	No. of cases
Nystagmus	52 (100%)
External rectus fatigue and paralysis	14 (26%)
Complete disconjugate wandering	4 (8%)
Loss of visual acuity	2 (4%)
Papillœdema	2 (4%)
Pupil abnormalities	2 (4%)
Ptosis	1 (2%)
Complete ophthalmoplegia	1 (2%)
Retinal hæmorrhages	1 (2%)

Nystagmus was the earliest sign obtainable. Horizontal and vertical varieties were seen, though the horizontal was far the commoner; with slow coarse movements a rotatory element was sometimes found. At first nystagmus could only be elicited on lateral movements of the eyes half-way from the midline, but as it became more pronounced it could be elicited instantly on deviation from the centre. In some severe cases there was a continuous fine rapid nystagmus on looking straight ahead, which was extremely unpleasant for the patient. Some patients on being tested for nystagmus would vomit or complain of extreme giddiness; nearly all complained that it gave them pain behind the eyes. Unilateral or bilateral fatigue or palsy of the external recti nearly always followed nystagmus. If, after repeated side to side movements, the eyes were then fixed to the side, the eye looking outwards would hold its position momentarily and then slowly swing inwards. In an attempt to maintain the external position coarse nystagmoid movements would be initiated. This phenomenon was independent of the fine rapid nystagmus which might also be revealed by the examination, though in an early case it was noticeable that protracted examination for nystagmus produced a wider range of movement in the outward-looking eye. Temporary complete disconjugate wandering could sometimes be produced after long-continued examination, or appeared in the last stages of severe cases. More severe degrees of oculomotor palsy would so limit the range of lateral movement as to obliterate nystagmus, the eyes being unable to deviate sufficiently from the midline to induce nystagmus.

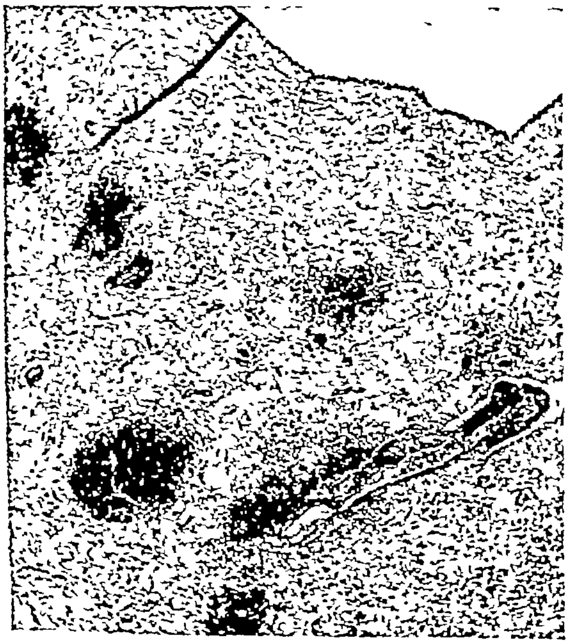

Fig. 2—Paraffin section through a small lesion in floor of 3rd ventricle showing hæmorrhages (not all perivascular) and dilated vessels; the large capillary with its irregular dilatation and endothelial thickening is very typical. (H. E. ×50.)

Complete ophthalmoplegia was seen in only one fatal case as a terminal sign. Constriction was the only pupil abnormality found, and reaction to light and accommodation continued normal. Only a few patients had their ocular fundi examined: 1 showed small flame-shaped retinal hæmorrhages, and 2 early papillœdema, with pinkness and blurring of the edges of the disk.

(b) *Mental changes* can be classified as follows:

	No. of cases
Emotional changes:	35 (67%)
Apprehension	17 (32%)
Apathy	17 (32%)
Excitement	7 (13%)
Memory loss for recent events	32 (61%)
Disorientation	24 (46%)
Confabulation and hallucinations	13 (25%)
Convulsions	1 (2%)
Sudden onset of advanced mental signs as first evidence of cerebral beriberi	10 (19%)

In a case with a gradual progression of signs and symptoms emotional changes occurred after the eye changes had become well established. Apprehension was the earliest change noted; as the condition progressed an apparent apathy developed, masking the underlying essential anxiety. Most patients were cooperative until the later stages; but, as the apathy became greater, there was increasing depression, with emotional instability and a tendency to cry on questioning. Occasionally excitement was seen instead of apathy. Loss of memory for recent events followed soon after the initial anxiety, gradually developing until a period of 2–3 weeks was involved. Memory for remote events remained excellent up to the stage of coma, except in 3 cases. Disorientation for time and then for place followed the loss of memory, and, as confusion deepened, wild confabulation and hallucinations occasionally preceded the onset of coma. A few cases showed none of the above progression of signs: a nocturnal hallucination, a burst of excitement, or a rapid onset of coma being the first indication of the patient's condition. In one established case an epileptiform convulsion occurred as a terminal event.

(c) *C.N.S. disturbances* other than those due to recognised forms of vitamin-B_1 deficiency can be classified as follows:

	No. of cases
Palsy of cranial nerves other than oculomotor or recurrent laryngeal:	
Trigeminal	2 (4%)
Facial	4 (8%)
Auditory	1 (2%)
Glossopharyngeal	2 (4%)
Pyramidal tract involved (these cases showed a transient positive Babinski during convalescence)	2 (4%)
Incontinence (not associated with severe neuritic beriberi)	2 (4%)
Ataxia not attributable to peripheral nerve damage (one noted at the onset, the other during convalescence)	2 (4%)
Respiratory difficulty at death	2 (4%)

(d) *Other forms of beriberi and other vitamin deficiencies:*

(i) Neuritic, cardiac, and œdematous beriberi:

	No. of cases
Neuritic beriberi	27
,, ,, + cardiac beriberi	10
,, ,, + ,, ,, + œdematous beriberi	3
,, ,, ... + ,, ,,	1

41 (79%) 13 (25%) 3 (5%) 41 (79%)

		No. of cases
(ii) Glossitis:		
Mild midline superficial atrophy	..	12
Severe glazed raw ,, ,,	..	5
	Total	17 (23%)
(iii) Purpura never proved to be scorbutic; all patients severely ill, and 5 died	..	7 (13%)

Neuritic beriberi included all varieties, from loss of reflexes to a complete generalised asthenia, associated with aphonia, dysphagia, dyspnœa, and incontinence. This form was seen in advanced cases of Wernicke's encephalopathy and was followed by profound wasting and a long convalescence. Cardiac beriberi was the fatal termination of 4 cases.

PATHOLOGY

The cerebrospinal fluid was examined in 8 cases and was uniformly normal by all the available procedures (pressure, cytology, and rough estimations of globulin and sugar).

There are many excellent descriptions of the pathology—e.g., Bender and Schilder (1933), Campbell and Biggart (1939). Since no histological examination was possible, the morbid anatomical findings were important only for diagnosis. In 2 cases there was no necropsy, and in 3 cases the fixed brains (which had used up all the available formalin) were removed for examination by a Japanese doctor whose claim to being a pathologist appeared to rest on the possession of a magnificent set of necropsy instruments looted from the Singapore General Hospital, and who did not divulge the results of his examination. There remain 16 brains, all of which were cut fresh.

Of these, 8 showed unmistakable naked-eye hæmorrhages in the corpora mammillaria and left no doubt of the diagnosis. The establishment of the diagnosis on anything less than this in the fresh brain, without the possibility of histological confirmation, must always be difficult; but the degree of congestion in the mammillary bodies or in the periaqueductal grey matter was enough to render 3 more cases highly suggestive. No macroscopical signs were found in 5 brains, but it is believed that close serial section of fixed brains would have reduced this number, and it is not unusual for brains which are negative to the naked eye to show microscopic lesions (Campbell and Biggart 1939). Of 73 brains examined during the first six months after the capitulation, including various traumatic, infective, vascular, and nutritional lesions, no cases which showed any other lesion showed the syndrome of Wernicke's encephalopathy, and no case which showed the lesion had not had diagnostic symptoms during life.

Several pieces of brain were preserved in formalin for post-war histological examination but were lost in a railway accident in Siam. The specimen (figs. 1 and 2) which illustrates the typical naked-eye and histological findings comes from a cholera convalescent in 1943 in Siam. The specimen spent the last two years of the war, together with the records on which this paper is based, buried in a Siamese cemetery.

ILLUSTRATIVE CASE-RECORDS

Since cerebral beriberi is divisible into chronological phases, these can be used as a basis for classifying the cases into four groups:

(1) Mild—up to and including the stage of eye changes.

(2) Moderate—up to and including the stage of loss of memory for recent events.

(3) Severe—up to and including the stage of disorientation and coma.

(4) Terminal—as a terminal event in an acute toxic condition.

CASE 1 (mild type).—Admitted on June 1, 1942, with a history of anorexia for rice since being captured, and bacillary dysentery six weeks before admission, though he had been doing heavy work for the past three weeks. Had dizziness and blurring of vision for a week. He looked well but thin, and had horizontal nystagmus with a rotatory element initiated half-way from the midline. He was given yeast tablets, but four days later complained of diplopia unless he concentrated. He was then treated with vitamin B_1 by injection on June 8 and recovered.

CASE 2 (moderate type).—Admitted on March 24, 1942, with three weeks' history of dysentery; after four weeks in hospital was up and on normal diet, though he had no return of appetite after recovery from dysentery. On April 16 he developed nausea, followed by vomiting two days later, and on the 20th he complained of "trouble with his memory" and sleeplessness.

His general condition was fair; he was coöperative but apprehensive, with early loss of memory for recent events. He had a bilateral horizontal nystagmus which appeared instantly on deviation from the midline, and a bilateral external rectus paresis accentuated by fatigue. The ankle jerks were absent. There was a midline superficial atrophy of the tongue. In the next two days vomiting increased up to 8 times a day, and the nystagmus acquired a vertical component. He lost his gold watch one night and reported the loss next morning; by midday he complained that, though he recalled losing his watch, he had forgotten how long ago, and when questioned in the evening he denied the whole incident. At this stage he was treated with vitamin B_1 by injection and recovered.

CASE 3 (severe type).—Admitted on March 25, 1942, with bacillary dysentery; within a week his diarrhœa had ceased, but his appetite did not return. On April 4 he complained of nausea, vomiting, tinnitus, headache, and giddiness while he was up assisting in the ward. On the 9th the tinnitus was more severe, and he vomited 4 times. His pulse-rate was 100 per min. There was a bilateral peripheral loss of visual acuity with nystagmus in all directions appearing instantly on deviation, and slight right-sided external rectus weakness. Power of the limbs was fair, but all deep tendon reflexes were absent.

Next day he complained of paræsthesiæ of both feet, violent giddiness, and that "everything was jumping up and down." Tinnitus was even more severe, and there was associated deafness. Pulse-rate 110 per min. No loss of memory or apprehension. Continuous fine vertical nystagmus on looking straight ahead.

On the 11th headaches and tinnitus were still increasing, and he complained that he "could not think" and that "everything was going round" in his mind. He also had

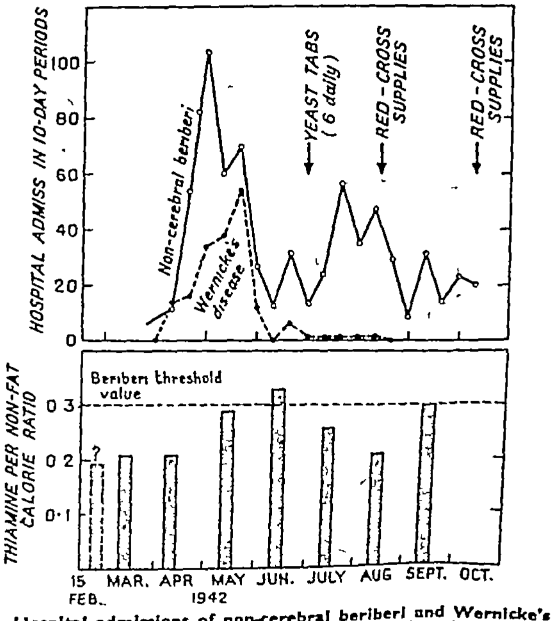

Fig. 3—Hospital admissions of non-cerebral beriberi and Wernicke's encephalopathy, in ten-day periods, compared with thiamine/non-fat-calorie ratio of diet (mg. of thiamine per 1000 n.-f. calories).

difficulty in swallowing, and numbness of all limbs and the face. He lay flat on his back with eyes half closed; he was apathetic, confused, and tearful about his condition. He kept asking for sweet things, which he assured the orderlies were in his trousers pockets, and he was not sure of the time of day though he knew where he was. There was a restless side to side movement of his head. The continuous vertical nystagmus was more severe, and he now showed early papillœdema of both optic disks, with blurring of the nasal edges and engorgement of veins. Pupils still reacted to light and accommodation, but seemed smaller than before. There was a slight left-sided facial weakness, with ptosis of the left eyelid, and tenting of the soft palate to the right. He could only swallow by pushing his larynx up with his hand. Sensation to pinprick was blunted over all limbs and face, and he had much weakness of all limbs.

He received no vitamin treatment, and his condition deteriorated steadily, with an onset of coma on the 13th and death on the 15th. Before death he had complete paralysis of the external recti, with disconjugate wandering, more severe papillœdema, and almost complete flaccid paralysis of all limbs. There was some dyspnœa just before death, with laboured respiratory movement. The cerebrospinal fluid showed no abnormality of cell-count, protein, or glucose content.

Necropsy showed almost healed bacillary dysentery; the brain was fixed in formalin but removed by the Japanese before it had been sectioned.

CASE 4 (terminal type).—Admitted on April 16, 1942, with right-sided pleural effusion, and developed bacillary dysentery next day. He quickly lost weight, and after two weeks' diarrhœa his condition was critical. He vomited twice on May 3, and though he appeared worried he was always rational until the onset of coma an hour before death. On the 5th he had bilateral nystagmus, absence of knee jerks and ankle jerks, and multiple petechial hæmorrhages. He died two days later.

At necropsy there was an empyema of his right pleural cavity, a carcinoma of his right lung, and bacillary type dysentery, with sloughing of most of the sigmoid mucosa. In the brain the mammillary bodies each contained about a dozen punctate hæmorrhages.

ÆTIOLOGY

The only article on Wernicke's encephalopathy available at the time of the outbreak was one by Campbell and Russell (1941), who suggested vitamin B_1 as the main ætiological factor and cited a case of Prof. D. M. Dunlop's, with cardiac and neuritic beriberi and encephalopathy up to the stage of loss of memory, in which treatment with thiamine led to quick and complete recovery.

The following evidence led us to believe that thiamine deficiency was responsible for our cases:

(1) The disease occurred in men in whom a vitamin deficiency was most likely. Three main categories developed the disease—i.e., those with (*a*) a deficient intake due to failure of adaptation; (*b*) a decreased absorption, with increased demand (dysentery); and (*c*) increased utilisation (febrile conditions).

(2) Owing to the diet a general outbreak of deficiency disease was expected, and the deprivation period for beriberi had just then elapsed. Williams and Spies (1938), using a reanalysis of Cowgill's (1934) figures for beriberi-producing and beriberi-preventing diets, found that a diet with a thiamine/non-fat-calorie ratio below 0·3 mg. per 1000 produced beriberi. They also say that 1–2 mg. (300–600 units) daily of vitamin B_1 is necessary for health in the normal subject, and that the incubation period for beriberi on beriberi-producing diets varies from a few weeks to several months. The estimated food value of foodstuffs in Changi for the whole period (March, 1941–August, 1945) has been given in elaborate detail by Burgess (1946). These figures show that the thiamine/non-fat-calorie ratio for the first seven months was below 0·3, and that at no time was the minimum of 1 mg. of thiamine a day attained. They also show that the most acute deprivation was in the first two months of this period. The first case of Wernicke's disease occurred after six weeks of captivity. Fig. 3 shows the thiamine/non-fat-calorie ratio in relation to the incidence of all forms of beriberi.

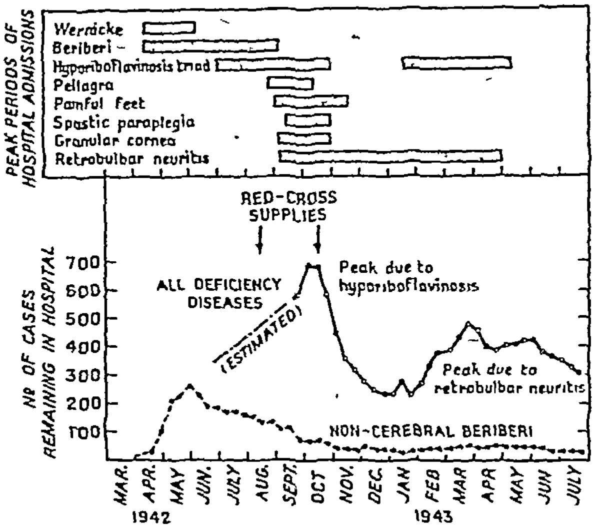

Fig. 4—Peak periods of hospital admissions for principal deficiency diseases.

(3) The time-incidence of the classical forms of beriberi (cardiac, neuritic, and œdematous) coincided with the time-incidence of Wernicke's encephalopathy. Fig. 3 shows that many more cases were notified than the 52 included in this paper. Most of the cases not included were notified from the dysentery wing, where eventually the earliest flicker of nystagmus was notified as a case of Wernicke's disease and treated with vitamin-B_1 preparations. No such early case has been included in this paper unless it showed well-marked nystagmus.

(4) In individual as well as general incidence there was a high correlation between the Wernicke's disease and classical beriberi. The close association (79%) with classical beriberi was not paralleled by a similar association with any other deficiency syndrome, though 17 (33%) of our patients had a smooth tongue.

(5) The effects of thiamine treatment, summarised below, provided the best evidence of all.

TREATMENT

The following preparations containing vitamin B_1 were available:

(1) Preparations for parenteral injection.

(2) Japanese tablets of compressed yeast of unknown potency (dosage recommended, 24 tablets a day).

(3) 'Marmite' in doses from 3 drachms to 3 oz. a day. (Old marmite contains thiamine 1 mg. per oz., nicotinic acid 16·5 mg. per oz., riboflavine 1·5 mg. per oz.)

The amount of thiamine for injection was lamentably small and varied from week to week, this explaining the variations in dosage: 9 mg. was the largest single dose given, and 2 mg. the average. Some patients recovered sufficiently on two doses and continued treatment with one or both of the other two preparations, which were always given concurrently with the injections. This necessity for minimal injections led to a few relapses which, however, cleared on further administration of thiamine.

Treatment in Non-fatal Cases.—Of the 31 non-fatal cases 29 were treated and the patients recovered. One mild case recovered without any specific treatment. Another patient, after receiving 4 mg. of vitamin B_1 by injection, followed by a continuous supply of tablets, retained confabulation, and when last seen seven months later showed no mental improvement, though his physical deterioration had been checked by the injections.

Since both yeast tablets and marmite contain the whole B-complex, and since these were always given concurrently with the injections of vitamin B_1, the case for thiamine rests on the immediate effects produced on injection, which effects, apart from one mild case, were never produced so early with yeast and/or marmite alone. Of the 29 cases which were treated and recovered completely, 25 received intramuscular thiamine and the remainder recovered on marmite or tablets alone. Of the 25 men who received injections, 20 are known to have improved dramatically within forty-eight hours, and 1 improved only slightly. Notes on the immediate effects in the other 4 cases were inadequate. Of these 25 patients, 11 had been receiving marmite or tablets before injection, and their condition had nevertheless deteriorated (presumably because of inadequate absorption, the patients usually having diarrhœa) until intramuscular vitamin B_1 produced a reversal of symptoms, leading to recovery.

An injection of thiamine produced recovery from the clinical picture in the same order as that in which it had appeared. Within twelve to twenty-four hours vomiting would cease, and the appetite would return, followed by a relief from diplopia. At the same time the patient would experience a sense of well-being and become cheerful, coöperative, and voluble. Sleep returned, and objective recovery of the eye abnormalities followed within forty-eight hours. Gross bilateral paresis of the external recti, if present, would improve to reveal the underlying nystagmus. This, in its turn, would improve until it was initiated only on lateral movement beyond 45°; this stage commonly remained for two to four months. Loss of memory for recent events returned within two days to a week, if the patient had developed no further phase of mental change before injection. However, a patient with a well-established confusional state, though he would exhibit all the above-mentioned rapid changes in anorexia, vomiting, eye changes, and emotion, was likely to take up to three months to return to normal mentality, losing successively confabulation, disorientation, and lastly loss of memory for recent events. In these patients there was apt to be a permanent amnesia for the time during which they were most confused. It must be emphasised again, however, that after the initial improvement with vitamin-B_1 injections no more were given owing to the limited supply, and treatment was continued with marmite and tablets. During recovery it was noted that large rice meals would often bring about a temporary postprandial relapse of symptoms.

It can therefore be seen that, up to the stage of early loss of memory, quick recovery could be expected after treatment by injection, and it is reasonable to suppose that thiamine was the responsible factor. All the severer cases except one eventually recovered completely from the other mental changes, but only after prolonged administration of the whole vitamin-B complex, so our evidence that no vitamin other than thiamine is concerned in the profounder mental manifestations cannot be said to be complete.

Treatment in Fatal Cases.—Of the 21 fatal cases, 4 patients died without having had any vitamin treatment, and 6 died after having marmite and/or tablets but no injections of vitamin B_1. In 5 of these death, though hastened, was not due primarily to Wernicke's encephalopathy; the encephalopathic state in 1 case was actually improving before death. Of the 11 patients who *died after receiving injections of vitamin B_1* before death, only 2 died of Wernicke's encephalopathy uncomplicated by any associated acute toxic condition just before death.

Results of treatment were as follows:

Vitamin treatment	*Died*	*Survived but not cured*	*Cured*	*Total*
Untreated	4	..	1	5
Treated: no injection ..	6	..	4	10
Treated with injection ..	11	1	25	37
Total	21	1	30	52

ILLUSTRATIVE CASE-RECORDS

CASE 5.—This patient was examined on April 16, 1942. He was convalescent from five weeks' bacillary dysentery and was then passing two solid motions a day. Since the onset of dysentery he had had no return of appetite, and for the past two weeks had complained of nausea and vomiting, wavering of fields of vision, and insomnia. He had had loss of memory for recent events since the 11th, and complete disorientation since the 13th. For twenty-four hours he had had incontinence, dyspnœa, and aphonia.

On examination he was lying flat on his back, with eyes closed, and difficult to question. He was extremely anxious and tearful, especially when any attempt was made to feed him, and he was completely confused. There was also dyspnœa on attempted phonation or movement, and nystagmus on minimal deviation in all directions, and all limbs were so weak that they were unable to flex against gravity. All deep tendon jerks were absent, except right biceps jerk. Pulse-rate 120, blood-pressure 110/80, with a widespread upper abdominal pulsation and abnormally loud heart sounds.

He was given 6 mg. of vitamin B_1 by injection and next day showed a remarkable change after a full night's sleep. He was smiling, cheerful, and responsive, but thought he was in Cornwall. He had stoppd vomiting and had eaten the whole of the full diet for one meal six hours after the first injection. The vertical component of the nystagmus was now gone, and the horizontal only initiated half-way from the midline. Pulse-rate 110. Marmite and yeast tablets were given from this day onwards.

Convalescence was slow, and 16 mg. of vitamin B_1 was given by injection during the first week. Confabulation on close questioning became evident for three or four days in the first week after treatment but had disappeared by the 25th. There was a gradual return to normal mentality in the following order of recovery: loss of memory for remote events after a week; disorientation, a month; and loss of memory for recent events, two months.

On discharge in November there remained a period of amnesia for the month following his admission to hospital. Nystagmus disappeared after a week's treatment, but reappeared three weeks later for a few days, when it again responded to injection of vitamin B_1. The cardiac condition cleared in a week, but the peripheral nerve lesions took six months before recovery. A month after the first injection of vitamin B_1 he developed a smooth glazed tongue, which became repapillated within four weeks.

CASE 6.—On April 29, 1942, after two weeks' bacillary dysentery, and while he was still passing from eight to ten motions a day with blood and mucus, this patient had a history of twenty days' anorexia, ten days' nausea and vomiting, and progressive loss of power of both legs, seven days' insomnia, two days' diplopia, and a day's dyspnœa.

On examination he was apprehensive about himself and showed early loss of memory—e.g., he could not remember having had marmite, though he had been having it three times a day for the past two days and had vomited each time, the last occasion being an hour before this examination. There was bilateral nystagmus, bilateral foot-drop and wrist-drop, and œdema of ankles. Pulse-rate 110, blood-pressure 95/45.

He was given 4 mg. of vitamin B_1 and yeast tablets. Next day there was no vomiting or diplopia, he said he felt more comfortable, and the nystagmus was only present to the left. Pulse-rate 100, blood-pressure 105/55. On May 2 he was eating large quantities of rice and felt contented and that "life was good." He was sleeping well, his memory showed no abnormality, and there was no nystagmus. Dyspnœa was reduced to half an hour after meals and when using the bedpan.

He made an uninterrupted recovery after receiving 16 mg. of vitamin B_1 during the first two weeks' treatment. The cardiac condition cleared within a week, when severe pain began in his calves and he had a hypertrophic condition of his gums (both of which cleared within ten days). The gross peripheral neuropathy improved only gradually, and on his discharge on July 20 (three months after initial treatment with vitamin B_1) he was still walking with a high-stepping gait.

DISCUSSION

Thiamine deficiency appears to be solely responsible for the cases we have described. Jolliffe et al. (1941) and Wortis et al. (1942) believe that thiamine deficiency cannot be the sole cause of Wernicke's encephalopathy because it is so often associated with other deficiencies, and the more profound mental changes do not respond completely and at once to thiamine. Pure deficiency of any one vitamin is so rare in practice that the first objection is hardly insurmountable, and slowness of response of some part of a syndrome to exhibition of a deficient factor is no bar to its acceptance as causal—e.g., neuritic beriberi, rickets, and the megalocytic anæmias. Black (1941) and Campbell and Biggart (1939) express a doubt about thiamine as an ætiological factor, based on a lack of any account of the association of Wernicke's disease with beriberi—a hiatus only partially bridged by Tanaka's (1934) account of the condition in infants breast-fed by mothers with beriberi. The previous lack of any recorded association may be due to the difficulty of diagnosing the condition, especially in Asiatics, and to the rarity of a deprivation as acute as that seen in Changi.

The series at Changi was seen during the height of the beriberi incidence, and 79% of the cases showed neuritic beriberi. Further, the main waves of other deficiencies of the vitamin-B complex (hyporiboflavinosis, pellagra, retrobulbar neuritis, "painful feet," and spastic paraplegia) developed after the cases of Wernicke's encephalopathy had ceased to occur and when there were only sporadic cases of other forms of beriberi (see fig. 4). If other deficiencies were concerned in the ætiology it is reasonable to suppose some overlap of Wernicke's encephalopathy with the better-known manifestations of these deficiencies, especially as the accepted basic deficiency of vitamin B_1 was present to some extent, as shown by sporadic cases of beriberi which continued to occur throughout the period.

Wernicke's encephalopathy appears to be produced only by an *acute* deficiency of thiamine, whereas the other forms of beriberi may be produced either by such an acute or, more commonly, by a less severe deficiency. This is evident from the fact that, while living on a beriberi-producing diet, only 1 patient in the whole Changi population developed encephalopathy *without* some additional factor, such as diarrhœa, aggravating the existing deficiency. This isolated case was the one which ate well at first but developed cerebral beriberi later without any associated disease.

Jolliffe et al. (1940), discussing encephalopathy due to deficiency of nicotinic acid, suggest that it is due to an acute deprivation of nicotinic acid, and classical pellagra to a more long-standing incomplete deprivation. They quote a parallel in the work of Street and Cowgill (1939) and others in dogs, in which complete and incomplete deficiencies of riboflavine produced distinct syndromes. We suggest a similar mechanism for thiamine. Williams et al. (1939, 1940) gave healthy subjects a diet grossly deficient in thiamine (T./N.F.C. ratio below 0·12) and found no signs of neuritic beriberi, but well-marked signs of what was obviously Wernicke's encephalopathy terminated the experiment. The authors, however, do not seem to have realised that they were dealing with this condition.

In general we agree with the theory of Alexander et al. (1938) that the difference in incidence of Wernicke's disease and neuritic beriberi is due to the fact that smaller amounts of thiamine are necessary for its anti-angiodegenerative than for its antineuritic action, but it is difficult to reconcile this entirely with the occasional onset of cerebral signs before neuritic in our cases and the findings of Williams et al. (1939, 1940).

The very large proportion of dysenteries in our series appears to confirm recent work—e.g., Najjar and Holt (1943), Benesch (1945)—on the importance of a normal intestinal flora as a source of vitamins.

Anorexia and vomiting are an integral part of the syndrome and once established produce a vicious circle which is probably largely responsible for the uniform fatality in untreated cases. This was well shown by Williams et al. (1939, 1940) in their excellent description of cases of induced thiamine deficiency. However, so many cases have been reported—e.g., Gill and McCall (1943), Wagener and Weir (1937), Wernicke (1881)—in which vomiting was part of the associated condition and was, in the first place, the cause rather than the result of Wernicke's encephalopathy, that its occurrence in many cases (Ecker and Woltman 1939, Wagener and Weir 1937, &c.) in which there appears to have been nothing to explain it except the actual lesion seems to have been overlooked.

Nystagmus was a constant finding and was by far the most valuable single sign in diagnosis. It disappeared in the later stages with the onset of ophthalmoplegia, which, together with the ease with which it may be overlooked, as suggested by Campbell and Russell (1941), perhaps explains the fact that many cases have been recorded as having had no nystagmus—e.g., Riggs and Boles (1944).

In the few cases in which the fundi were examined retinal hæmorrhages were noted in 1 case. Retinal hæmorrhages appear to be common only in cerebral beriberi associated with severe vomiting of pregnancy (Black 1941, Sheehan 1939, and many others). We suggest that prolonged vomiting may damage retinal vessels already affected by the angiodegenerative changes; but we can find no description of the histology of the retina in Wernicke's encephalopathy.

Pupil abnormalities were seen in only 2 cases; the proportion has been much higher in other series (Jolliffe et al. 1941, Campbell and Russell 1941).

Alcohol may be completely excluded from the ætiology of our cases. Only 2 patients gave a history of previous alcoholism, and no alcohol was obtainable in Changi.

SUMMARY

There were 52 cases of Wernicke's encephalopathy in a Japanese prisoner-of-war camp; 30 of the patients recovered.

The early diagnosis, based on anorexia, vomiting, nystagmus, and emotional changes, before the onset of gross mental and eye changes, is emphasised.

Early treatment with thiamine injections cured rapidly and completely.

Acute thiamine deficiency appears to be the sole cause of the syndrome.

The name cerebral beriberi is suggested.

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LOW BLOOD-PRESSURE PHASES FOLLOWING HÆMORRHAGE

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ARTERIAL blood-pressure depends on cardiac output and total peripheral resistance (skin, muscle, and splanchnic resistance, and other factors—e.g., viscosity). *Cardiac output depends on two factors at least: the venous filling pressure of the heart and the heart-rate. The venous filling pressure of the heart may be considered as depending on the amount of blood in the veins and the tone or tension of the veins.*

When normal volunteers are bled rapidly up to 1500 c.cm., the following changes have been demonstrated:

(1) The right auricular pressure, reflecting venous filling pressure, falls (McMichael and Sharpey-Schafer 1944, Warren et al. 1945). Restoration of blood-volume after such bleedings is slow in man (Wallace and Sharpey-Schafer 1941, Ebert et al. 1941); and since there is a *steady decrease in right auricular pressure with bleeding, it appears that there is no immediate conspicuous increase in venous tone.*

(2) The fall in right auricular pressure leads usually *to a decrease in cardiac output* (McMichael and Sharpey-Schafer 1944) in spite of some acceleration of the heart. Warren et al. (1945) found variable changes in cardiac output by similar methods, but their results may possibly have been affected by the use of young subjects with particularly labile heart-rates.

(3) The arterial blood-pressure is maintained in each subject up to a point when it falls suddenly and the heart-rate slows. There is now much evidence that this vasovagal reaction can be produced in all subjects, provided the amount bled is sufficiently great. It has been shown that the sudden fall of blood-pressure cannot *be explained by a further fall of cardiac output and is* due to vasodilatation in muscle arterioles (Barcroft et al. 1944), which is mediated through the sympathetic nervous system (Barcroft and Edholm 1945).

Another change in the circulation, the hyperkinetic phase, has been demonstrated after hæmorrhage, the intervening period varying from hours to days, and identical circulatory changes have been found in severe *anæmia* (Sharpey-Schafer 1944); *the right auricular pressure is normal or increased, and the cardiac output is increased.* Since the blood-volume may be reduced to low levels, it is probable that the high filling pressure of the heart is maintained by an increase in venous tone. *The systolic blood-pressure is within normal limits in this phase, but the pulse-pressure is increased.*

OBSERVATIONS IN CASE 3

—	Blood-pressure (mm. Hg)	Pulse-rate (per min.)	Right auricular pressure (cm. saline above sternal angle)	Cardiac output (l./min.)	Hb %
Observation 1 (4th day)	72/40	100	−0	4·0	59
		Transfusion of 650 c.cm. of blood			
	92/72	104	−3·5	5·6	..
Observation 2 (11th day)	86/48	114	−2·5	8·5	40
		Transfusion of 250 c.cm. of blood			
	..	..	0	8 6	..
Observation 3 (23rd day)	72/50	128	+12	7·9	32
		Digoxin 1·5 mg. intravenously			
	90/60	120	+7	8·7	..

Neither the hyperkinetic phase nor a phase with low blood-pressure and increased heart-rate has been observed to follow immediately the loss of a litre or more of blood and reduction of blood-volume in about 150 volunteers; yet patients with low blood-pressure and high normal or increased heart-rates after hæmorrhage are often seen in clinical practice.

We report here some findings in such cases by the methods described in previous papers (McMichael and Sharpey-Schafer 1944, Sharpey-Schafer 1944), cardiac output and right auricular pressure being measured by cardiac catheterisation with the patients supine.

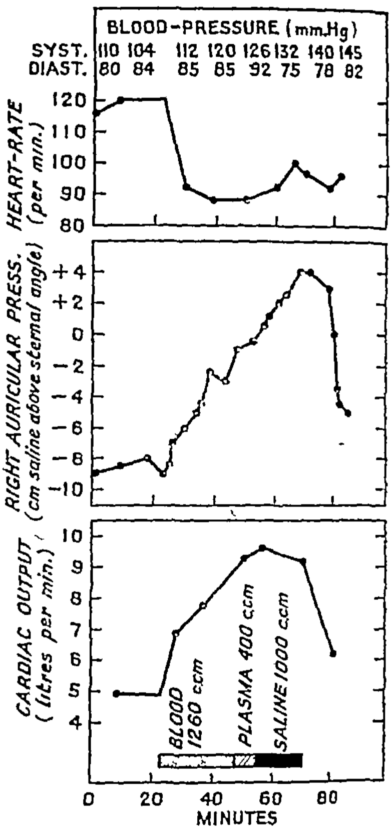

Fig. 1—Case 1: initial Hb (Haden) 67%; final Hb 57%.

RESULTS

The cases observed fall into two groups and may conveniently be labelled "low blood-pressure, phases 2 and 3," phase 1 being the immediate vasovagal reaction with muscle vasodilatation.

Phase 2 is characterised by low right auricular pressure, low cardiac output, and increased heart-rate. The appearance of the patient is that often described by the term "shocked." The skin is pale and cold, sweating and air hunger may be present, and the venous pressure is too low to be assessed by observation of the neck veins. The general appearance of the patient is, however, often not so alarming as that observed in phase 1. Two examples are presented.

CASE 1 (fig. 1).—A man, aged 37, had had a hæmatemesis, amounting to about 2 litres, from a carcinoma of the stomach, starting five and a half hours before the observations were made. He had fainted. An hour and a half before the observations the blood-pressure was 90/60 mm. Hg. The skin was pale, cold, and sweating. Hb 67%. Right auricular pressure was low (5 cm. below the average normal). Cardiac output was low for a heart-rate of 120 per min.

Transfusion of 3000 c.cm. of blood, plasma, and saline raised right auricular pressure and cardiac output, while the blood-pressure rose and the heart-rate slowed. Right auricular pressure was raised considerably above the normal resting level by the transfusion, and the heart-rate began to increase again, possibly a Bainbridge reflex. Cardiac output, which showed an increase to over 9 litres/min. during the early part of transfusion, was maintained at that level in spite of a further rise in right auricular pressure and acceleration of rate, suggesting that the maximal output on Starling's venous filling pressure-cardiac output curve may have been reached. There was no clinical evidence of overloading, such as acute dyspnœa. The maintained high blood-pressure, in spite of a falling output after stopping transfusion, suggests that arterial vasoconstriction may have developed at this stage.

CASE 2 (fig. 2).—A man, aged 52, gave a history suggesting melæna for two months. Three days before the observations he fainted, and later had melæna. A day before the observations his blood-pressure was 100/65 mm. Hg, heart-rate 90, Hb 39%. The extremities were warm, and the venous pressure was not raised. Two and a half hours before the observation he vomited about 500 c.cm. of blood, blood-pressure was 84/44 mm. Hg, the heart-rate increased, and blood-urea was 96 mg. per 100 c.cm. His appearance was that of severe "shock," with cold, pale, and sweating skin and air hunger. Right auricular pressure was low, 5·5 cm. below the average normal figure, and cardiac output was unexpectedly low for a heart-rate of 150 per min. Blood, plasma, and saline amounting to 3380 c.cm. was needed to raise auricular pressure, cardiac output, and blood-pressure. The heart-rate decreased.

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* Working on behalf of the Medical Research Council.

Phase 3 is characterised by high right auricular pres-ure, high cardiac output, and increased heart-rate. hese patients look ill and pale, but the skin is warm. hey may be moderately dyspnœic. Two examples are resented; case 3 illustrates the progression from phase 2 o phase 3.

CASE 3.—A woman, aged 50, had been admitted on three previous occasions for hæmatemesis in fifteen years. She vomited 500 c.cm. of blood on the day of admission, when the blood-urea was 70 mg. per 100 c.cm., and again vomited blood on the fourth day, when observation 1 was made (see table). The circulatory state was that of phase 2: right auricular pressure and cardiac output were low and increased after transfusion, and blood-pressure rose.

On the eleventh day (see table) blood-urea was 55 mg. per 100 c.cm., right auricular pressure slightly above normal, and cardiac output increased, but blood-pressure was still ow. From the eleventh to the twenty-third day blood-ressure remained low, and there were several small æmorrhages.

On the twenty-third day (see table) the patient looked very ill. She was dyspnœic, and the venous pressure in the neck was raised to the level of the angle of the jaw. The blood-urea was 38 mg. per 100 c.cm. Right auricular pressure was considerably increased, but blood-pressure was low in spite of a high cardiac output.

Digitalis was given to lower right auricular pressure before transfusion. The slight rise of cardiac output following digoxin indicates that the status of the heart in this patient was on the overloaded or falling part of Starling's curve (Howarth et al. 1946). Thereafter 500 c.cm. of concentrated corpuscles was successfully given at a very slow rate. Blood-pressure remained low until the fifty-sixth day, when it was 118/80 mm. Hg, and Hb was 75%. The patient eventually made a complete recovery.

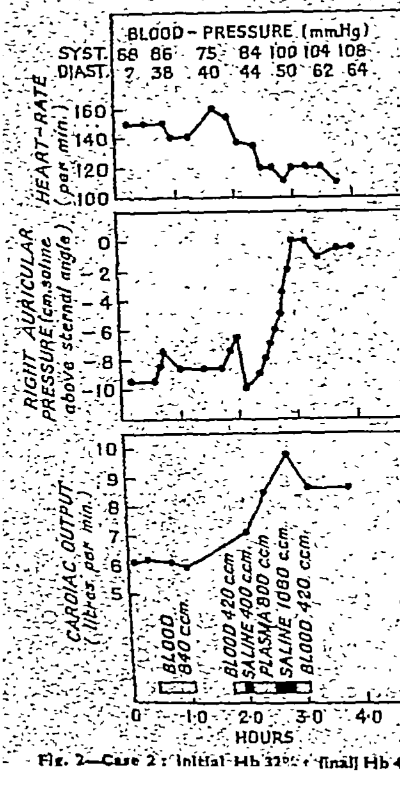

Fig. 2—Case 2: initial Hb 32%; final Hb 44%.

CASE 4 (fig. 3).—A woman, aged 60, had had melæna from a chronic gastric ulcer for two weeks when admitted to hospital. She was then very pale; the jugular venous pressure was raised 5 cm. above the sternal angle. Blood-pressure 112/70 mm. Hg, heart-rate 110 per min., Hb 21%. Over the first four days blood-pressure slowly fell in spite of three slow transfusions totalling 4 litres of blood.

On the fifth day, when the observations were made, the patient was semicomatose. Right auricular pressure was 4·5 cm. above the sternal angle; cardiac output 10 litres/min.; Hb 67%. A rise in right auricular pressure produced a further increase in cardiac output, and a fall in auricular pressure produced by digoxin led to a fall in cardiac output, indicating that the status of the heart in this case was on the normal or the rising part of Starling's curve. There-after blood-pressure remained low; transfusions of about 100 c.cm. of packed cells were given. The patient died, on the thirteenth day after admission, of pulmonary œdema, which was confirmed at necropsy.

DISCUSSION

The normal resting cardiac output in the supine position is about 5 litres per min. when the heart-rate is less than 80 per min. When the heart accelerates, the output increases, provided the venous filling pressure remains constant (McMichael & Sharpey-Schafer 1944). The cardiac outputs of about 5 and 6 litres per min. of the cases in phase 2, though within normal limits, are low in relation to the fast heart-rates. Some degree of vasodilatation also appears to be present in case 2. Cournand et al. (1943) and Warren et al. (1945) found low cardiac outputs in a similar phase after hæmorrhage, but in some cases output was not so low as might have been expected. In phase 3 considerable vasodilatation must be present, since blood-pressure is low in spite of increased cardiac output. The site of peripheral changes has not yet been determined in phases 2 and 3. The normal blood-urea level in phase 3 suggests that renal blood-flow is not seriously impaired in spite of the long-continued low blood-pressure.

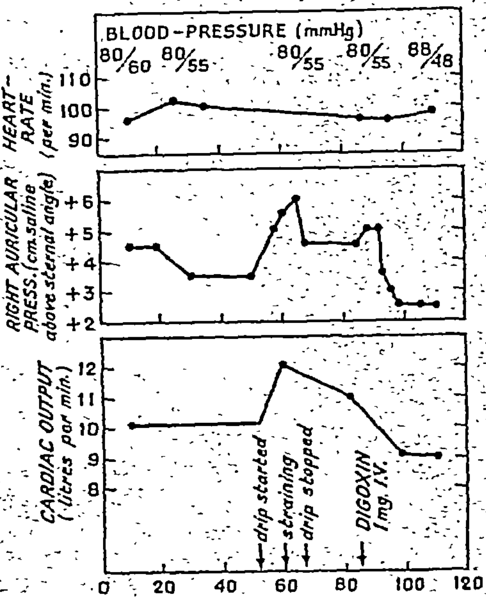

Fig. 3—Case 4: total transfusion was about 100 c.cm.

The clinical differentiation of these two low blood-pressure phases after hæmorrhage is necessary, since the treatment differs. The venous pressure is raised in phase 3, and clinical observation of the neck veins gives all the required information. Further, observation of venous pressure is the best clinical method, in conjunction with blood-pressure measurements, of judging the effects of transfusion. In phase 2 large rapid transfusions are needed; and we suggest that enough blood should be given to raise the venous pressure to the level of the sternal angle. The heart in phase 3 behaves similarly to the heart in severe anæmia, and raising the filling pressure by transfusion may lead to a falling output and pulmonary œdema (Sharpey-Schafer 1945). A rising blood-pressure on transfusion in this phase may indicate not improvement but left heart-failure, with possibly serious consequences (Howarth and Sharpey-Schafer). Small transfusions with concentrated corpuscles given very slowly are needed if transfusions have to be given at all.

SUMMARY

Three low blood-pressure phases after hæmorrhage have been investigated.

Phase 1, as previously described, is the sudden vaso-vagal reaction with bradycardia and muscle vasodilatation which develops suddenly during or after bleeding.

Phase 2 is associated with increased heart-rate, low right auricular pressure, and low cardiac output. Large transfusions raise right auricular pressure, cardiac output, and blood-pressure.

Phase 3 takes time to develop and may persist over long periods. Severe anæmia may be a causal factor in this phase. Right auricular pressure and cardiac output are increased. Large transfusions may be dangerous from overloading.

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AGGLUTINATION OF LEPTOSPIRÆ

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The combination of an antigen with its specific antibody under optimal conditions is a reaction of high velocity (Eisenberg and Volk 1902, Dreyer and Douglas 1910), which begins immediately the reagents are mixed and proceeds to about 90% completion in a few minutes at room temperature or below; and, though the combination of the ever-diminishing free residues may take several hours to reach final equilibrium, the reaction is so far advanced in some five minutes that an estimation of titre, not substantially differing from that obtainable by any macroscopic or microscopic technique, may be made at once, provided that a method is available for observing the very earliest effects of the combination.

In the familiar agglutination techniques for bacteria of various genera, observation is made exclusively of large clumps or aggregates, which take a considerable time to form; and it is this, and only this, that necessitates periods of two, four, or even twenty-four hours of incubation, during which the convection currents in the fluid accelerate the necessary contacts between the sensitised bacteria.

Now it happens that in a living rich culture of leptospira we have a reagent that will give an immediate visible response to its combination with the specific antibody. When one examines by dark-ground illumination a rich normal living culture, the leptospiræ can be seen to make frequent contacts with each other, and sometimes become longitudinally intertwined; but by their vigorous vibratory and undulating motions they move up and down each other and soon separate. Moreover, in actively multiplying cultures there are many long individuals, bent at the centre, which are about to divide; and these, by their lashing movements, tend to tie themselves up into temporary loops or knots which quickly untie themselves again. Occasional loose clumps of from five to ten cells, if watched for 5–10 sec., can be seen rapidly to resolve into free separate individuals. Nothing like a permanent or progressive aggregation takes place.

But in the presence of an adequate concentration of specific agglutinating antibody the picture is strikingly different. In the half-minute or thereabouts required for setting up a dark-ground preparation many of the contacts and intertwinings of two or more leptospiræ have already taken place, and more and more can be seen every moment. Moreover, these associations, when watched for 15–30 sec., show little or no sign of reversibility. Whorls, balls, and leashes of interwoven leptospiræ are progressively formed, and in a few minutes aggregates may be seen of such size as to convince even the unpractised eye that agglutination is taking place. These appearances are shown semi-diagrammatically in the accompanying figure.

In preparations made with decreasing quantities of antibody fewer and fewer aggregates are formed, and more and more cells remain free. Contacts between the free cells lead with decreasing frequency to permanent aggregations, till a dilution is reached that shows no definite effect. The estimation of the end-point of the reaction is no more difficult than it is with other techniques. Of three successive twofold dilutions near the level of full titre the first will generally show an undoubted reaction, the second a trace or doubtful agglutination, and the third no observable effect.

In the agglutination of a leptospira by the antibody of a different but antigenically related type the phenomena show some modification. At all effective dilutions (the highest being generally much lower than the full homologous titre of the serum) the clumping is imperfect, loose and partially reversible aggregates being formed, and a much larger proportion of cells remain free or escape from the clumps. The appearance is like the incomplete reaction in the higher dilutions of a homologous serum, and suggests that the cells are only weakly or partly sensitised. The formation of clumps is slower than with strong specific antibody, but 5–10 min. is enough to allow a reliable reading.

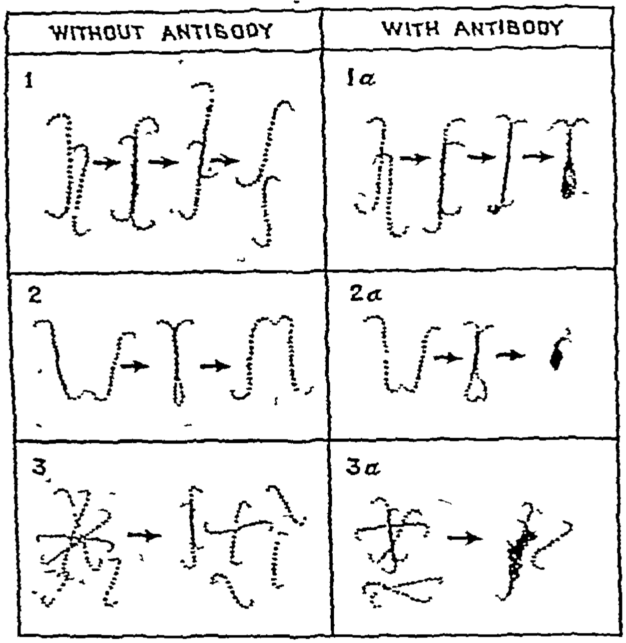
TECHNIQUE

Apparatus.—Nothing special is needed except the thin microscope slides and no. 0 coverslips required for dark-ground microscopy and two wire loops; one of the wire loops should be about 3 mm. in diameter, and the other, made of thinner wire, should be roughly 1 mm. in diameter and should deliver a volume about a tenth of that delivered by the larger loop.

The agglutinable suspension is a living culture of a suitable leptospira 4–7 days old in 12% rabbit-serum water or some other standard fluid culture-medium. It should be rich enough to show at least 10 leptospiræ per $^1/_{12}$ dark-ground oil-immersion field in a wet film made as described below. If it shows more than 20 per field it should be suitably diluted with sterile culture-medium before use. For routine work a culture should be selected in which the organisms are of at least average length. Some strains produce mostly short cells which, for purely physical reasons, show the early phenomena of agglutination less rapidly and obviously than do the longer ones.

Serum.—For routine diagnosis the serum is used (1) undiluted, (2) diluted 1 in 10 with saline solution, and (3) diluted 1 in 100.

Procedure.—With the 3 mm. loop a loopful of the suspension is placed on a slide, and a 1 mm. loopful of the 1 in 10 dilution of serum is added, making a final serum dilution of about 1 in 100. A coverslip is placed over the fluid, and the preparation is examined by dark-ground illumination, first with a low-power lens, to find a suitable luminous object, such as the edge of an air bubble, on which to focus with the $^1/_{12}$ oil-immersion lens. If the result is negative, a similar preparation is made with the undiluted serum, giving a final dilution of about



Movements of living leptospiræ in fluid culture-medium: 1, two leptospiræ entwining and disengaging; 1a, two leptospiræ entwining and becoming agglutinated; 2, a dividing leptospira twining and untwining itself; 2a, a dividing leptospira twining and tying itself into a ball; 3, a fortuitous aggregate of leptospiræ dispersing; 3a, a fortuitous aggregate of leptospiræ becoming agglutinated.

1 in 10; but, if it is positive at 1 in 100, a final dilution of about 1 in 1000 is examined.

Controls.—If on a given day all sera examined give negative results at 1 in 100 and over, the culture used must be proved to be agglutinable by testing it with a suitable dilution of a known positive serum. If all preparations give positive results the culture must be examined for auto-agglutination, though this is very rarely seen.

Microscopical Examination.—This has already been sufficiently described. The reaction may be considered as strongly positive when half or more of the leptospiral objects are aggregates of two or more cells, and half or less are free single leptospiræ. Though in occasional preparations streaming or oscillating movements may give a little trouble, they are very seldom enough to confuse the observer. But if they should do so, and for special examinations when immobility of the fluid is essential, the coverslip may be sealed along its edges with melted soft paraffin.

Titre.—For routine diagnosis agglutination at 1 in 100 or over is to be considered significant. If a serum reacts only at 1 in 10, it is well to put up a 1 in 30 dilution, because a good proportion of normal sera react at 1 in 10, which is therefore insignificant, whereas a titre of 1 in 30 is suggestive and indicates a repetition of the test. In the same way, if 1 in 100 is positive and 1 in 1000 negative, an intermediate test at 1 in 300 is desirable. In both cases the intermediate dilutions will provide a titration precise enough for a subsequent determination of a rise or fall of titre, should this be desired.

DISCUSSION

Disadvantages of Other Methods.—The method previously used in this laboratory (Gardner 1943) involved the use of killed formolised suspensions, the preparation of which, though rather difficult and uncertain, was for a considerable time successful; and a sufficient bulk was made to suffice for two or three years of tests for Weil's disease, done on behalf of the Emergency Public Health Laboratory Service. But, when the time came to replenish the stock, attempt after attempt to make satisfactorily stable formolised suspensions was unsuccessful, and it became necessary, at least temporarily, to use a technique suitable for living cultures.

In the State Serum Institute in Copenhagen, where expert work on leptospirosis is done, investigators have had similar difficulties with formolised serum-water cultures and have abandoned them in favour of living suspensions (Borg Petersen, private communication). On the other hand Hampson (1946) appears to have had some success with formolised serum-water cultures. Owing, therefore, to uncontrolled variable factors the method advocated by me in 1943 can no longer be confidently recommended in routine laboratories. Several workers have reported reliable results with modifications in which the killed leptospiræ are separated by centrifugalisation and resuspended in a fluid free from serum-protein (Pot 1936, Brown 1939). Lederle's suspensions, obtainable in England before the war, were presumably made in this way and seemed to be of good quality. Further work on these lines is desirable.

The method of Schüffner (1934) involves living suspensions, twenty-four hours' incubation at room temperature, and low-power dark-ground observation of clumping. It is therefore slow, and the end-point of the reaction is, in my opinion, difficult to determine, though it (and its modifications) can undoubtedly give reliable results in skilled hands.

Advantages and Disadvantages of Present Method.—In its favour is its unique rapidity and simplicity, and the extremely small quantities of serum and suspension required.

Against it are the disadvantages and potential danger of using live cultures, contrasted with the convenience and safety of killed ones. The danger, however, is slight, since most stock strains are of greatly reduced virulence. Living cultures also suffer from the theoretical risk of changes in agglutinability, though no evidence of their occurrence is available; and the maintenance of cultures rich enough, but not overgrown and degenerating, needs some care. On the other side of the picture the difficulties of making satisfactory and durable killed suspensions are great enough to act as a considerable deterrent to their use.

Experience with Rapid Micromethod.—After it had been ascertained that the full titre of a human specific serum was substantially the same with the new micromethod as with the macroscopic killed-culture technique, the new method was put into routine use, and over 300 specimens of human serum from patients suspected of Weil's disease were tested with it. The ratio of positive to negative results is very similar to that given by over 1000 previous macroscopic tests (Gardner and Wylie 1946), and there is no reason to believe that the method does not give equally reliable results. It has also given satisfaction in various pieces of experimental work.

SUMMARY

A description is given of a very simple and extremely rapid microscopical technique for leptospiral agglutination, in which the earliest and smallest visible effects of the antibody are observed.

The relative advantages and disadvantages of this and other methods are discussed.

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For a full discussion of septicæmia due to proteus from origins other than the urinary tract, reference should be made to McKee (1944).

In very few of the cases in the literature is there mention of the patient's serum showing a rise in agglutinin titre to the specific organism. This evidence substantiates the belief that active infection by that organism is present. As proteus bacilli are often found as contaminants in cultures, it is very important that this evidence should be obtained.

It is suggested that cases should be treated with at least 1,000,000 units of penicillin daily, immediately blood infection is proved.

SUMMARY

The published work on proteus septicæmia is reviewed.

A case is described where the infection was secondary to an osteitis of the foot.

A tumour in the foot was thought to be a primary round-celled sarcoma, and a nodule in the chest wall an infected metastatic deposit. Presumably, this tumour provided a portal of entry for the proteus bacilli.

Improvement followed amputation and penicillin therapy; but, as the heavy dosage could not be maintained, fatal reinfection of the blood took place.

Our thanks are due to Mr. J. S. Batchelor, F.R.C.S., for permission to describe this case and for help with the clinical details; and to Mr. P. R. G. Browne and Mrs. R. Udall, technicians at the Public Health Laboratory.

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Medical Societies

ROYAL SOCIETY OF MEDICINE

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Treatment and Prognosis of Traumatic Paraplegia

was opened by Dr. L. GUTTMANN, who gave an account of 177 patients treated for spinal conditions at the Stoke Mandeville centre. The patients had been received at varying intervals after injury, and the condition of some had been serious, and complicated by contractures, sepsis, or demoralisation.

Food, said Dr. Guttmann, is an important therapeutic weapon. On admission patients were often undernourished, and a high protein intake was essential to replace that lost through pressure sores or urinary infection. Sores are caused both by intrinsic factors, such as the lowering of tissue vitality from peripheral vascular changes, and by extrinsic causes, such as pressure and laceration. The stages are (1) reddening of the skin, disappearing with relief of pressure; (2) persistent reddening and congestion, and induration: (3) excoriation of the skin, sometimes with a blister; (4) damage to the deeper layers, with necrosis and ulcer formation; and (5) penetrating necrosis with involvement of muscle and bone, ending in gangrene. Often the deeper tissues are more widely affected than the superficial.

The most important measure in the prevention of sores is continual change of posture by day and by night, regardless of whether the patient is sleeping. Infection is controlled by the various chemotherapeutic agents, and the necrotic portions are excised. Dressings must be changed once or twice a day. Plastic operations are sometimes successful, but should never be contemplated unless the general condition is satisfactory. Even when the sores are fully healed the patient and his attendants must remain sore-conscious; when he is fit enough to sit he must still change his posture often. Plastic beds are to be deprecated; they may even cause sores.

In the management of the bladder neither urethral catheterisation nor suprapubic cystotomy has proved wholly satisfactory. Every patient admitted with a cystotomy had an infected urine, often with severe ascending infection. Where a cystotomy is undertaken with cord lesions the bladder becomes contracted; the procedure does not prevent action of the detrusor of the bladder. There are certainly indications for cystotomy, such as urethral stricture, but there is no case for its adoption as a routine. Tidal drainage is a valuable auxiliary method, but the tube tends to get blocked. Where suprapubic cystotomy is adopted it should be discontinued as soon as possible and replaced by intermittent washouts through a catheter or an indwelling catheter to reduce infection.

Distension of a painless bladder below the level of the lesion sets up a widespread reflex, with flushing, sweating of the head and neck, nasal occlusion, raised blood-pressure, slow pulse, and respiratory discomfort. This is due to an autonomic disturbance. Recognition of the reflex has proved a valuable guide to distension; and its observation has reduced the call for aspirin to relieve headache.

Mental changes may be due to infection; an early sign is querulous or rude behaviour. Reactive mental disturbance also occurs, from the psychological shock of crippling, and from feelings of hopelessness or economic insecurity, or fear of impotence. It is essential that the patient's coöperation should be secured, and that he should be surrounded by a cheerful and optimistic atmosphere; but at the same time the spoiled-child mentality must be avoided.

The aim is to shorten the period of recumbency and to restore the patient's independence as soon as possible. Contractures and atrophy must be guarded against by keeping the paralysed limbs in the proper position; the worst contractures are seen in patients who have been in plaster beds. Passive movements once or twice a day are begun immediately. The intramedullary injection of 1 c.cm. of 90% alcohol effectively controls flexor spasm for 3–4 weeks.

Mr. E. W. RICHES said that in spinal shock the bladder becomes inert. After 24–36 hours there is overflow from retention, and after an interval which is prolonged by infection or general injuries the bladder eventually reacts automatically to stretch. Initial treatment is all-important. Former teaching that distension of the bladder must, from the start, be prevented is harmful. The bladder can be safely left to distend for 24–36 hours until the patient reaches suitable surgical surroundings. Infection is almost inevitable where intermittent catheterisation is continued for more than two days. Pain from a distended bladder may be relieved by morphine or the expedient of withdrawing the urine through a serum needle introduced suprapubically.

The suprapubic route is to be advocated for general use. Urethral catheterisation and tidal drainage are sometimes successful, but these methods call for constant attention. The system of drainage must allow of no leakage and no infection; it must prevent contraction and dilatation; and it must be understandable to nurses. A method which answers these criteria is that of introducing a small (size 16 French) suprapubic catheter at the top of the bladder. The incision is made at the highest point of bladder dullness, or midway between the symphysis pubis and the umbilicus—whichever is higher—and the catheter is inserted downwards and backwards with a trocar-pointed introducer. The catheter is changed after 10–14 days, and thereafter weekly. A slightly larger catheter (size 20 French) later replaces the smaller one.

Drainage, once established, must be continuous, and tidal drainage is the best method. Some favour sulphonamides in the prevention of infection, but their use cannot be continued long. Infection is more likely with drainage through the urethra because of the inevitable urethritis

PENICILLIN IN PROTEUS SEPTICÆMIA

REPORT OF A CASE

R. IRENE HUTCHINSON
M.B. Birm., D.P.H., D.T.M.
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ORGANISMS of the proteus group are not generally considered to be very pathogenic. In routine examinations of nose and throat swabs or of fæcal specimens, proteus bacilli are often isolated as saprophytes.

During the last two years in a Kent orthopædic unit, 31 out of 67 cases of compound fracture were found to be infected with proteus. In spite of manipulations, bone-grafting, &c., these organisms did not interfere with the healing of the wounds, nor did they cause any general infection.

Occasionally outbreaks of food-poisoning have been reported (Wichels and Barner 1925, Plähn 1937, Cooper et al. 1941) in which these organisms are believed to have been responsible. The urinary tract, however, is a common site of infection by proteus. Kretschmer and Mason (1929), reviewing 305 cases, describe 20 in which proteus was isolated.

Workers in India (Harley et al. 1946) have noted the enhanced pathogenicity in that country of the gram-negative bacilli, especially when occurring in compound fractures. They list the proteus group among these and suggest that tropical conditions may be responsible for the increased virulence of organisms which in England are regarded as mainly saprophytic.

A careful search of the literature has revealed 43 cases of generalised blood-stream infection by proteus.

MacKenzie and Hawthorne (1933) reviewed 18 cases where the urinary tract was the primary source.

McKee (1944) collected 23 cases of septicæmia due to proteus from causes other than infection of the urinary tract. Otitis media was the most common, the course of the disease being short and termination fatal in most cases. He himself reported a case which was cured by sulphonamide therapy.

Poirier (1942) described a case in a North African following a war wound infected with this organism.

With the control of staphylococcal and streptococcal organisms by penicillin, infection by gram-negative bacilli may assume an increasing frequency and importance.

The present case is of interest because (1) septicæmia was secondary to osteomyelitis of the foot, which was the seat of a primary malignant tumour; and (2) the patient was treated with penicillin.

CASE-RECORD

A woman, aged 29, had had six weeks' pain and swelling in the foot, with a vague history of injury. Radiography showed some rarefaction of the bones in the mid-tarsal region, with swelling of overlying soft tissues.

Tuberculosis of the tarsus was diagnosed, but despite immobilisation the patient continued to complain of pain and have pyrexia. Pyogenic osteitis was now diagnosed, and the swelling was incised. A course of sulphadiazine and of penicillin (100,000 units daily) was given with only slight temporary improvement.

On re-exploration ten days later a large abscess cavity was found, lined by gelatinous necrotic faintly smelling granulation tissue with no true pus. The infection extended to the periosteum but did not apparently involve bone or joint. Cultures yielded a pure growth of proteus bacilli. The white-cell count was 10,200 per c.mm.

In spite of sulphadiazine the temperature climbed to 105° F after a week, and the white-cell count to 14,600 (polymorphs 80%). There was now much swelling and free bleeding.

On exploration the infection was found to have spread to the bones and joints of the mid-tarsal region; the cuneiforms, the scaphoid, and the head of the astragalus were friable and necrotic, and many loose fragments were removed. Cultures yielded a heavy growth of proteus bacilli.

Two days later amputation was performed above th ankle-joint, because the temperature had continued to swin violently, and a heavy growth of proteus bacilli had bee isolated from the blood. Patient's serum now agglutinated proteus suspension to a titre of 1 in 40. A further blood culture was positive next day; so intramuscular penicilli (125,000 units three-hourly) was begun.

Two days later the general condition had improved, th wound appeared clean, and the temperature was only 100° F Blood-culture was sterile. Penicillin 4,000,000 units was give in three days but had to be discontinued as it was not availabl

On April 21, six days after amputation, the temperatur rose to 104° F, and the hæmoglobin had fallen to 48%, wit a white-cell count of 11,000 per c.mm. The condition steadil deteriorated, the temperature rising from 102° F to 104° daily.

On April 28 further rigors occurred, and a blood-cultur next day yielded proteus bacilli. The serum now agglutinate a suspension of the organism to 1 in 320; this rising titre fro 1/40 to 1/320 in ten days indicated an active infection wit this bacillus. The serum also agglutinated the standar Oxford proteus XK O to 1/320 and X2 O to 1/40, but did no agglutinate the X19 strain. The patient soon becam comatose, developed deep jaundice, and died on May 1.

Necropsy.—The body was that of a jaundiced woman wit a healthy amputation stump. All viscera jaundiced an showing much post-mortem staining. Numerous petechi hæmorrhages over pericardium. Cardiovascular syste otherwise normal. Spleen enlarged (250 g.) and soft. Som œdema of lungs.

Between 8th and 9th ribs posteriorly was a swelling 3 cm in diameter, containing necrotic yellowish material, whic had begun to erode both ribs. Cultures from this yielde proteus bacilli. Hepatic, alimentary, genito-urinary, an central nervous systems normal.

Histologically the intercostal swelling was an anaplasti round-celled tumour, and sections of the foot showed a round celled sarcoma of similar cytology causing necrosis of bon and some osteitis.

Bacteriology.—The bacillus was gram-negative and motil and grew rapidly on blood-agar and agar plates. It gave th biochemical reactions of *Proteus vulgaris* and, injected intra peritoneally, killed mice in twenty-four hours, the bacil being recovered from the blood. Guineapigs and rabbit were not affected. The bacillus was sensitive to penicilli only in a concentration of 1000 units per c.cm. A suspensio was agglutinated by a polyvalent proteus serum to a titre o 1/1280 (the full titre).

A culture injected near the sacro-iliac joint of a rabbi produced in 14 days an abscess containing $1^1/_2$ oz. of thic creamy pus; the muscles, tendons, and ligaments wer destroyed. The femur was loose in its socket but intac Sterile pieces of bone were inoculated with the bacillus; th marrow was rapidly destroyed, but the bone remaine unharmed. Growth was profuse in media containing 0·01 g of calcium chloride per c.cm. but was inhibited by 0·1 g./c.cm

DISCUSSION

There are three interesting points about this case:

(1) The local rapid and peculiar destruction of bone an tissue *accompanied* by all the signs and symptoms of pyogenic infection.

(2) The persistent blood invasion by an organism whic is not generally considered to be very pathogenic.

(3) The apparent improvement under penicillin therap when the infection was due to a gram-negative bacillus

Local destruction of tissues, similar to that in th patient's foot, was reproduced to some extent in a experimental animal. Here the soft tissues were obviousl destroyed by the proteolytic enzymes of the bacillus and it is reasonable to conclude that the same proces took place in the patient. It seems that the rapid destruction of soft tissues was due to a combination o sarcoma and proteolytic bacilli; but that of the bone wa due to the neoplasm alone, as we were unable to obtain experimentally any true destruction with the proteus organisms.

Blood-culture was positive for proteus on numerous occasions. The fall of temperature, patient's general improvement, and sterility of the blood after heavy doses with penicillin suggest that the penicillin destroyed the organisms in the blood. Their reappearance was probably due to the infected focus in the rib. It is unfortunate that the dosage of penicillin could not be continued, as the infection might then have been completely overcome.

For a full discussion of septicæmia due to proteus from origins other than the urinary tract, reference should be made to McKee (1944).

In very few of the cases in the literature is there mention of the patient's serum showing a rise in agglutinin titre to the specific organism. This evidence substantiates the belief that active infection by that organism is present. As proteus bacilli are often found as contaminants in cultures, it is very important that this evidence should be obtained.

It is suggested that cases should be treated with at least 1,000,000 units of penicillin daily, immediately blood infection is proved.

SUMMARY

The published work on proteus septicæmia is reviewed.

A case is described where the infection was secondary to an osteitis of the foot.

A tumour in the foot was thought to be a primary round-celled sarcoma, and a nodule in the chest wall an infected metastatic deposit. Presumably, this tumour provided a portal of entry for the proteus bacilli.

Improvement followed amputation and penicillin therapy; but, as the heavy dosage could not be maintained, fatal reinfection of the blood took place.

Our thanks are due to Mr. J. S. Batchelor, F.R.C.S., for permission to describe this case and for help with the clinical details; and to Mr. P. R. G. Browne and Mrs. R. Udall, technicians at the Public Health Laboratory.

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Dr. DAVID WHITTERIDGE, from a study of changes in the upper limbs, confirmed Dr. Guttmann's clinical observation of a reflex with distension of the bladder. The change, he said, is much more marked with lesions above the level of the 5th cervical vertebra. The entire vasomotor apparatus below the level of the lesion comes into activity.

Dr. P. H. A. JONASON showed that with cord lesions there is increased sensitivity to change of posture, most pronounced in those with high thoracic or cervical lesions.

Dr. W. RITCHIE RUSSELL supported Dr. Guttmann's contention that patients with paraplegia should be admitted to a spinal centre. In civilian cases, he said, there is a sharp conflict of interests between the wishes of the orthopædist and those of the physician; it is only in special centres that a balance can be reached.

Dr. P. W. NATHAN was opposed to long-continued suprapubic cystotomy. He suggested early closure of the suprapubic wound, urethral catheterisation, manual compression, and the sustained use of sulphadiazine in small doses.

Reviews of Books

A Textbook of Bacteriology and Immunology

J. M. DOUGHERTY, PH.D., professor of bacteriology, Villanova College; A. J. LAMBERT, M.S., instructor in bacteriology, Temple University. London: H. Kimpton. Pp. 360. 22*s.* 6*d.*

CURRICULA in medical and dental schools are already crowded, and a case can be made for teaching students the essentials of some medical subjects before they reach the university. The present book is designed for such premedical study in America, and it describes simply the main pathogenic organisms and the reactions of the body to invasion. There are useful chapters on the history of bacteriology, and on simple methods for culture and staining, and a full description of the technique for quantitative titration. With the rickettsias, the viruses, and the parasitic protozoa also included, the general scope of the book does not differ greatly from standard texts. Only the elementary facts about serology are included, and some groups of organisms are dealt with very briefly, but certain modern techniques, such as fluorescence microscopy, get considerable attention. Each chapter carries a quota of valuable references, but the authors are too ready to accept some of the statements of early workers. The tradition in this country is to teach the premedical student more about the general principles of biology than about more specialised aspects of medical knowledge, but there is no harm, and probably much good, in relating one to the other as opportunity arises. This book, which does explain clearly the main facts about pathogenic organisms, may well serve to keep an early enthusiasm burning.

Criminal Justice and Social Reconstruction

HERMANN MANNHEIM, Dr. Jur., lecturer in criminology in the University of London. London: Kegan Paul, Trench, Trubner. Pp. 290. 15*s.*

WE have travelled far in penal reform since men were hanged for stealing five shillings' worth of goods, and King Edward VII was able to say with some truth, in opening the Central Criminal Court at the Old Bailey in 1907, that "the barbarous penal code which was deemed necessary a hundred years ago has gradually been replaced in the progress towards a higher civilisation by laws breathing a more humane spirit and aiming at a nobler purpose." In the four decades that have elapsed since that speech progress towards an enlightened penal code has been even more rapid, largely owing to the replacement of retribution by reform as the aim of punishment. Notable examples are seen in the field of juvenile delinquency, in the probation system, and in the widening of judicial discretion. But, substantial as these reforms are, they concern only or mainly punishment, while the content of the Criminal Law itself remains unaltered. "To a greater or smaller extent in every country," says Professor Mannheim, "the Criminal Law has in essential parts become out of date. Instead of being a living organism supported by the confidence of all sections of the community and developing according to the practical and ideological needs of the time, it presents itself as a petrified body unable to cope with the ever-changing world and kept alive mainly by tradition, habit, and inertia." His plea is for a complete rethinking of the system of values upon which the criminal code is based. He reviews some of the basic values in present-day society and considers how far their treatment by the Criminal Law is in harmony with the functions these values have to fulfil especially in relation to problems of human life, the protection of sexual and family life, and the protection of property. Much of the book is concerned with the replanning of criminal justice. He describes not only our own criminal code but refers also to the codes of many other countries, of particular interest being the references to the Soviet code.

Euthanasia, he thinks, should—with suitable safeguards—be legalised, and voluntary sterilisation permitted in a narrowly defined category of cases. Birth control should be given its proper place in the educational system and social and health services. Abortion should be legalised on clearly defined therapeutic, eugenic, ethical, socio-economic, or personal grounds, but only under strict control; otherwise it should still remain a criminal offence.

His final plea is for more international coöperation and comparative study in the field of Criminal Law, for more planning in the law itself and its administration, and for the prevention of crime.

Squint and Convergence

N. A. STUTTERHEIM, M.D. Rand, formerly surgeon to the eye clinic, University of Leyden. London: H. K. Lewis. Pp. 95. 15*s.*

"THIS monograph," says the author, "is written to place a new conception of squint before the medical profession." This is an interesting start, and after relating some of his early successes he goes on to state his conception of squint. Concomitant squint, like eye-strain, is, in his opinion, a disorder of the visual brain due to insufficient action of the centre for convergence in the mid-brain: squint and eye-strain are different grades on a scale, and the scale is insufficiency or lack of effective power of involuntary or reflex convergence, which is the basic movement of the di-ophthalmos (or bi-unial eye). The profession must make what they can of this: and certainly any man has a right to his own pet theory of the cause of squint, since all theories remain at present without proof. Dr. Stutterheim's treatment, which lasts about a year, is at first with a battery of prisms to encourage the simultaneous use of the two eyes and later with the synoptophore or some similar apparatus. This treatment differs in no essential from the orthoptic training of squints as now practised almost universally. Dr. Stutterheim admits that "surgical adjustment" is necessary in a number of cases. "These adjustments," he says, "are not squint operations, but intended merely to overcome an anatomical impediment for physiological treatment. . . . No muscles or tendons should be severed by advancement or tenotomy." He then goes on to describe his adjustments, and the reader may well be surprised to learn that he takes a tuck in the external rectus and then divides the lateral expansions and three-quarters of the width of the internal rectus tendon in two different places. If this is not a squint operation, and not a tenotomy, the terms must be differently interpreted in Johannesburg.

The *British Encyclopædia of Medical Practice for 1946* contains its usual critical surveys of advances in medicine by experts in the various subjects, a section on drugs—written this year by Prof. Noah Morris—and a long section of abstracts on subjects ranging from abdominal pain and acute abdominal emergencies at one end of the alphabet, to yellow fever at the other. Lord Horder succeeds the late Sir Humphry Rolleston as chief editor, and notes in his foreword what able collaboration his contributors have given. The surveys, he suggests, "should be read and valued as non-committal epitomes of what authors who are in the van of medical progress are saying." The usual cumulative supplement, in a separate binding, accompanies the "Medical Progress" volume.

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References:—Shortage of space precludes full documentation, which may be obtained on application to Clinical Research, Dept. 3.B.

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LONDON: SATURDAY, JAN. 4, 1947

The Distributors

RATHER shabby, rather tired, and rather poor, we have come to think too meanly of ourselves, our country, and our profession. We award medals to FLEMING and FLOREY, but we forget that medicine stands on the threshold of a golden age. We no longer suppose that foreigners look to Britain; and it seldom occurs to us that they may be interested in the painful rearrangement of our medical services. No doubt the egocentric depression of convalescence is excusable after so long and dangerous a war; but it may be salutary to begin the New Year by looking at ourselves through other people's eyes. Provided we care to do so, said an expert from America recently, we can now raise medicine to a higher level in this country than in any other. Three things, he holds, are needful to fulfil its modern promise. The first is removal of the money barrier between doctor and patient. The second is technical achievement. The third is distribution of the fruits of knowledge wherever they are needed. The National Health Service Act takes away the money barrier; the medical schools of Britain are capable of attaining and maintaining the highest technical standards. Only on the third requirement—the efficient distribution of medicine to the consumer—does this friendly observer fear that we may fail ourselves and the watching world.

The distribution of medicine is primarily the function of the *general practitioner*; and, at its best, general practice in these islands is as good as anywhere, or better. But its best is exceptional; the standard on the whole is none too high; and some aver that the new legislation will make it lower. "Taking a long view," it has been argued,[1] "the general public will get an ever-improving service from the consultant and the hospital but a continuously deteriorating service from the general practitioner." Already for a generation the rôle of the G.P. has been contracting. New methods of investigation have placed the diagnosis of all but the simplest disorders in the hands of the specialist, while many forms of treatment have passed beyond the family doctor. The dearth of private nurses and domestic help drives people to hospital for illnesses formerly treated at home. In establishing clinics to do work which was not being done sufficiently by private doctors, local authorities have reduced the practitioner's interest in maternity, child welfare, school-children, and the treatment of tuberculosis and venereal disease. We must face the fact that the G.P. has lost much of his authority—partly because medicine has become more complex, partly because man-power has been redistributed, and not least because the system by which he earns his living has made him unable to give much attention to unremunerative tasks. At the same time general practice remains as arduous as ever, and it is scarcely surprising that so many of the younger men should now be seeking to specialise in order to avoid it. In the National Health Service the number of specialists is likely to rise, while general practitioners may have to bear an even heavier load, owing to the calls of those who for the first time are offered medical care without payment. The natural impulse to transfer responsibility by sending the patient on to a specialist will always be strong when time and energy are limited, and both personal interest and clinical alertness grow dull as soon as personal responsibility is lost. There would be something radically wrong with any service in which the practitioner ceased to be a real doctor and became a mere channel through which the patient could reach one.

To be a first-class G.P. is harder than to be a competent specialist; and this will remain true when the emphasis of the family doctor's work has shifted, as it must, towards preventive and functional medicine. If men and women of high calibre are to be attracted into general practice, the incomes within their reach there should not be substantially lower than those of their coevals who decide to specialise. At least equally important, however, is the opportunity to do satisfying work, with freedom from irrelevant duties and claims; and it is here that some of us see in the National Health Service a chance of regenerating (rather than degrading) general practice, through the health centres which it will develop. We hope that these will be found to save the practitioner's time, improve his equipment, and above all give him regular association with other doctors. Where the specialist has hitherto had most advantage has been in his attachment to a hospital, which not only is an object of loyalty but also polishes him continually with the friction of professional contacts. The health centre will do a great deal for the general practitioner if it gives him too an object of loyalty and a mental atmosphere in which his work will be known to and appraised by his fellows—practitioners and specialists alike.

The suggestion that health centres would improve the quality of general practice came from the medical profession, not from governments. The difficulties of practising singly have led more and more doctors to form partnerships, and professional bodies such as the B.M.A.'s Medical Planning Commission have commended the health centre as a further evolutionary stage deserving full trial. Hostility to the idea was indeed seldom vocal until the Coalition Government suggested that health-centre practice was incompatible with competition between the participating doctors, who must therefore be paid by "salary or similar alternative." (In the light of subsequent opposition it is strange to recall that the Medical Planning Commission had itself proposed a basic salary.) From then onwards B.M.A. spokesmen began to stress the need for experiment rather than the need for centres, pointing to the danger of committing the profession to a mode of practice which has not yet been tried. As late as May, 1945, the B.M.A. representative body voted for experiment "on the widest possible basis," but since that time the tendency has been more and more to regard the health centre as a Government device for regimenting doctor and patient. Even those who would gladly remove their surgeries from their own homes have acquired an exaggerated idea of the changes intended. As the Coalition white-paper said:

> "There has often been misconception as to the precise implications of Health Centre practice. It has been assumed that a doctor would be on duty only for stated periods and that, outside those periods,

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[1] Matthews, E. R. *Brit. med. J.* 1946, ii, 306.

> his patients would always be attended by some other doctor. That need not be so. Normally, a doctor will attend his own patients as necessary, either at the Centre or at the home. He will have his consulting hours and visit his patients as at present. But the grouping of practices at a Centre will make possible a greater fluidity of arrangements; for example, as arrangements will be made for continuous staffing, a patient will, in emergency, get immediate attention even though his own doctor does not happen to be available. The grouping of practices will, moreover, make it easier for doctors to obtain reasonable holidays and to attend refresher courses. The internal organisation of the Centre so as to facilitate reasonable absences consistent with the doctor's responsibilities will be a matter for the doctors themselves."

The misconceptions have arisen partly because nobody quite knows what a health centre would be like. Some see it as little more than the central surgery which some large medical firms have already found convenient, while others have in mind a temple of Hygeia that would dwarf the Edinburgh Royal Infirmary. In a way this latitude of opinion is healthy, and we hope it will find expression in experiments of widely different kinds. Nevertheless there are certain common purposes that all health centres in the National Health Service would have to fulfil; so, in the hope of clearing our own minds if nobody else's, we have prepared a short series of articles on what seems to us necessary and feasible. Having already published descriptions of some existing Health Centres of Today,[2] we turn this week to the Health Centres of Tomorrow; and though our sketch will be tentative and incomplete it may arouse some of the discussion now badly needed. The time has come for getting down to brass tacks.

Which brings us back to the visitor from America "You English," he said, "are disappointing. You produce remarkable and far-seeing plans, like the report of the Royal Commission on University Education in 1913, the Dawson report of 1920, and the recent reports of your College of Physicians; and then you go on exactly as before. Is that what you are going to do now?" The fateful answer lies in this new year.

Death Under Anæsthesia

DEATHS during surgical operations do not seem to become any less common with advance in anæsthetic technique. To a great extent this can be explained by the increasing boldness of surgery, where the dangers of the operation must be set against the certainty of early death from disease Many tragedies, however, must be attributed to the tendency to serve the convenience of the patient at some added risk. Basal hypnosis has not made anæsthesia safer though it has removed many of its terrors and discomforts. Though an accurate estimate is impracticable, it is likely that *thiopentone, except in expert hands, carries a mortality* far higher than the 1 in 4000 commonly attributed to chloroform. There is much to be said for the establishment of a committee of experienced anæsthetists to investigate (but not to criticise) all deaths under anæsthesia, few of which reach the medical journals, though many get more space than they deserve in the lay press

The dangerous emergencies of anæsthesia are better prevented than treated—prevented, for example, by reasonable caution in the use of preoperative hypnotics and discretion in the use of thiopentone. There is, with the last, a band of laryngeal irritability between very light anæsthesia (which is, after all, the limit of one's aim before proceeding to the main anæsthetic agent), where stimuli may produce stridor but not the dangerous and persistent laryngeal spasm that is the usual cause of death, and relatively deep anæsthesia, where the larynx is insensitive except to severe stimuli. When thiopentone is the main agent, the risk may be reduced by maintaining an anæsthesia sufficiently deep for the degree of surgical stimulation, and by avoiding direct stimuli such as the introduction of an oral airway or a laryngoscope; tracheal intubation is only for the expert. When a potentially dangerous laryngeal spasm does occur, the intravenous injection of as little as 5 mg. of *d*-tubocurarine chloride will relieve the situation; if this is not obtainable the anæsthetist or surgeon should surely perform an emergency tracheotomy. It may be embarrassing to explain an unexpected wound to the patient (and occasionally an unnecessary wound, for who can tell the exact moment when the heart will fail?), but no-one should be allowed to die from laryngeal obstruction—now the commonest fatal accident during anæsthesia—when an effective remedy is always to hand.

Heart-failure under anæsthesia may conveniently be classified as primary and secondary, though some anæsthetists who read his article on another page may think Mr. HAMILTON BAILEY's subtitles—"white" and "blue" asphyxia—inappropriate. Primary cardiac failure applies to ventricular fibrillation and to cardiac asystole excited reflexly. Ventricular fibrillation can be diagnosed only by direct palpation of the heart when cardiac massage is attempted. Where fibrillation is present, the intracardiac injection of 10 ml of 2% procaine may restore a normal rhythm.[1] Failing this, it may still not be too late for the heart to be stimulated into activity by cardiac massage after fibrillation has ceased from coronary anoxæmia. The first need is to restore the cerebral circulation of oxygenated blood, and, as BAILEY rightly insists, the need is urgent. Recovery of consciousness has taken place after heart-failure lasting more than 10 minutes but it would be wiser to regard 4 minutes as the outside limit of time available, and this is considerably reduced where heart-failure is due to anoxæmia. The first stimulus to be applied, without delay, is auricular puncture through the third right intercostal space close to the border of the sternum, the needle being directed backwards and medially (the auricle is more sensitive than the ventricle to mechanical stimuli[2]). If this fails, subdiaphragmatic cardiac massage should follow at once, though it is questionable whether "quick and forcible" movements may not sometimes do damage. As OGILVIE[3] says, direct cardiac massage with the right hand inserted through an incision in the diaphragm can maintain an artificial circulation which, with artificial respiration, will suffice to oxygenate the vital centres. It is doubtful whether this can be equally effective through the button-hole incision of Nicholson. In one of OGILVIE's cases there was no spontaneous heart-beat for 75 minutes, though the patient remained a good colour and was breathing, groaning, and moving spontaneously. In another case an artificial circulation of oxygenated blood (judged by skin colour) was maintained for over 3 hours until it was decided that the medullary centres had been damaged beyond recovery and resuscitation was abandoned. It has been suggested that early injection of adrenaline may convert cardiac asystole into ventricular fibrillation,[4] but adrenaline should certainly be tried when cardiac massage has failed to produce a response. Few anæsthetists will agree that artificial respiration is less important than cardiac massage, especially in a case where heart-failure is secondary to asphyxia. Surely the first step in resuscitation must be the establishment of a clear airway, including bronchial suction where this is appropriate, though preparation for cardiac massage need not wait on this. Cardiac stimulation must otherwise be a waste of time.

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[2] *Lancet*, 1946, i, 302, 471, 515, 550, 586, 665.

[1] Burstein, C. L., Marangoni, B. A., De Graff, A. C., Rovenstine, E. A. *Anesthesiology*, 1940, 1, 167.

[2] Hyman, A. S. *Arch. intern. Med.* 1930, 46, 553

[3] Ogilvie, W. H. Recent Advances in Surgery, London, 1929, p. 147.

With sufficient foresight in the early institution of intravenous fluid therapy death during operation from shock and hæmorrhage can nearly always be prevented. The treatment of sudden hæmorrhage should be the copious and rapid transfusion of blood. Where a cannula is already in a vein, the pressure from a sterile Higginson's syringe, which should be included in every transfusion outfit, will force blood through in spite of venespasm. If the apparatus is to hand, sternal puncture is more rapid and more certain. When the heart fails in spite of intravenous fluids there seems little more that can be done; though one patient, apparently dead at the end of a severe operation, was restored to normal within 10 minutes by the rapid injection, under pressure, of 500 ml. of plasma and 750 ml. of blood Though heart-failure in the operating-theatre will not be encountered often, so urgent is the need for effective treatment that, besides an *anæsthetic emergency outfit* such as BAILEY illustrates and tracheotomy instruments, blood-transfusion apparatus and a supply of plasma must be kept ready for immediate use.

During an operation the anæsthetist's responsibility is seldom lighter than the surgeon's; with minor operations it is heavier. Is the anæsthetist always equipped to carry such a responsibility? Operative mortality will be reduced to a minimum only when every anæsthetic is given or supervised by an experienced administrator who is also a good physician well versed in the practice of intravenous fluid therapy. The administrator will then be in charge of the patient, from his angle, from the time an anæsthetic is decided on until the end of the immediate post-operative period. With the recognition that such a wide range of duties falls within the province of the anæsthetist who has made himself competent to undertake them there will be no lack of recruits of suitable quality.

Reorganisation in Cancer Research

IN the coming year the British Empire Cancer Campaign[1] is to widen its activities and provide facilities in fields of research previously somewhat neglected in this country. All research-workers will welcome the Campaign's new official organ, the quarterly *British Journal of Cancer*, the first number of which will appear in the spring. Articles on cancer investigations have hitherto appeared in a multitude of journals, every issue of which must be consulted lest some new contribution to the subject be missed. The gathering together of sources of information will save time and effort. The editors of the more general journals will no doubt be grateful, even when paper becomes plentiful, to be relieved of the hoped-for *embarras de richesses* from the field of cancer research.

Another innovation now revealed in the Campaign's annual report is the enlargement of the scientific advisory committee by the inclusion of separate biochemical, biological, and physical subcommittees, each made up of experts in their own branches but subject to coördination from the parent committee. Of these, the one intending the greatest expansion of opportunity is the biological. The grand council has been asked by the scientific advisory committee to provide £25,000 for investigations on the relation of viruses to cancer. It is no longer denied that some viruses cause cell proliferation and even malignant proliferation, yet the discoverer of the virus origin of tumours, Dr. PEYTON ROUS, questions whether this cause is universal. In his lectures in July at the Royal College of Surgeons[2] and at the Microbiological Society meeting in Leeds, and in his Ludwig Kast lecture to the New York Academy of Medicine reported in this issue, he refers to his own recent experimental work as speaking against the assumption that most tumours are caused by agents of this sort. It cannot be denied that this is one of the most important of the theoretical—and ultimately of the practical—aspects of cancer research. Acceptance or rejection of the virus theory must be aimed at: "our senses must inform us, not our reason—ocular inspection, not any process of the mind."[3] Here we cannot do better than be guided by one of the greatest of explorers, who argued that "no kind of science can possibly flow, save from some pre-existing knowledge of more obvious things."[4] Of virus-induced tumours there is pre-existing knowledge, and we would be well advised to follow the example of others in proceeding from the known to the unknown. Extension of knowledge of those minute particles which are able to cause cell proliferations of varying degree appears to wait upon more subtle and refined methods of investigation. These are too expensive for any one institution to supply. The British Empire Cancer Campaign will be doing a great service if ultracentrifuges, an electron microscope, and other costly pieces of apparatus are supplied for the use of the whole country. In providing for the production of synthetic chemical carcinogens the Campaign will be performing a similar service. Hitherto research-workers have been dependent on commercial firms which have since ceased to supply these substances, and also, to an extent which is rarely appreciated, on the generosity of Prof. E. L. KENNAWAY, F.R.S., and Prof. J. W. COOK, F.R.S. These chemicals are indispensable to cancer research.

Another notable announcement in this report is the assurance that the Government research committee on the medical and biological applications of nuclear physics will include consideration of all the objects that the Campaign would otherwise have undertaken in respect of recent discoveries. This fortunate conjunction of biologists and physicists leads to the hope that one fascinating and unexplored field of investigation may sometime be tackled—that is, the quantitative and qualitative effects on and the time relationships in the response of vascular endothelium and other components to various wavelengths of all the rays and to all the particles we know. The physicists can direct and assess the stimuli and the biologists have an exquisite technique for observation—the Sandison-Clark transparent chamber. The importance of such observations to radiotherapy and the study of injury can no longer be contested; they might provide a delicate biological measure of various rays with one yardstick

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[4] Organe, G. *Proc. R. Soc. Med.* 1942, 35, 439.

[1] British Empire Cancer Campaign. Twenty-third annual report. 1946.

[2] *Lancet*, 1946, ii, 98.

[3] The Works of W. Harvey, M.D. Sydenham Society, p. 132.

[4] *Ibid*, p. 133.

A central consultant panel in morbid histology, with a service available throughout the country, has been formed by the Campaign, together with the Pathological Society of Great Britain and Ireland and the National Radium Commission, to assist in the diagnosis of obscure pathological material. Other new departures include a scholarships and fellowships committee and a Hospital Physicists Association. The first may enable the Campaign to recruit new blood, the second will serve as a kind of library of physical data which is ordinarily too extensive for full reproduction in journals. Two catalogues (A, December, 1944, and B, June, 1946) have already appeared These promise to have a world-wide circulation.

Annotations

PLACE FOR THE CHRONIC PATIENT

THE plight of the chronic sick and of the old and infirm is rightly causing more and more anxiety. In the United States, as here, these patients are often segregated in isolated county hospitals, almshouses, poor-farms, homes for the aged, and mental hospitals, where, according to Dr. E. M. Bluestone,[1] they "vegetate their lives away under a sentence of life imprisonment or death." Yet they cannot be allowed to occupy indefinitely beds intended for acute cases. Dr. Bluestone suggests that hospital beds should be reserved for those who need intensive scientific care, without regard to the probable length of their illness. Poverty, or the convenience of the doctor or relatives, is an insufficient reason for admitting patients to such beds: those who do not require the special equipment of a hospital must be cared for in their own homes, if necessary being subsidised financially. "Elevation of the economic status of the patient," he says, "or, in lieu of this, better government support in all of its levels, more group-insurance, and more philanthropy if necessary, will do much to free hospital beds and promote a home-care program." If the disease is stationary, not capable of further relief by hospital treatment, and if the patient cannot afford to live at home, he must be supported in an appropriate institution, but not in the general hospital. Convalescents, too, must be transferred from the hospital to their own homes or convalescent centres.

This means that long-term patients who can benefit by treatment will be retained in the hospital; as Dr. Bluestone points out, "the doctor, working with scientific problems in the hospital, is entitled to a well balanced diet of clinical material." Moreover if both the long-term and the short-term patient are under the same roof, the doctor is less likely to lavish most of his interest on the short-term case: "never place an obstacle between patient and physician, and remember that distance is an obstacle." In England, not only distance but the whole pattern of our health services have, until now, prevented the doctor in the acute hospital from sharing in the care of the chronic sick, many of whom could benefit by the "intensive scientific care" of which Dr. Bluestone speaks; and here, too, opinion is beginning to favour the inclusion of chronic wards in our general hospitals. Moreover, as he remarks, chronic disease and old age are not recognisable entities: "there is no such thing as a specialist in chronic disease or a specialist in all the diseases of old age. Every medical specialty is represented in geriatrics." The aged sick, he says, belong in a general hospital more often than we are willing to concede.

CYTOCHROME C IN TISSUE ANOXIA

IT is now known that the greater part of the respiration of mammalian tissues takes place through the cytochrome system. The hydrogen transported from the foodstuffs or metabolites brings about the reduction of cytochrome, and this is in turn reoxidised by the specific cytochrome oxidase which can react directly with oxygen from the atmosphere. There is evidence that the tissues sometimes contain more cytochrome oxidase than there is cytochrome for it to act on; so added cytochrome might increase the respiration of these tissues. Proger, Dekaneas, and their co-workers[1] have therefore studied the effect of parenteral injections of cytochrome C on various conditions associated with tissue anoxia. They found that cytochrome C would increase the oxygen consumption of well-oxygenated tissues above the normal level, and, in cases where the oxygen tension in the blood was low, would prevent a falling off in tissue respiration. Some of the secondary deleterious effects of low oxygen tension could also be avoided by the administration of cytochrome.

Cytochrome C, as prepared from ox heart by the method of Keilin and Hartree,[2] is a conjugated protein containing an iron-porphyrin group; but in spite of its protein nature it appears to be non-antigenic and non-toxic, doses of 50–350 mg. of the purified substance, passed through a Seitz filter, having been given intravenously to dogs and man without any apparent harmful effect.[3] After the injection the blood-serum assumes a pinkish colour, thus providing a useful indication of adequate dosage. The excess cytochrome C gradually disappears from the blood-stream but cannot be recovered in the urine; it is presumably broken down in the body but the products have not yet been detected. The effect of inducing anoxia in a subject thus saturated with cytochrome C is to cause a sharp decline in the amount of circulating cytochrome and a simultaneous increase in the cytochrome content of the tissues. Discontinuance of the anoxia leads to a reversal of this relationship, cytochrome now leaving the tissues and passing into the blood-stream.

These observations clearly provided a basis for the clinical trial of cytochrome injections, and beneficial results have been claimed. The heart, studied by the electrocardiograph, showed the effects of moderately severe anoxia when the oxygen in the inspired air was reduced to 10%; but these effects, and the subjects' distress, were regularly averted[1] by the previous intravenous injection of cytochrome C. Patients with angina pectoris benefited moderately from the injections, but there was no improvement in acute myocardial infarction, presumably because occlusion of the coronary vessels prevented the cytochrome reaching the affected region. The effects of anoxia on the brain, manifested by electro-encephalographic changes, impairment of visual discrimination, and reduced performance of decoding tests, were definitely lessened by cytochrome. Tissue anoxia is thought to be a major factor in hæmorrhagic shock, and dogs injected with cytochrome C a few hours after severe hæmorrhage survived, whereas without this additional respiratory carrier other dogs almost invariably died from similar bleeding. On the other hand, traumatic shock produced in rabbits by the application of a tourniquet was not favourably affected.[1]

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[1] *Bull. Amer. Coll. Surg.* 1946, **31**, 104.

[1] Proger, S., Dekaneas, D. *Science*, 1946, **104**, 389; Proger, S., Aisner, M., Squires, R. B. *J. clin Invest.* 1942, **21**, 630; Proger, S., Dekaneas, D., Schmidt, G. *J. biol Chem* 1945, **160**, 233.

[2] Keilin, D., Hartree, E. F. *Proc Roy Soc* B, 1937, **122**, 298; *Biochem J.* 1945, **39**, 289.

[3] Proger, S., Dekaneas, D., Schmidt, G. *J. clin Invest.* 1944, **23**, 249, 1945, **24**, 864.

These findings are important, for tissue anoxia is suspected to play a part in many varied conditions. The American workers have already produced evidence which justifies a more extensive investigation, and this they intend to carry out. It is a pity that cytochrome C is not readily obtainable (from one to three ox hearts would be needed for the preparation of a single dose of purified material); but if the more detailed results justify it steps will no doubt be taken to overcome this difficulty.

PENICILLIN CHEWING-GUM

THE advent of penicillin brought many suggestions as to its incorporation in everyday materials such as tooth-pastes and cosmetics. Its use in chewing-gum seems likely to be of practical value since MacGregor and Long[1] have shown that local application is effective in the control of acute ulcerative gingivo-stomatitis, sepsis accompanying oral and dental operations, and some types of tonsillitis, when incorporated in a slowly dissolving base such as gelatin. Work has been done in the United States with penicillin in a chewing-gum base and the results are said to have been good. Now McIntosh and Perryman,[2] of Tunbridge Wells, have described a method of incorporating the penicillin in ordinary commercial chewing-gum. Using a pellet of gum containing 10,000 units of the calcium salt they have shown that a considerable amount of penicillin still remains in the gum even after it has been chewed for seven hours. There was a difference between the findings with sodium and with calcium penicillin, probably because of the lower solubility of the calcium salt. After four hours' chewing the residual penicillin in the gum was only half as active in the gum containing sodium penicillin as in that containing the calcium salt, each pellet having started with 10,000 units. After seven hours no penicillin could be detected in the gum containing the sodium salt, whereas the calcium gum was still active. When a control tablet of calcium penicillin not contained in gum was dissolved in the mouth the saliva showed no penicillin activity after two hours; so absorption and re-excretion can be ruled out as an explanation of the continued activity of the gum preparations. For comparative work it would perhaps have been preferable to have estimated the amount of penicillin in the saliva at intervals while the gum was being chewed, since this would have indicated the amount of penicillin being liberated rather than the amount still retained in the gum.

As could be expected, successful results have been reported in the treatment of Vincent's infection. The chewing-gum has also been used instead of pastilles or lozenges in streptococcal tonsillitis, subacute laryngitis, pharyngitis, and post-tonsillectomy cases. In pharyngitis this vehicle is not likely to be of great value, since the salivary flow will not carry effective amounts of the drug to the pharynx.[3] If it can be shown that with chewing-gum the backward flow of saliva to the tonsillar area and the rate of liberation of penicillin are satisfactory this should prove a valuable method of therapy, especially in children. It might also be worth while to investigate the use of chewing-gum containing 60,000 to 90,000 units of sodium penicillin as a method of administering the drug by mouth, for Dolkart and others[4] have shown that tablets containing this amount, placed under the tongue, will produce effective blood-levels for 2–5 hours.

WHY NO NURSES ?

A THOROUGH, knowledgeable, and epigrammatic account of the reasons for our lack of nurses makes absorbing reading, even though the reasons themselves are not new. Mr. James Barclay[1] has studied the many reports on this theme, that of THE LANCET Commission among them, and concludes that, since we now know the reasons why we are short of nurses, it remains to act. Nevertheless he believes that action could be hastened by a new committee of inquiry, to be appointed by the Ministry of Health, to examine proposals already made for the increase of nursing recruitment and to encourage progressive improvement in conditions. This committee should continue until terminated by the Minister of Health, but after that a nucleus with its secretary would remain to review conditions periodically and make five-yearly reports to the Minister. Employing authorities, too, should reconsider nursing and domestic conditions in their hospitals every five years, with a view to improving them. A body should be set up by the Ministry to study domestic service in institutions, to find ways of reducing crude domestic work, and to introduce a training structure into this part of hospital work. The Minister should ask all nursing employment authorities to concentrate on improving conditions; and those authorities which have already made improvements should ascertain that these have not been allowed to lapse—especially those dealing with lectures and duty-times. Mr. Barclay suggests that money allowances to student nurses should be reviewed in relation to their special expenses in textbooks and examination fees. The student's contract should be renewable year by year, and there should be no penalties for breach of contract—a condition now fulfilled in many hospitals. Hostels should replace nurses' homes wherever possible, and should not be under the matron but under a warden responsible to the employing authority. Methods of looking after the sick nurse should be revised so as to remove undue supervision and control by her hospital seniors. He recommends the formation of nurses' councils which can report not through the matron or other officer but directly to the employing authority.

With these and many others of his suggestions we can heartily agree, for (as he is good enough to point out) most of them appeared in THE LANCET Commission's report, though some are still waiting to be put into action. But training and experience in nursing skills and techniques—that delicate and elusive art of making the patient comfortable—are scarcely mentioned among the attractions to be offered, though it is precisely for these things that the good candidate takes up nursing. No amount of good living conditions or good catering can make up to her for inadequate nursing training; but since the curriculum needs revising and the ward sisters are too pressed to teach training cannot be truly adequate.

Mr. Barclay also shares our belief that a well-conducted experimental school of nursing could do much to revive and raise standards. Himself the officer of a public-health authority, he would like to see this experiment made in a municipal hospital by an authority controlling a large group of institutions. It could be done, he thinks, with chosen staff released for the purpose from the other hospitals under the authority, and would be devised to test how far conditions of service are the

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1. MacGregor, A. B., Long, D. A. *Brit. dent. J.* 1945, 78, 33.
2. McIntosh, C. F., Perryman, P. W. *Pharm. J.* 1946, 157, 354.
3. MacGregor, A. B., Long, D. A. *Lancet*, 1945, ii, 299.
4. Dolkart, R. E., Halpern, B., Larkin, M. *Quart. Bull. Nthwest. Univ.* 1946, 20, 413.

1. Why No Nurses? By James Barclay. With a foreword by Dr. D. Stark Murray. London: Faber & Faber. Pp. 176. 6s.

dominating factor in recruitment, and to establish a new tradition in hospital life and management. This is not quite our conception. Instead of acquiring a picked staff, who might be expected to do well anywhere, we should like an experimental school to take a cross-section of current types of nursing candidates, and establish by research how good a nurse can be made not only of the best but of the average type of girl now entering training; for that is the urgent problem of the small training schools at present.

The parts of Mr. Barclay's book which come freshly to the student of nursing problems are those dealing with publicity. He is on sure ground when he suggests that nursing has never been well advertised, judged by advertiser's standards; and he shows a sensible appreciation of what will appeal to the young girl. "... the case for entry to the nursing profession," he says, "is being made to the same audience to whom commercial publicity is addressed." The vocational appeal, as hitherto understood, has failed, and should rather be made he thinks on the basis of coöperation in a worthwhile national task. Statistics of promotion would *show that there is a real chance of rapid advance*; statistics might also get rid of the idea that nursing interferes with marriage. Much could be done by personal interviews, in schools or better in hospitals, between nurses and possible candidates.

He may be right in his belief that better publicity would bring a better yield of recruits, but he himself asserts that "increasing publicity and decreasing recruitment have gone together." This statement is not, in fact, quite accurate: recruitment has steadily risen, but increasing publicity and increasing wastage have gone together. Mr. Barclay's clear mind seems here to miss its focus. He is, of course, right in saying that it is the young girl, with her notions (however foolish), who must be won as a recruit; and this girl has a clear opinion of the demands which her job can fairly make on her life. Whether her standards agree with nursing traditions or not we must respect them as the genuine standards of her generation and not play the part of a huckster by beating them down. That has been tried, and has robbed nursing of its appeal for the more enterprising leavers of public and secondary schools. If we want the standards, apart from the numbers, of recruits to rise we must make nursing acceptable not only to the untried girl but to her sisters, one, two, or three years older, who have already crossed the hospital threshold. This, in the short as well as the long run, will prove the best publicity for nursing.

TUBERCULOUS CATTLE

THE attested-herds scheme, begun in 1935, can be regarded as the first real attempt to reduce the incidence of bovine tuberculosis in this country; and it was certainly the first to be based on systematic use of the tuberculin test. The progress of the scheme and the various methods that may be used to get rid of tuberculosis in cattle were recently described by Francis,[1] and elsewhere in this issue a veterinary correspondent summarises some interesting new developments in tuberculin testing.

From the standpoint both of public health and of human nutrition the eradication of bovine tuberculosis is probably the most important measure which can be taken by the milk-producer. It is therefore surprising that under the Milk Industry Act, 1939, a farmer who raises calves instead of selling milk receives no reward for establishing a tubercle-free herd, and the farmer who sells milk receives no reward unless his buildings are of such a standard that they can be licensed for the production of tuberculin-tested milk, for which he receives 2½d. per gallon more than for milk of the "accredited" standard of cleanliness. Since the removal of the old capitation bonus there has been little incentive, where milk is not sold, to maintain or create tubercle-free herds, and many dairy herds which a few years ago could readily have been freed from tuberculosis are now heavily infected because of the purchase of heifers from infected sources. Of the farmers who sell milk, many are now in a stronger financial position than before the war, and would face the expense of eradication if they could get the tuberculin-tested milk bonus; but they may be unable to obtain the necessary licence without expensive alterations to buildings, which the landlord often cannot afford and for which in any event labour and material are lacking. The insistence by local medical authorities on certain building standards for cow-houses, though in itself desirable, is thus retarding the establishment of tubercle-free herds.

The position could perhaps be remedied by reintroducing the capitation payment for all tubercle-free herds, so as to compensate for the expense of eradication in herds whose milk is not sold. With proper grading there could be an additional benefit for tuberculin-tested milk, but instead of the licence depending partly on a somewhat arbitrary building standard it might depend on the quality of the milk as determined by laboratory tests over, say, a six-month period. In some parts of America milk-grading is based entirely on laboratory tests, irrespective of conditions on the farm.[2] While it may seem retrograde to abandon definite building standards, the fact remains that if a farmer has the ability and enthusiasm to produce clean milk under difficult conditions, and in addition desires to eradicate tuberculosis, he ought not to be prevented by factors outside his control. The veterinary profession and the farming community seem ready to begin a campaign against tuberculosis, and it may be wise to make some temporary sacrifice in building standards so as to let them go ahead.

PROFIT FROM WAR

ALL too often official reports convey a sense of cold aloofness, as if the authors were above all human folly. Not so the report for 1945 by the Chief Inspector of Factories.[1] Here is a document on a subject without intrinsic appeal to many readers, which nevertheless grips the attention by its warm, sometimes anecdotal, style. Signed by Mr. H. E. Chasteney, who succeeded Sir Wilfrid Garrett as chief inspector at the end of 1945, it is largely concerned with the balance of profit and loss from the war years. On the debit side are serious deterioration in standards of cleanliness and upkeep, and a swollen legacy of antiquated buildings. But these setbacks are offset by notable achievements: the number of power-machine accidents has continued to fall; factories constructed during the war have set a new high standard; employers have become more attentive to the physical and mental welfare of their workers; canteens and other amenities are increasingly commonplace; and, through the agency of works' committees, there is growing understanding between employer and employed.

Many concerns, particularly those with small "slum" or "backyard" factories, though within the law, are still very badly housed; eventually perhaps these may get the chance of renting space in modern "flatted" factories. Some of the new buildings constructed during the war have revealed how good conditions can be; to get the best labour employers will have to keep a watchful eye on the conditions they offer. But good wages are still a powerful inducement: "As an ex-company-sergeant-major working in an insalubrious back-street joinery expressed it, 'Well, it's not exactly smashing, but it's Friday that counts.'"

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[1] Francis, J. *J. R. sanit. Inst.* 1946, 66, 355.

[2] Agriculture Overseas. Report no. 1 Milk in North America H.M. Stationery Office. 1946. See *Lancet*, 1946, ii, 127.

[1] Annual Report of the Chief Inspector of Factories for the Year 1945. Cmd. 6992. H.M. Stationery Office. Pp. 104. 2s.

MECHANISM OF HEADACHE IN FEVER

Recent work has shown that some headaches are due to dilatation of intra- and extra-cranial arteries and increased tension on the vessel wall and perivascular structures; this mechanism has been demonstrated by Pickering[1] for the headache caused by intravenous injection of histamine, for migraine, and for cases of hypertension by Sutherland and Wolff,[2] who also demonstrated dilatation of intracranial arteries in animals after induction of fever by protein shock.

Bodley Scott and Warin[3] have studied the mechanism of headache in 100 patients in M.E.F. who were suffering from acute fevers of various types without evidence of meningeal involvement. The headaches occurred in three constant situations, much the commonest being frontal and temporal; these were usually bilateral but they were predominantly unilateral in 8 patients, including a sufferer from migraine who could not distinguish his febrile headache from his accustomed hemicrania. The other two situations were at the back of the head above the occipital protuberance and in the upper cervical and lower occipital region, but pain in these areas was always accompanied by fronto-temporal headache. The character of the headache was throbbing, increasing to a constant severe pain exacerbated by each heart-beat and waning as the fever subsided; it was accompanied by peripheral vasodilatation, prominent and vigorous pulsation of temporal arteries, and a raised pulse-pressure. In 93 of the patients with headache there was also a constant boring ache behind the eyes, which often continued for one to two days after the headache had stopped.

The headaches were abolished on one side of the head when the common carotid artery was compressed, and returned on release of the artery; and actions such as straining, which raise the blood-pressure, accentuated the pain, while a fall of pressure due to inhalation of amyl nitrite temporarily relieved it. These findings suggested that the headache of fever is also due to tension on the walls of arteries, and from further tests Bodley Scott and Warin concluded that in some cases the pain is due to dilatation of extracranial arteries, in some of intracranial ones, and in a larger number of both.

They based this conclusion on the difference of response to unilateral occlusion of the temporal artery and to bilateral compression of the jugular vein in three groups of cases. In one group unilateral obliteration of the temporal pulse did not alter the headache, whereas jugular compression lessened it, and in 10 of these patients lumbar puncture was done which showed a normal initial pressure. In these patients the headache was thought to originate from increased tension in the intracranial arteries, jugular compression relieving the pain because its effect is to raise first the intracranial venous pressure and secondarily the C.S.F. pressure; so lessening the difference of pressure inside and outside the arteries and reducing the distending force on the arterial walls. In a second group the headache on one side was effectively relieved by occluding the temporal artery, showing that the cause of the pain was in the extracranial vessels, and this view was supported by the finding in these cases that jugular compression increased rather than alleviated the headache, since the cushioning action of a rise in C.S.F. pressure would not affect the temporal arteries. The third group showed features common to both the other groups, and in these presumably both sets of arteries were involved.

Investigations into the source of the pain behind the eyes were inconclusive. They were relieved by compression of the common carotid artery, increased by jugular compression, and unaffected by compression of the temporal artery. A raised ocular tension was sometimes found in these cases, and eserine partly or completely relieved the ache in 9 out of 16 cases in which it was tried. It seemed probable that the eyeache arose from some vascular disturbance in the orbit, but its nature remains doubtful.

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1. Pickering, G. W. *Clin. Sci.* 1933, 1, 77.
2. Sutherland, A. M., Wolff, H. G. *Arch. Neur. Psychiat.* 1940, 44, 929.
3. Bodley Scott, R., Warin, R. P. *Clin. Sci.* 1946, 5, 51.

THE DENTISTS AND THE MINISTER

There is no sign of agreement between the Minister of National Insurance and the dentists on the scale of payment for insured persons. The negotiations with the Minister are in the hands of the Joint Advisory Dental Council (J.A.D.C.), which represents the British Dental Association, the Incorporated Dental Society, and the Public Dental Services Association, and in November the J.A.D.C. advised the profession to accept a scale of fees proposed by the Minister. Since then, however, the British Dental Association has met and rejected this scale. The Public Dental Services Association has accepted it, and the Incorporated Dental Society is meeting shortly; but since the B.D.A. has a membership of 7500, against a total of 4600 for the other two bodies, it is unlikely that the Advisory Council will continue to support the Minister's scale in face of B.D.A. opposition. Meanwhile most dentists are refusing to accept dental letters but are doing urgent work for panel patients on a private basis.

NEW YEAR HONOURS

The New Year honours include three knighthoods for medical men. Mr. Eardley Holland recently concluded a notable presidency of the Royal College of Obstetricians and Gynæcologists, whose position in the counsels of the nation he has done much to assure. Major-General H. C. Buckley, I.M.S., is the former principal of the Medical College, Agra, and Dr. C. E. Hercus, professor of bacteriology and preventive medicine at Otago, was a welcome visitor to this country last summer. Other honours conferred include:

C.B.

Surgeon Rear Admiral H. R. B. Hull, M.R.C.S.
Major General E. A. Sutton, C.B.E., M.C., M.R.C.S.

C.M.G.

Prof. P. A. Buxton, M.R.C.S., F.R.S.
Melville Mackenzie, M.D. Lond.
Albert R. Southwood, M.D., M.S. Adelaide.

C.I.E.

Major F. A. B. Sheppard, O.B.E., M.B. Melb., F.R.C.S.E., I.M.S.
Lieut. Colonel W. J. Webster, M.C., M.D. Aberd., I.M.S.

C.V.O.

Daniel T. Davies, M.D. Wales, F.R.C.P.
F. Anderson Juler, M.B. Camb., F.R.C.S.

C.B.E.

Eldred Curwen Braithwaite, O.B.E., M.S. Durh., F.R.C.S.E.
Air Commodore H. Osmond Clarke, M.B. Dubl., F.R.C.S.
James Hardie-Neil, D.S.O., M.B., of Auckland.

O.B.E.

F. A. L'Estrange Burges, M.B.E., M.R.C.S.
Percival P. Cole, M.B. Birm., F.R.C.S.
P. F. J. L. R. Du Vergé, of Mauritius.
Lieut.-Colonel E. F. Edson, M.B. Sheff., R.A.M.C.
John W. H. Grice, M.R.C.S.
C. D. Johnston, M.D.
Squadron-Leader R. A. Moorehead, M.B. Belf., R.A.F.V.R.
Patrick W. R. Petrie, M.B. Edin.
Major E. Soysa, Ceylon Medical Corps
James Graham Willmore, M.D. McGill, M.R.C.P.

M.B.E.

Leon Gillis, F.R.C.S.
Charles Stuart Ogilvie, L.R.C.P.E.

The Society of Apothecaries of London has decided to admit medical women to its yeomanry and livery.

Health Centres of Tomorrow

I—SCOPE

"IN the last two years there has been such a clamour from sectional interests in the field of national health that we are in danger of forgetting why these proposals are being brought forward at all." This remark by Mr. Aneurin Bevan applies very well to health centres. In controversy on whether, how, where, and by whom these centres shall be built, we have lost sight of why they are needed at all.

WHY ARE HEALTH CENTRES WANTED ?

In 1942 the Medical Planning Commission, after long and detailed discussion by representatives of all branches of medical practice, issued an interim report which said:

> "The days when a doctor armed only with his stethoscope and his drugs could offer a fairly complete medical service are gone. He cannot now be all-sufficient. For efficient work he must have at his disposal modern facilities for diagnosis and treatment, and often these cannot be provided by a private individual or installed in a private surgery. He must also have easy and convenient access to consultant and specialist opinion, whether at hospital or elsewhere, and he must have opportunities of real collaboration with consultants. There must also be close collaboration amongst local general practitioners themselves, for their different interests and experience can be of value to each other.
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> "Greater efficiency and economy would be secured and less expense incurred if groups of practitioners would coöperate to conduct a single centre at which all of them would see their own patients and share equipment and the services of secretarial, domestic, and dispensing staff. The value of the practitioner to his patients would gain immeasurably from his close and constant contact with his colleagues. . . .
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> "The health centre must on the one hand preserve the professional independence of the coöperating general practitioners, it must on the other hand be capable of becoming an organised unit in an integrated medical service."

The main purpose of the centre, as the Medical Planning Commission saw it, is to create better conditions for general practice by allowing the more general use of modern methods of diagnosis and treatment, by encouraging practitioners to work with one another and with dentists, nurses, and midwives, and by making fuller use of secretarial and other ancillary staff so as to prevent waste of medical time and effort.

WHAT KIND OF CENTRE ?

Most of this has long been common ground, but opinions differ over the emphasis, and consequent priority, to be given to the several aims. Of the two main schools of thought the first holds that what the general practitioner needs most of all is access to special diagnostic methods carried out on his behalf by experts. The other school chiefly seeks better facilities for the practitioner's own use; it wants to increase his usefulness by sparing him non-medical tasks and by promoting more coöperation with his fellow practitioners and other health workers.

From the arguments of these two different schools we have different conceptions of the type of health centre needed.

The first would be an elaborately equipped building staffed by consultants and technicians and devoted entirely to the examination of patients already seen elsewhere by the general practitioner. The kind of work done at such a centre would mostly resemble that done in a hospital outpatient department: indeed some of the investigations demanded would almost certainly involve keeping the patient under observation overnight or even for several days, and thus make it necessary to provide inpatient or hostel accommodation, with nursing and catering staff.

But if the work is to be that of a hospital outpatient department, why should it not be done at the hospital rather than at some special new centre? True, there are areas without hospitals, where a diagnostic centre staffed by specialists would be invaluable; but really this is an argument for seeing that every area has a hospital accessible to it. In a genuinely comprehensive service there should be no gaps in hospital provision; and with modern methods of transport there need be none.

If then the object of the first type of health centre is best fulfilled by the hospital, we can concentrate our attention on the second type—the centre in which general practitioners undertake all work ordinarily coming within their scope, and, where they assist each other, with ample aid from technicians. But before we come to details of the structure, layout, and equipment there are still one or two matters of general policy to be considered.

GENERAL AND SPECIAL WORK

Firstly, what duties should in fact come within the scope of the practitioners who will work in the centre? Obviously all ordinary methods of examination and treatment now undertaken in the doctor's private consulting-rooms would be included. So also would minor surgical techniques which do not necessitate inpatient nursing. At almost every centre, moreover, there will be one or more practitioners particularly interested in one of the specialties, who could be of considerable help to their colleagues, especially if they could enlarge their knowledge by special courses or experience. Provision should therefore be made in the centre for carrying out the simpler techniques of (for example) dermatology, ophthalmology, and otorhinolaryngology.

What about radiology and pathology? Is it better to put radiographic and pathological equipment in the health centre, for the use of the practitioner himself (assisted by appropriate technicians), or to put it in the local hospital under full specialist supervision?

Where a centre accommodates six or more general practitioners there seems to be a strong case for giving it a pathological laboratory with a full-time technician. Such a laboratory could undertake all routine biochemical, many hæmatological, and some bacteriological examinations. It would need to be linked with the main district laboratory, both for the performance of investigations which it could not undertake and for regular supervision by the hospital pathologist, who would have to be responsible for the work of all the health-centre laboratories in his charge. To such a laboratory the practitioner would himself take specimens or (better still) patients; and whether or not he made his own investigations he would generally get early information. The difficulty, the delay, and the expense of obtaining laboratory help have often prevented or postponed proper investigation of the patient, and have depressed the practitioner—especially the younger man fresh from hospital, where he has been accustomed to such aids. Undoubtedly a very wide undisclosed demand would be revealed wherever a service of this type was established in a health centre, and there need be little fear that a full-time technician would not soon be fully occupied. Laboratory technicians are of course not nearly numerous enough for the establishment of laboratories on this wide scale; but, as it will probably be several years before the health centres can be built in any number, there is time to recruit and train more of these people if the need to do so is recognised now.

The case of radiology is rather different, and there are good arguments both for and against having radiographic equipment in the health centre. Those who think it undesirable say that X-ray examination requires complicated and expensive apparatus, which has to be replaced regularly because it is always obsolescent. Its most efficient use demands the services of experts both for taking and for interpreting X-ray pictures. If every health centre were to be given radiographic apparatus, this would have to be comparatively cheap, and would be infrequently renewed or replaced. The tendency would be to use it for tasks beyond its proper capacity, and to entrust difficult radiographic problems to general practitioners who could not justly claim the necessary training and experience. All this would be uneconomical if it meant that the expensive apparatus and skilled ancillary staff of the larger radiological departments were not to be used to the full. And it would be unnecessary if every health centre were linked, as it should be, with a nearby hospital to which the practitioner had easy access, and from which he would receive the fullest possible assistance from an expert team working with the best equipment.

Those who favour wide provision of radiological facilities argue, on the other hand, that times are changing and that we are planning for a future in which we can have standardised and simplified apparatus which will not be costly and which will serve its purpose for many years. We are planning, too, for a generation of doctors who are being brought up to regard radiography as necessary for accurate diagnosis and for any exact estimate of progress and prognosis—who are being taught themselves to interpret X-ray films and are encouraged to be present whenever their patients are examined under the X-ray screen. The health centre will be properly equipped only if it enables them to use the knowledge acquired in their training.

But if, in due course, it proves both desirable and possible to have X-ray apparatus at all centres, this must not be used in isolation: the health centre must be linked with the district hospital in such a way that the radiologist there can keep an eye on the work done at the centre by the practitioners and their radiographer. The radiologist should indeed have regular and frequent meetings with the centre staff so as to be able to offer his expert advice and aid on any radiological problem which may arise, and all examinations outside the scope of the centre and its staff should be referred to the parent hospital.

Such is probably the ideal arrangement for the future; but until there is suitable apparatus, and enough radiographers, the doctors at health centres will have to rely on the hospitals for most of the radiography required. Access to this and other hospital specialist services must be made as simple as possible, or we shall miss most of the improvement of general practice which health centres are meant to promote.

WORK FOR THE LOCAL AUTHORITY

Among the special activities which certainly could nd should be undertaken at the health centre are antenatal and postnatal examinations and child welfare. And these bring us to the question of the relation between [illegible] general practitioner, working in the centre, and the public-health authorities.

The white-paper on the National Health Service Bill ets out the position thus:

> "The Bill makes it the duty of the county and county borough councils to provide, equip, staff, and maintain the new health centres to the satisfaction of the Minister. The local authorities will directly administer such of their own local clinic facilities as they may provide in the centres. Doctors and dentists, however, who use the new centres while participating in the general personal practitioner service will be in contract only with the new Executive Councils, and it will be for those Councils to arrange with the local authorities for the use of the centres' facilities by those doctors and dentists."

The local-authority services which we may expect to be partly or wholly provided at or from the health centre include "antenatal clinics for the care of expectant mothers, postnatal and child clinics, the provision of such things as cod-liver oil, fruit juices, and other dietary supplements, and in particular a priority dental service for expectant and nursing mothers and young children." In addition, the Education Act, 1944, requires the local authority to provide a service both of medical inspection and of treatment for all children attending State-provided or State-aided schools; and while the function of inspection will still be performed most conveniently at the schools, the health centre seems a far more appropriate place for treatment. The local authority has also to arrange a domiciliary midwifery service, and services of health visiting and home nursing; and though in a compact area such as a county borough it may be possible to conduct all nursing services from a central health department in the municipal administrative offices, the more widely spread responsibilities of the county M.O.H. will often oblige him to depute the day-to-day supervision of these services to divisional officers, who may well find that the health centres are their most suitable headquarters.

It will often be necessary, therefore, to establish in the health centres some form of condominium between the general practitioners and the local-authority doctors.

HEALTH

The work of the centre should thus associate the techniques of *curative medicine* and *preventive medicine*, and we may hope that practitioners will increasingly look on the latter as part of their affair. But both cure and prevention are concerned with disease, and an organisation designed solely to promote them would scarcely be entitled to the name of health centre. A health centre ought also to serve the third and newer branch which one might call *functional medicine*, the purpose of which is to help people to make the best use of their capacities—to have life more abundantly.

"Positive health" is a state of well-being above the average, while "negative health" is a state of ill-being below the average. The medical profession has hitherto had to give most of its attention to the negative departures from ordinary health which we call disease; but as curative and preventive medicine grow more successful doctors should have more chance to practise functional medicine—the promotion of positive health. Though the technique of this branch is in its infancy, it is obvious at least that the health centre is a convenient base for what is called health education, applied both to individuals and to groups. Lectures, films, classes, and demonstrations are among the means by which this work can be done, and if there is no more suitable meeting-point for them the public might be invited to the health centre for instruction.

The most attractive place for it would of course be a community centre with some of the characteristics of Peckham, including swimming-bath, gymnasium, restaurant, and equipment for amateur entertainment and hobbies. In some towns it might indeed be possible quite soon to bring the medical work and these social activities under a single roof; but for a long time to come this will be exceptional. Meanwhile, however, the ideal of a true health centre should be kept always in mind, so that our emphasis is increasingly placed on positive health. This is not so much a matter of planning and building as of mental attitude—particularly the attitude of the practitioner.

The term "health centre," like the term "National Health Service," represents an aspiration rather than an immediate probability; though it is none the worse for that. It raises problems of medical education to which we shall return in our concluding article.

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The case of radiology is rather different, and there are good arguments both for and against having radiographic equipment in the health centre. Those who in mice will grow only if the new hosts are given œstrogen. Lipschutz, working in Chile and following up Nelson's observation that uterine myomas appear in guineapigs repeatedly injected with œstrogen, has now demonstrated that testosterone will prevent them from developing.

The dependence of some tumours on hormonal influences for success justifies the inference that the change of a normal cell to a tumour cell does not necessarily mean that a growth will ensue. If the caloric intake of mice is cut down so slightly that they are only 5% under weight, carcinogenic agents induce no tumours on their skin. This is not because these agents have failed to bring about neoplastic changes; for if the animals are again fully fed, tumours appear. The "spontaneous" tumours to which mice of some strains are liable can also be prevented by cutting down the food. At the moment much work is under way to learn whether modifications of the diet which involve no caloric reduction will hinder tumour growth.

How shall the presence of incipient cancers be perceived? Recently Kidd has demonstrated a distinctive antigenic substance in the Brown-Pearce rabbit carcinoma. Though this finding may raise hopes of multiple diagnostic blood-tests, it does not foster faith in the chance of a single general test. Even the possibility of multiple special tests is still problematical, since in rabbits with the tumour just mentioned the production of antibodies necessary for serological tests is inconstant despite the fact that every one of the growths contains the specific antigen.

SPECIALIST STATUS IN CANADA

FROM OUR CANADIAN CORRESPONDENT

Lord Moran is reported as saying recently that in Britain anyone on the Medical Register can call himself a specialist and none can say him nay. Until lately this was so in Canada too. Some years ago the province of Alberta entrusted the nomination of specialists to the faculty of medicine in the provincial university; but the other provinces accepted laissez-faire as the rule until the federal government announced preparations for a Bill to provide health services throughout the Dominion. Such matters as education and social legislation are the prerogatives of the provincial legislatures, so this Bill was to be designed as a model; and each province that agreed to enact legislation conforming to the model was to be assisted by grants from the federal treasury.

The model Bill is still unpassed, and the provinces have various schemes of their own in force; but these schemes may be modified when the federal Bill becomes law. Every scheme provides for service by specialists, and the licensing bodies of the provinces are asked to make official lists of specialists who are to be recognised and entitled to fees higher than those paid to general practitioners. Registers have been opened by the provincial licensing bodies, known as the College of Physicians and Surgeons in each province.

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Physicians have long been aware that there are agents in the human environment which are capable of causing neoplasms. These agents have now been identified in bewildering numbers, and more must be expected as new physical and chemical processes are pressed into industrial service. The very sunlight is carcinogenic, and the only reason anyone goes free from cancer is because the action of most carcinogens is episodic or weak.

It has now been established that extracts of some diseased human tissues produce tumours in animals; and for some time it has been known that certain normal substances—namely, hormones—may also give rise to tumours. Hormones are not themselves carcinogenic, but they bring the tissues upon which they act into such a disordered and excited state that neoplastic changes take place.

Study of "spontaneous" tumours shows that often they are the outcome of many influences working together or consecutively, often for years. Even the smallest details in the previous history of cancer patients may prove vital for other human beings, by giving hints as to where the chain of determining factors can be broken. In every cancer hospital there may eventually be specialists whose main aim will be to learn precisely how each patient's tumour has come about.

For nearly seventy-five years doctors have known that cancers often start at sites of chronic disturbance, yet chronic inflammation alone is not enough to cause them. *Some special influence precipitates the neoplastic change.* Some workers, and notably Haddow, have concluded that the cells become neoplastic while they are faring badly, and that the chemical carcinogens act through their depression of cellular activities; and injection of some of these substances causes transplanted tumours to grow more slowly than in control animals. Just before the late war a German surgeon actually painted human cancers of the skin with a powerful carcinogenic hydrocarbon, heedless of whether it induced other growths later on; he reported that the tumours disappeared.

Haddow himself has synthesised numerous hydrocarbons nearly related chemically to those with carcinogenic properties, in an effort to find some which would check established tumours while giving rise to none on their own account; his results so far are encouraging. Laboratory observations in the United States on the effects of the nitrogen mustards in retarding cellular activity have led to their use in the treatment of lymphoid tumours and leukæmia in human beings.

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The fact that tumour cells are not ordinary cells which have seized an opportunity to go on the loose is the basis for the present-day search for a chemical trait distinguishing the neoplastic cell; already remarkable differences have been discovered.

Some of the agents which are highly effective in producing tumours—the röntgen ray and bilharzia ova, for example—*cannot possibly be the real causes of these growths; their part is played when they have produced neoplastic change.* The fact that certain hydrocarbons are capable of inducing tumours has led workers to ask whether substances having similar effects may not be continually elaborated within neoplastic cells, thus maintaining them in their pathological state.

Strains of animals have been procured with striking liabilities to spontaneous tumours, while other strains are remarkably free from these growths. What are the reasons? At first it was assumed that the tumour tendencies were passed through the chromosomes. Then workers in Holland and in the United States, studying hybrids between mice of strains having marked and slight liabilities respectively to mammary cancer, simultaneously found that the tendency to such tumours is handed down through the mother. There followed a startling discovery by Bittner, working at Bar Harbor, Maine. Taking newborn mice away from mother-mice of strains liable to mammary cancer, he had them suckled by females devoid of this liability, and found that he had thus rescued them from the disease in later life. By reversing the experiment, the tendency to mammary cancer could be conferred upon mice of strains not ordinarily having it.

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The discovery of the milk factor has given new weight to the hypothesis that tumours in general may be due to viruses, but recent experimental evidence speaks against the assumption that most tumours are caused by agents of this sort. However, decisive evidence may soon be available; with the electron microscope Claude and Porter have already obtained pictures of chicken-tumour viruses within the cells of the sarcomas that they cause.

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A tumour has long been defined as an autonomous new growth. But Huggins's demonstration that many prostatic cancers which have metastasised stand still or disappear after removal of the testicles shows that even the cells of malignant growths may not be truly independent in their behaviour. The meaning of this discovery far transcends its practical application; for it denotes that endeavour in cancer research has been led astray by the *idea that tumour cells are anarchic.*

The experience with prostatic cancer justified the expectation that many mammary cancers would regress when the influence of the female sex hormones was lessened by removal of the ovaries or by injections of testosterone. The results with women have so far not been very promising, but the fact that cancers of the male breast yield to orchidectomy or to stilbœstrol provides encouragement.

Scarcely a month goes by without some discovery. For example, certain transplantable testicular tumours in mice will grow only if the new hosts are given œstrogen. Lipschutz, working in Chile and following up Nelson's observation that uterine myomas appear in guineapigs repeatedly injected with œstrogen, has now demonstrated that testosterone will prevent them from developing.

The dependence of some tumours on hormonal influences for success justifies the inference that the change of a normal cell to a tumour cell does not necessarily mean that a growth will ensue. If the caloric intake of mice is cut down so slightly that they are only 5% under weight, carcinogenic agents induce no tumours on their skin. This is not because these agents have failed to bring about neoplastic changes; for if the animals are again fully fed, tumours appear. The "spontaneous" tumours to which mice of some strains are liable can also be prevented by cutting down the food. At the moment much work is under way to learn whether modifications of the diet which involve no caloric reduction will hinder tumour growth.

How shall the presence of incipient cancers be perceived? Recently Kidd has demonstrated a distinctive antigenic substance in the Brown-Pearce rabbit carcinoma. Though this finding may raise hopes of multiple diagnostic blood-tests, it does not foster faith in the chance of a single general test. Even the possibility of multiple special tests is still problematical, since in rabbits with the tumour just mentioned the production of antibodies necessary for serological tests is inconstant despite the fact that every one of the growths contains the specific antigen.

SPECIALIST STATUS IN CANADA

FROM OUR CANADIAN CORRESPONDENT

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Seen in this light, there is little room for doubt that the lay board is best served by a lay executive officer; who, by very reason of the fact that he does not possess medical qualifications, is free from the temptation to lose sight of the all-important distinction between his own sphere and that of the profession. Talk of the relative "efficiency" of the layman and of the medical chief executive slides into the background as the mere irrelevant issue that it really is.

MEDICAL SUPERINTENDENTS

The medical superintendent of a progressive local-authority hospital, proud of the efficiency of his unit, will find this doctrine hard to accept. It is only natural that this should be so.

The medical superintendent first appeared in the old "institutions" as a direct result of *The Lancet's* inquiry of 1865, which exposed the neglect arising from reliance on occasional visits by outside practitioners. He and his salaried whole-time staff have ever since been a feature of the public hospital provision in this country. But he has in fact carried only partial responsibility for the group of lay functions that together comprise policy and administration. This responsibility rested first on the guardians, and since 1929 has lain with the committee of the local authority. The effect of grouping the hospitals under local authorities has often meant the exercise of administrative and financial functions by people whose contact with, and knowledge of, the hospital was inadequate—*hinc illæ lacrimæ*! The achievements of the more capable medical superintendent are properly seen, therefore, not as a natural result of an excellent system but as a tour-de-force of personality, and a triumph over adverse circumstances for which all credit is due to him.

But we must not forget that there is another side to the picture: in the medical world of our generation none are more to be pitied than the hospital medical superintendents who find themselves "in charge" of institutions which they are powerless to improve and of whose deficiencies they are acutely aware. It is not their fault: it is the fault of a system which has used the medical man as an instrument, as an executive, and has ignored his proper professional status. His administrative appointment has destroyed his power to protest with a voice that can be heard: he is a servant, he must not speak out. His presence has been used as a screen to hide the inadequacies of a system which failed to place the administrative responsibility squarely on the shoulders of those who hold the purse-strings.

Happily this phase is now about to pass. It is one of the fundamental intentions of the present Act, by means of the hospital management committees, to break up remote control where it now exists; and to ensure that, subject to the necessary degree of regional supervision, the affairs of each unit shall be managed by its own management committee. Of special importance is the fact that each such committee is to have its own budget, to be responsible for the allocation of resources as between one department and another. The management committee will thus have far greater financial (and ipso facto administrative) freedom than does the typical municipal hospital today. This is as it should be. But it carries the implication that the management committee will require the twin machinery of a predominantly lay body on the one hand, bearing ultimate responsibility for policy, and a medical advisory committee on the other, safeguarding professional interests and keeping the lay body up to scratch. In this scheme of things the executive officer is best unencumbered by medical qualifications. He will not be tempted to go outside his own proper sphere.

A DIFFERENT ARRANGEMENT

Does this mean that there is no place for a medical superintendent? If the question means "should the executive officer of the hospital management committee be a doctor?" the answer must be that to thrust the medical man in here is to place him in a false position vis-à-vis his medical colleagues. If on the other hand the question means "is there in a large hospital no room for a senior man resident in the hospital discharging other functions?" a different answer can be given. Here we are on less certain ground, but a suggestion may perhaps be hazarded.

It is often a defect in the voluntary hospitals that there is no resident (or at least whole-time) senior medical man supervising the junior staff and available in the absence of his consultant colleagues to give advice in emergencies. Here we have surely a group of functions (which might well be combined sometimes with the secretaryship of the medical committee) the importance of which needs no emphasis. One great hospital in London, and others in Scotland and the North of England, have experience of the value of appointments approximating to that we have sketched out.

It is doubtful, however, whether the title of medical superintendent is the right one for the future, or indeed quite appropriate. The words have come to have a connotation which, unless corrected by a strong tradition at the hospital in question, may lead to friction and difficulty. There is a word which carries the right note of dignity and authority tempered with fatherly care for the younger members of the community—"dean." If the medical schools and the universities are not too jealous of an extension of a good old English usage, the hospital management committees could well find a place for a medical dean of the hospital. He should not find it difficult to work in harness with a lay house-governor, and indeed there are often times when the house-governor and the matron would welcome someone upon whom to unload difficulties which fall more appropriately to his sphere than to their own.

There is not, or rather there should not be, a question here of relative "status." Status flows from function: the two functions are distinct, and each carries an importance quite sufficient in its own right to ensure the necessary status. Such a plan surely offers the means whereby the advisory relationship of the profession vis-à-vis the administrative side of the hospital services may be safeguarded, and the profession freed from the temptation to share directly an administrative responsibility which must ultimately rest upon the Minister in Parliament and not upon his professional advisers.

THE REGIONAL AREAS

As we have already recorded, the Minister of Health has laid before Parliament an order defining the areas for which regional hospital boards will be responsible under the National Health Service Act.

On Nov. 15 he sent to more than 200 bodies his provisional proposals for the boundaries of these areas,[1] and asked for their views and advice. Among those from which he has received observations are the universities and medical schools, the British Hospitals Association and its area committees, the three Royal Colleges, King Edward's Hospital Fund for London, the Nuffield Provincial Hospitals Trust, and the local health authorities (county and county-borough councils). In the light of their views he has made a number of modifications, which are shown in the map overleaf.

The following are the more important amendments:

Goole and neighbourhood are associated with Leeds instead of Sheffield.

Burton-on-Trent and neighbourhood are associated with Birmingham instead of Sheffield.

Hinckley is associated with Sheffield instead of Birmingham.

The whole of Bedfordshire is associated with London instead of the northern part being associated with Cambridge.

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[1] *Lancet*, 1946, ii, 804, 842, 876.

of tuberculous cattle. They showed that after parturition there was a loss of skin sensitivity in tuberculous cows, and they concluded that the simplest explanation of this phenomenon is that the formation of colostrum, with its considerable antibody content, creates a state in which fixed-cell antibodies are abstracted into the general circulation and then drained into the colostrum. Many difficulties, of course, arise in accepting such a hypothesis, but more precise information must await the results of further investigations. Of 13 colostrum-fed calves from mammalian infected cows, 3 showed definite evidence of passive skin sensitisation.

The same workers also demonstrated that under various conditions the injection of tuberculin resulted in a loss of skin sensitivity. During the experiments on desensitisation it became evident that, after a single intradermal injection of tuberculin in an infected bovine, the site of the original injection had an enhanced specific sensitivity. This could be detected 6–9 days after the original tuberculin injection; and though the optimum time for its development has not yet been fully explored, a test known as the Stormont test has been developed in which a second injection of tuberculin is given 7 days after the first and the reaction is read 24 hours later. In experiments on 300 animals the Stormont test had an error of 1·66%, as against 15·33% (plus 9% doubtful) for the single intradermal test, and 12·33% (plus 9% doubtful) for the single intradermal comparative test.

A disadvantage of the Stormont test was that it gave strong reactions in animals with skin tuberculosis, but Kerr, Lamont, and McGirr conclude that its merits and possible modifications demand attention.

INTELLIGENCE AND FERTILITY

SIR CYRIL BURT'S FINDINGS

THE first attempt to study the inheritance of mental characteristics by formal tests was made by Sir Cyril Burt, in collaboration with J. C. Flugel, at Oxford in 1907. His latest survey, undertaken for the Royal Commission on Population and lately published by the Eugenics Society,[1] confirms his early observation "that the dull and defective are multiplying more rapidly than the bright."

He finds that during the past generation the decline in the intelligence quotient (I.Q.) has amounted in urban areas to about 1·5 points (equivalent to about 3 mental months for adults), and in rural areas to about 2·0 points (equivalent to about 4 mental months for adults). If prolonged, this decline, of which these are regarded as conservative estimates, would have grave effects. For example, if the rate were to remain constant until the end of the century, the number of youths of scholarship ability would be approximately halved and the number of feeble-minded almost doubled—an outcome even graver than the lowering of the general average by about 5 I.Q. points.

The survey was undertaken on school-children in a London borough. At the poorest school the average number of children in the family was 5·2, and at the best only 2·9; the average intelligence quotients were 98 and 113 respectively. Thus the children from the poorest social classes not only had an intelligence nearly two years below that of the children from the better social classes but were drawn from families nearly twice as large. The suggestion that the inverse correlation between size of family and intelligence may be simply due to differences in reproductivity between the different social classes is refuted on the score that the correlations are still significant (ranging from −0·11 to −0·18) among pupils of a fairly homogeneous social and occupational class. The important conclusion is not that the smaller, well-to-do, classes are producing few children but that among the more numerous working classes it is still the most intelligent families that contribute fewest to the next generation. With the rise in the standard of living throughout the whole community, the class correlation will grow smaller; and the partial correlation with intelligence will soon outweigh the partial correlation with occupational category or economic group.

Reconstruction

HOSPITAL ADMINISTRATION
LAY OR MEDICAL?

FROM A CORRESPONDENT

RECOMMENDATIONS made by the Medical Superintendents Society and endorsed by the British Medical Association some months ago urged that "the administrative head of a large hospital or group of small hospitals should ordinarily be a medical practitioner, designated medical superintendent." The *Hospital* has been championing the cause of the layman. It is a controversy which has been smouldering for years. And now there seems to be a danger that if the rival parties continue to express their views in a self-interested manner we may find ourselves confronted with a first-class source of friction which could gravely handicap the new service.

The controversy as thus conducted is apt to turn on the question of the efficiency of the medical man as an administrator. His supporters claim that "other things being equal"—a favourite phrase in this context—the doctor possesses by virtue of his training and outlook certain advantages over his lay opposite number. He can, it is said, more easily speak the same language as the medical staff, he can cope better with the matron and nursing staff, and so on. The laymen claim on the contrary that the doctor cannot be expected to have that background of knowledge of administration which they regard as essential.

It is true that the need for knowledge of many technical aspects of hospital work has increased rapidly in recent years; but this fact is an insufficient basis for the lay case. If a layman with relatively little experience, but with a flair for administration, can get it up relatively quickly and become sometimes an exceptionally good administrator there is no reason why a medical man with a similar flair should not do the same.

The controversy, when waged on these lines, is apt to result in the tame conclusion that provided you get the right man it does not very much matter whether he is a doctor or a layman. But this is surely to miss the significance of the issues raised. Discussion on the relative "efficiency" of medical man and layman implies a lack of grasp of the principle on which the medical profession in this country conducts its affairs and influences the life of the country.

THE DOCTOR'S RÔLE

The status of the medical profession is bound up with its function of giving advice. The doctor at the bedside may on occasion adopt a tone of command, but he does not forget that in the last resort he is but offering advice. So now, under this new Act, the Central Health Services Council and the advisory committees will stand in an advisory relation to the Minister. The medical officers of the Ministry in turn stand in an advisory relation to their lay colleagues, on whom rests the responsibility for giving effect to decisions of policy.

It is of vital importance to the proper status of medicine and of the profession under the new régime that this distinction should be preserved right through the organisation. If, and in so far as, we depart from it, we shall find the profession entangled in policy: and policy means, in the last resort, politics. It is a piece of good fortune that in the typical organisation of our great voluntary hospitals we have a pattern, a form of machinery, which preserves the distinction intact—an organisation which fits easily and without embarrassment into the general framework which has to be preserved. The lay board lines up with the lay side of the Ministerial organisation: the medical staff retains its clear advisory status in relation to the policy of the institution.

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[1] Intelligence and Fertility; the Effect of the Differential Birth-rate on Inborn Mental Characteristics. By Sir Cyril Burt, M.A., D.Sc. Oxfd, hon. LL.D. Aberd., Professor of Psychology, University College, London. London: Eugenics Society and Hamish Hamilton. Pp. 43. 2s.

Seen in this light, there is little room for doubt that the lay board is best served by a lay executive officer; who, by very reason of the fact that he does not possess medical qualifications, is free from the temptation to lose sight of the all-important distinction between his own sphere and that of the profession. Talk of the relative "efficiency" of the layman and of the medical chief executive slides into the background as the mere irrelevant issue that it really is.

MEDICAL SUPERINTENDENTS

The medical superintendent of a progressive local-authority hospital, proud of the efficiency of his unit, will find this doctrine hard to accept. It is only natural that this should be so.

The medical superintendent first appeared in the old "institutions" as a direct result of *The Lancet's* inquiry of 1865, which exposed the neglect arising from reliance on occasional visits by outside practitioners. He and his salaried whole-time staff have ever since been a feature of the public hospital provision in this country. But he has in fact carried only partial responsibility for the group of lay functions that together comprise policy and administration. This responsibility rested first on the guardians, and since 1929 has lain with the committee of the local authority. The effect of grouping the hospitals under local authorities has often meant the exercise of administrative and financial functions by people whose contact with, and knowledge of, the hospital was inadequate—*hinc illæ lacrimæ*! The achievements of the more capable medical superintendent are properly seen, therefore, not as a natural result of an excellent system but as a tour-de-force of personality, and a triumph over adverse circumstances for which all credit is due to him.

But we must not forget that there is another side to the picture: in the medical world of our generation none are more to be pitied than the hospital medical superintendents who find themselves "in charge" of institutions which they are powerless to improve and of whose deficiencies they are acutely aware. It is not their fault: it is the fault of a system which has used the medical man as an instrument, as an executive, and has ignored his proper professional status. His administrative appointment has destroyed his power to protest with a voice that can be heard: he is a servant, he must not speak out. His presence has been used as a screen to hide the inadequacies of a system which failed to place the administrative responsibility squarely on the shoulders of those who hold the purse-strings.

Happily this phase is now about to pass. It is one of the fundamental intentions of the present Act, by means of the hospital management committees, to break up remote control where it now exists; and to ensure that, subject to the necessary degree of regional supervision, the affairs of each unit shall be managed by its own management committee. Of special importance is the fact that each such committee is to have its own budget, to be responsible for the allocation of resources as between one department and another. The management committee will thus have far greater financial (and ipso facto administrative) freedom than does the typical municipal hospital today. This is as it should be. But it carries the implication that the management committee will require the twin machinery of a predominantly lay body on the one hand, bearing ultimate responsibility for policy, and a medical advisory committee on the other, safeguarding professional interests and keeping the lay body up to scratch. In this scheme of things the executive officer is best unencumbered by medical qualifications. He will not be tempted to go outside his own proper sphere.

A DIFFERENT ARRANGEMENT

Does this mean that there is no place for a medical superintendent? If the question means "should the executive officer of the hospital management committee be a doctor?" the answer must be that to thrust the medical man in here is to place him in a false position vis-à-vis his medical colleagues. If on the other hand the question means "is there in a large hospital no room for a senior man resident in the hospital discharging other functions?" a different answer can be given. Here we are on less certain ground, but a suggestion may perhaps be hazarded.

It is often a defect in the voluntary hospitals that there is no resident (or at least whole-time) senior medical man supervising the junior staff and available in the absence of his consultant colleagues to give advice in emergencies. Here we have surely a group of functions (which might well be combined sometimes with the secretaryship of the medical committee) the importance of which needs no emphasis. One great hospital in London, and others in Scotland and the North of England, have experience of the value of appointments approximating to that we have sketched out.

It is doubtful, however, whether the title of medical superintendent is the right one for the future, or indeed quite appropriate. The words have come to have a connotation which, unless corrected by a strong tradition at the hospital in question, may lead to friction and difficulty. There is a word which carries the right note of dignity and authority tempered with fatherly care for the younger members of the community—"dean." If the medical schools and the universities are not too jealous of an extension of a good old English usage, the hospital management committees could well find a place for a medical dean of the hospital. He should not find it difficult to work in harness with a lay house-governor, and indeed there are often times when the house-governor and the matron would welcome someone upon whom to unload difficulties which fall more appropriately to his sphere than to their own.

There is not, or rather there should not be, a question here of relative "status." Status flows from function: the two functions are distinct, and each carries an importance quite sufficient in its own right to ensure the necessary status. Such a plan surely offers the means whereby the advisory relationship of the profession vis-à-vis the administrative side of the hospital services may be safeguarded, and the profession freed from the temptation to share directly an administrative responsibility which must ultimately rest upon the Minister in Parliament and not upon his professional advisers.

THE REGIONAL AREAS

As we have already recorded, the Minister of Health has laid before Parliament an order defining the areas for which regional hospital boards will be responsible under the National Health Service Act.

On Nov. 15 he sent to more than 200 bodies his provisional proposals for the boundaries of these areas,[1] and asked for their views and advice. Among those from which he has received observations are the universities and medical schools, the British Hospitals Association and its area committees, the three Royal Colleges, King Edward's Hospital Fund for London, the Nuffield Provincial Hospitals Trust, and the local health authorities (county and county-borough councils). In the light of their views he has made a number of modifications, which are shown in the map overleaf.

The following are the more important amendments:

Goole and neighbourhood are associated with Leeds instead of Sheffield.

Burton-on-Trent and neighbourhood are associated with Birmingham instead of Sheffield.

Hinckley is associated with Sheffield instead of Birmingham.

The whole of Bedfordshire is associated with London instead of the northern part being associated with Cambridge.

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[1] *Lancet*, 1946, ii, 804, 842, 876.

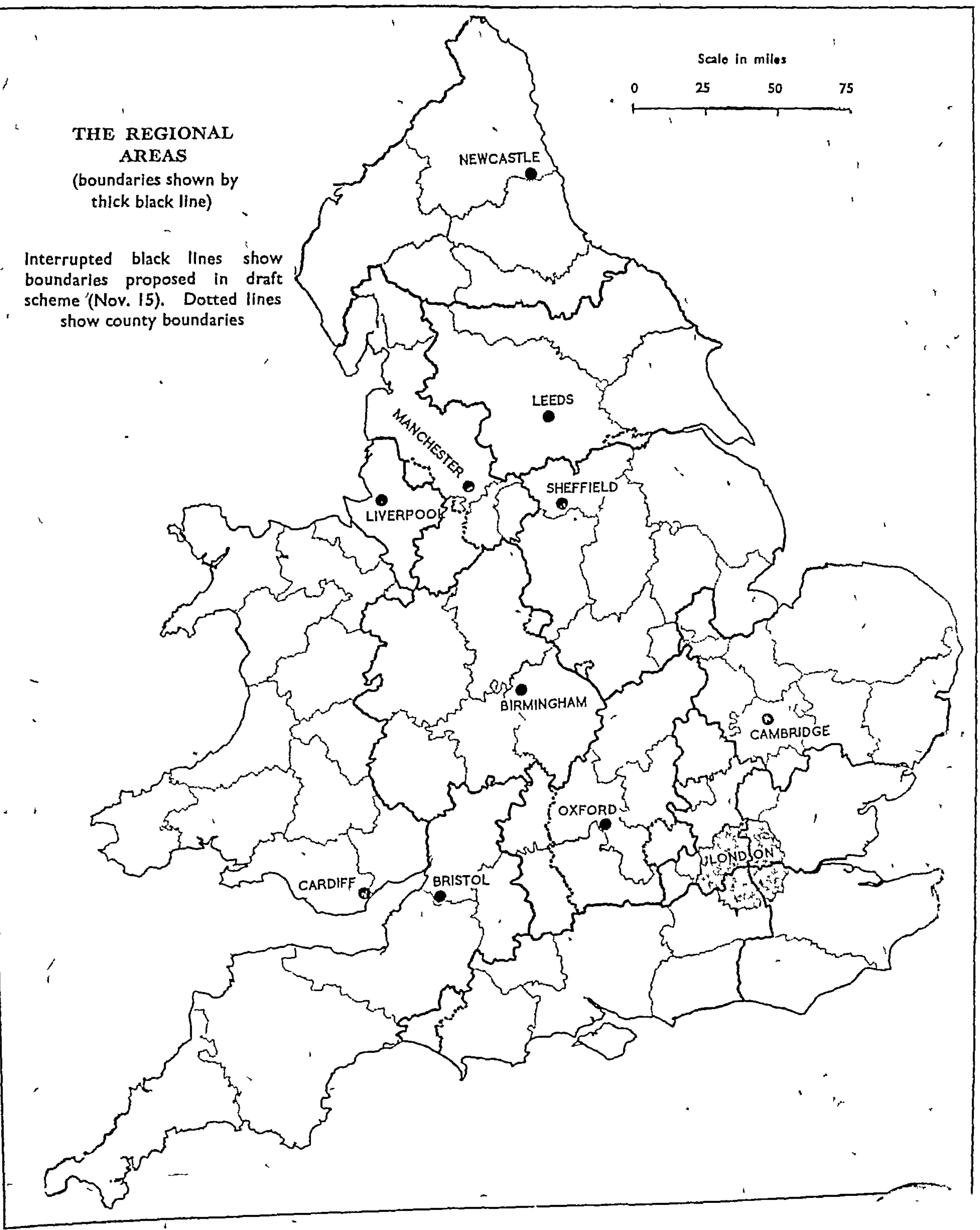
High Wycombe and district are associated with Oxford instead of London.

West Dorset (except Lyme Regis) is associated with the South-west London region instead of Bristol.

North-east Gloucestershire and North-east Wiltshire (including Marlborough and Swindon) are associated with Oxford instead of Bristol.

Wigan and district and Crewe and district are associated with Manchester instead of Liverpool.

Representations have been made that the area of the Liverpool region is inadequate to meet the needs of a large medical school and modern teaching hospital. The Minister realises the force of this contention and he has kept in mind the needs of the Liverpool region. He feels, however, that they can best be met by administrative arrangements rather than by varying the regional boundaries, which would create other difficulties. There has long been a close link between the Liverpool hospitals and North Wales and this will be preserved by providing representation for Liverpool representatives on the Welsh regional board. Similarly there are links between Liverpool and North Lancashire which will be maintained by appointing for that area a subcommittee of the Manchester regional board on which Liverpool representatives will sit.



THE REGIONAL AREAS
(boundaries shown by thick black line)
Interrupted black lines show boundaries proposed in draft scheme (Nov. 15). Dotted lines show county boundaries
Scale in miles
0
25
50
75
NEWCASTLE
LEEDS
MANCHESTER
SHEFFIELD
LIVERPOOL
BIRMINGHAM
CAMBRIDGE
OXFORD
LONDON
CARDIFF
BRISTOL

Medicine and the Law

Drugging the Truth out of Witnesses

OVERSEA tribunals and criminologists have sometimes played with the idea of using drugs in order to detect the falsity of evidence or at any rate to elicit the truth. Some such application of drugs was mentioned in the High Court in London lately during a case of a non-criminal nature. Mr. Justice Denning was hearing an appeal in respect of an ex-Serviceman's pension. Counsel for the appellant said the man was invalided from the Army by reason of psychoneurosis which the Pensions Appeal Tribunal held not to be attributable to war service. While still serving, said counsel, the man went sick. A psychiatrist was said to have obtained the truth about his condition under the influence of 'Amytal'; the man had then confessed that he was afraid of going overseas.

After argument as to the admissibility of this evidence, the judge said he would have thought it admissible; whether it was reliable was another question. He thought the evidence similar to evidence of blood-group tests in cases of disputed paternity. It would be a question how much weight should be attached to it. The court apparently was not troubled further with this problem; the judge, finding that there was no previous history of mental trouble, was satisfied that the disablement was attributable to war service. The man's appeal was therefore allowed.

If an attempt were made to use a "truth drug" against an accused person in an English criminal court, the judge would reject its results as an involuntary confession. Even where an accused person happens to make a voluntary statement, he is not to be cross-examined in custody; the police must put no question to him thereon except for the purpose of removing elementary and obvious ambiguity. This prohibition was laid down in the "Judges' Rules" in 1918, which did no more than restate the principles of judicial practice on which courts act when deciding whether evidence is admissible. The whole subject was examined by the Royal Commission on Police Powers, presided over by Lord Lee in 1929. The commission's report (Cmd. 3297) paid THE LANCET the compliment of reprinting from its columns a note on the use of hyoscine in a police investigation in Hawaii (1928, ii, 990). The Lee Commission cited this incident with obvious disapproval as an illustration of the lengths to which third-degree methods might be carried in countries where there were no restrictions on police action. The note referred to an earlier article (1922, ii, 1082, 1190) on a paper read before the State Medical Association of Texas, which suggested that experience of the use of scopolamine in obstetric practice might perhaps be applied for the detection of guilt in criminal cases. British justice insists on giving an accused person a fair run. To use a lie-detecting machine on him would be as unsportsmanlike as shooting a fox. But even if the machine were vouched for by eminent scientific authorities and if its testimony were admitted, our judges and juries would still find difficulty in overcoming their natural repugnance to expert evidence.

Death after Gold Salt

On Dec. 21 we drew attention to an inquest held by the Manchester city coroner on a woman who was found to have died as the result of gold injections for rheumatoid arthritis. Within a few days the Manchester county coroner held an inquest at Ashton-under-Lyme on a very similar case. This inquest was on a woman who two years ago, at the age of 36, developed rheumatoid arthritis, for which she was twice treated in hospital. According to the *Ashton-under-Lyme Reporter* (Nov. 22), her own doctor began gold treatment ten months ago; after ten injections her condition was improved and the treatment was stopped. Three months later she was given a further five injections, at the end of which she became listless and her condition deteriorated. On readmission to hospital she received six large blood-transfusions, but hæmorrhage continued and she died from aplastic anæmia. The coroner said he was satisfied that the gold had not been given in excessive doses, and suggested that there might be hypersensitivity to the drug. A verdict of death from misadventure was recorded.

Public Health

The Third Quarter

FIGURES of births and deaths in the third quarter of the year appeared in our issue of Nov. 9 (p. 695). The Registrar-General's report for the quarter [1] shows that the infant-mortality rate—35 per 1000 related live births—was the lowest ever recorded for England and Wales, being 7 per 1000 below the average rate for the third quarter of the ten preceding years, and 2 per 1000 below that for the September quarter, 1945, which was the previous lowest. The diarrhœa death-rate for children under two years of age was 3·2 per 1000 live births, compared with 6·2, 5·5, 5·6, and 4·2 in the four preceding quarters.

Marriages totalled 109,047, which was 10,400 fewer than the number registered in the September quarter, 1945, but 9663 more than the average for the five years 1940–44.

Infectious Disease in England and Wales

WEEK ENDED DEC. 14

Notifications.—Smallpox, 0; scarlet fever, 1392; whooping-cough, 1664; diphtheria, 328; paratyphoid, 5; typhoid, 7; measles (excluding rubella), 6957; pneumonia (primary or influenzal), 693; cerebrospinal fever, 31; poliomyelitis, 14; polioencephalitis, 0: encephalitis lethargica, 0; dysentery, 68; puerperal pyrexia, 148; ophthalmia neonatorum, 43. No case of cholera, plague, or typhus was notified during the week.

Deaths.—In 126 great towns there were no deaths from scarlet fever, 1 (0) from enteric fever, 3 (0) from diphtheria, 6 (0) from measles, 7 (1) from whooping-cough, 63 (7) from diarrhœa and enteritis under two years, and 22 (2) from influenza. The figures in parentheses are those for London itself.

Sheffield reported the death from an enteric fever. There were 10 fatal cases of diarrhœa and enteritis at Leicester, 8 at Manchester, and 6 at Liverpool.

The number of stillbirths notified during the week was 296 (corresponding to a rate of 31 per thousand total births), including 42 in London.

WEEK ENDED DEC. 21

Notifications.—Smallpox, 0; scarlet fever. 1201; whooping-cough, 1586; diphtheria, 242; paratyphoid, 6; typhoid, 4; measles (excluding rubella), 7728; pneumonia (primary or influenzal), 741; cerebrospinal fever, 29; poliomyelitis, 13; polioencephalitis, 2; encephalitis lethargica, 0; dysentery, 62; puerperal pyrexia, 133; ophthalmia neonatorum, 79. No case of cholera, plague, or typhus was notified during the week.

Deaths.—In 126 great towns there were no deaths from scarlet fever or enteric fever, 3 (1) from diphtheria, 4 (0) from measles, 18 (1) from whooping-cough, 91 (5) from diarrhœa and enteritis under two years, and 26 (5) from influenza. The figures in parentheses are those for London itself.

Liverpool reported 11 deaths from diarrhœa and enteritis, Manchester and Birmingham each reported 10, and Leicester 7.

The number of stillbirths notified during the week was 269 (corresponding to a rate of 29 per thousand total births), including 29 in London.

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[1] Registrar-General's Return of Births, Deaths and Marriages for the September Quarter, 1946. H.M. Stationery Office. 6d.

ANY nursing-home, even if not licensed as an institution by the Ministry of Food, may now have four additional rations of soap on behalf of each expectant mother whose confinement takes place in the home. Application should be made by matrons to the local food office, and must be accompanied by the expectant mother's ration book R.B 2 (EM).

In England Now

A Running Commentary by Peripatetic Correspondents

IN these days of atom bombs and other monstrous follies of man, it is a relief and joy to find places where human happiness on a simple scale reigns. The other day I went to see some children suffering from bronchiectasis, which is a miserable affliction for a child. But they were all as happy as could be doing gym—or I suppose I should call it physiotherapeutic exercise. The young woman taking the class was overflowing with energy and enthusiasm, so that what might have been dull exercises were one long game, and the children were in turn engines, windmills, and crocodiles trying to bite her toes. From time to time a child would need to bring up sputum, and without a trace of self-consciousness would run to his mug at the side of the classroom, spit it out, and immediately return to the game. Later, at tea with the matron, there were endless happy anecdotes of the children, ending with bringing in little Harry, who sang a song about a train going to the sea, and "would it please take me." Unfortunately, little Harry could not remember how to stop, so the train went round and round until Harry's dilemma was solved by the matron who brought it to a standstill with a chocolate biscuit. By the time I left I could almost feel that the children were lucky to have an illness which took them to such a place.

As a contrast I visited a home for chronics, who would normally have been either a miserable burden on their families or the flotsam and jetsam of life swept into the backwaters of an institution. But far from it. They lived in a hostel looked after by a woman who so enjoyed her work that all the old ladies—average age about 80—were as merry as could be. Introduced to each one punctiliously by name as a friend and neighbour, the afternoon went rapidly by in a stream of lively chat, ending with an old lady who, having to sleep sitting up leaning against a cushion, said, "I'm luckier than the others—I sleep with my old man," giving the cushion an affectionate squeeze. Those old women, well past medical aid so far as returning to a useful life was concerned, still had some years of happiness to enjoy, free from troubles, neglect, or the reproach of wearing down their younger relatives. Here the term "chronic sick" implied not misery, weariness, or even incarceration, but just a happy old age.

* * *

I have always been interested in soup since as a boy it formed a staple part of my diet. Kale, Scotch broth, cockie leekie, hare soup, salmon cream, game, white and brown onion soups, *pot-au-feu* (the Borderers have many affinities with the French) were all standard dishes. This was not peculiar to our household but common throughout the town. The nutritive and economical values of soup were well appreciated. It is said that one worthy possessor of a large family used to encourage his brood with the adjuration: "Them that sups the maist soup gets the maist meat." But my interest was clinched at my oral in medicine when one examiner was tousling me sorely over biochemistry. The other, his senior and a kindly soul, interrupted him blandly with a question about nephritis in a girl of twelve. Turning to him gratefully I launched out on the specific and general treatment—I knew his method—and in detailing a diet mentioned broth. "And how do you make broth?" he asked. "You cannot just say broth to an ignorant mother. You must tell her how to make it. Give me a recipe." The junior examiner nursed his wrath while I went into culinary minutiæ, silently thanking my chief who used to import his sister into the infirmary to lecture his clinic on invalid cookery. The five minutes spent on this took me safely to the bell and a pass.

I maintain my interest in soup these days by making it myself; my wife heartily approves of this hobby and I find it satisfies the experimental urge as well as the wame. It is marvellous what can be done with the produce of a small garden which includes a goodly variety of herbs, even without meat stock. Still, there is little difficulty about the latter even today. In the southern English town where we now dwell my wife has never any trouble in getting soup bones from the butcher. There is no demand among the local people. I keep on recommending soups to my patients for various reasons, not least to improve their nutrition and give them mineral salts that they would otherwise lack. I fear however I am merely gathering a reputation for eccentricity, because making soup is far too much trouble for the average housewife with whom I have to deal. It is a pity, for much valuable nutriment is thereby wasted.

Before the war Professor Mayer, of the Collège de France, used to say that one could divide France geographically into two parts. In the one it was customary to throw away water in which vegetables were boiled. In the other the vegetable water was always used for soups and sauces, and the state of nutrition was demonstrably better than in the former area.

I could expand this subject almost to book length. Perhaps some day I shall.

* * *

If, as Dr. Moody (Dec. 28) suggests, a psychiatrist can dig such unpleasant experiences out of the subconscious that actual physical signs appear, surely he can dig out *some pleasant experiences and thereby produce desirable* physical effects? I am going to set up an Abreaction Holiday Clinic. Under a little 'Pentothal' my patients will be made to recall that prewar week at Torquay or Hastings—the heat of the August sun on their backs, the chill of the water as they took their first plunge, the soreness of their feet from unaccustomed climbing on the rocks, the mighty blow-out at the hotel afterwards. They will cram the health-giving properties of a week at the seaside into 30 short minutes. And if when they come round and are handed my account they doubt my word for what has taken place, there will be the stigmata of a mahogany face and two stone on their weight to convince them. There will be no more need to queue for emergency ration books, to hoard petrol for the journey, or to write endless letters pleading for non-existent reservations. People will come in hoards (I'd almost said queues), and in a couple of months I ought to make enough to take self and family to the sea this summer.

* * *

I think it was Chesterton who dismissed a whole epoch with the damning phrase: "They have no songs." And that, I believe, is what is wrong with our profession today. I am not disposed to think that I can remedy the whole defect myself, though the post of song- and slogan-writer to the new health service might be an attractive one if adequately remunerated on a per-item basis and if a right of appeal to the Poet Laureate were assured. It is rather in the hope of encouraging other readers to try their hand that I offer the following small lyric as an example of what I mean.

"Oh Dr. Dain! Oh Dr. Dain!
Are you coming round to meet me, Dr. Dain?
Everybody seems confused
By your ballot—or amused,
Don't you think that you had better try again?
Oh Dr. Dain! Oh Dr. Dain!
My advances you will surely not disdain?[*]
What a service there might be,
If we only could agree!
Absolutely, Mr. Minister! Completely, Dr. Dain!"

In choirs and places (like local meetings of the B.M.A.) where they sing, this lyric may be rendered effectively to the tune of *Mr. Gallacher and Mr. Shean*, provided a sufficient number of members are familiar with the tune of *Mr. Gallacher and Mr. Shean*. A concerted tutti-frutti from the whole council of the B.M.A., led by the booming bass of the Radio Doctor, would without doubt be quite overpowering in its effect, and irresistible to any Welshman. You will see, therefore, that my simple scheme has unexpected and incalculable possibilities, and it only remains for the more imaginative members of the profession—readers of THE LANCET, that is—to start the ball rolling by applying themselves to the composition of suitable lyrics.

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[*] I think line seven rather pithy myself, but the contrapuntist may substitute "entertain" for "not disdain."

Letters to the Editor

THE B.M.A.'s DECISION

SIR,—I have read Mr. Layton's letter very carefully but am still not sure what he complains of, except that he does not like the result of the plebiscite. But why blame the B.M.A.? There was no other body ready and competent to take the lead in ascertaining the opinion of the profession. It invited and obtained the coöperation of all the bodies representing the specialist groups. To say that they have "become absorbed by the B.M.A." is no compliment to men who are quite able to hold their own. They put their ideas into the common pool and produced a set of requirements which they regarded as fundamental to a good medical service, and these have been endorsed over and over again by representative meetings. If Mr. Layton has any other organised body in mind which was or is capable of doing this I should like to know what and where it is. To speak of "the herded will of the medical profession" comes with an ill grace from one who presumably calls himself a democrat. But evidently the old slogan still persists as it did all the time I was in office: "When in doubt, blame the B.M.A."

Mr. Layton has a curious notion about the meaning of the word "strike." I have always thought a strike was an organised refusal to *continue* to work in conditions previously accepted. Mr. Layton apparently proposes to apply it to an organised refusal to accept entirely new conditions never previously proposed. And his B.M.A. history is not correct: the "failure in 1922–23 or thereabouts" was not a strike. It was an organised proposal that insurance doctors should give legal notice to resign from the service unless the Government would arbitrate on the capitation fee. The Government did go to arbitration, with considerable advantage to the doctors concerned.

What the Negotiating Committee will do now I cannot prophesy. But as it has never abjured the principles it declared to be fundamental; as these have not been accepted; as it agreed to the plebiscite; and as it clearly has no mandate to negotiate with a Minister who in any case declines to negotiate (in strong contrast to his Welsh predecessor, Mr. Lloyd George) it seems to me that the next move is up to the Minister if he still wishes to provide that free and comprehensive service he has promised to the public who will shortly be paying for it.

London, S.W.7. ALFRED COX.

SIR,—Since the collective unconscious of the B.M.A. executive has got down to the level of making arithmetical errors, the ordinary citizen may be left in some doubt as to whether there really is a majority of doctors so opposed to the wishes of the country as a whole as to decline even to negotiate on the new Act. Three considerations seem to me to be of some importance in justifying such doubts.

(1) As your leader of Dec. 21 so well expresses it, "the leaders of the British Medical Association have presented a partial picture of the National Health Service scheme, continually emphasising its risks and imperfections rather than its opportunities." Even among doctors there are many who will vote very largely as they are told; but votes cast under such persuasion scarcely correspond to a resolved determination not to help in working the new service.

(2) Voting in the younger age-groups was in favour of negotiating. Quantitatively, in terms of years of useful service to be expected, such favourable votes average more than the adverse opinion of long-established practitioners, who are naturally more conservative in their outlook.

(3) In the Services there was a majority of Yes's. Although the difficulties of communicating with doctors in uniform are recognised by allowing a longer period for their votes to be returned, this means that the votes of one important section of the profession have not yet been considered in full, and the absence of a "mandate to negotiate" at this stage of the analysis may well be removed by the two-thirds of Service doctors whose votes have still to come in.

In view of these things, the refusal of the B.M.A. council to accept the opportunities offered by negotiation will certainly appear to the general public as arbitrary and unjustifiable action. Is it too late to reverse this decision?

Manchester. DOUGLAS A. K. BLACK.

SIR,—I think your leading article of Dec. 21 underestimates the strength of the B.M.A. position. All who voted No on the plebiscite are definitely pledged to support it; but the Yes-men (of whom I am one) are by no means to be reckoned as necessarily its opponents. I voted Yes, partly in a sort of Munich spirit, and partly because I did not wish to be committed to blind obedience to some future decision of the B.M.A. (of which I am a member). But I shall certainly not apply for leave to join the National Service unless I am satisfied that—

1. The relation of the basic salary (if any) to the capitation fee cannot be substantially altered by unilateral action of a politician or politicians.
2. Only professional considerations shall be allowed to influence the appointment of hospital staffs.
3. Every reputable doctor at present established in practice shall have the right to join the service without being required to uproot himself and start afresh elsewhere.

It should be clearly understood that under the Act no doctor has a right to enter the service; he has only the option of asking leave to enter it, and this will only be granted on conditions. Many who would have been willing to negotiate will refuse to exercise this option so long as conditions which they believe to be detrimental to the efficiency of the service are retained.

Paignton. ATHELSTANE HILL.

SIR,—As a reader of *The Lancet* for over forty years I have always looked upon it as a scientific and not a political journal; but your editorial on Dec. 21, ignoring the majority of general practitioners against negotiation *now*, and your criticism of the British Medical Association for acting on that vote, seems to me to be biased propaganda.

You do not criticise the Minister of Health for refusing to negotiate before the Bill was presented to Parliament, nor for cutting out much that would have been beneficial in the Bill proposed by his predecessor, and the amendments proposed by the House of Lords.

At the time when the National Health Insurance Act was passed I resigned from the B.M.A. on account of their then feeble attempts to improve it, but I am now applying for membership as I see that the association has learned to stand up and not allow a profession to be dictated to and treated like a flock of sheep as Hitler (*Mein Kampf*) described the German people.

The B.M.A. has taken great pains to give both sides of the question a very fair hearing in accordance with their truly democratic principles (vide the *British Medical Journal* of the last two years). They do not allow politics to enter into their discussions, and they have refused to discuss monetary matters in connexion with the new Health Service Act.

Swindon, Wilts. R. P. BEATTY.

SIR,—May I suggest a "way out" for the B.M.A.? The future medical service concerns mainly the young people. Let a new vote be taken, therefore, restricted to those practitioners who are under fifty years of age. We over-fifties have had our day; let us leave it to the young people to decide how the future service shall be worked. While standing aside and leaving the decision to them, we can yet assure the young people that we will stand by them and support them in whatever decision they may make.

Barnet. JOHN ELAM.

SIR,—64% of the voting general practitioners of Great Britain voted No. This is a higher percentage than that of the electorate whose votes returned the present Government to power. If votes mean anything this 64%—the men most directly affected—must therefore be accepted as decisive.

Those of your readers who have neither party nor emotional bias can see that your conscientiously propagated gospel has now been found imperfect, and your first reaction is that of the well-known animal which refuses to recognise the existence of that which it fears. I submit that it is you, Sir, and others like you, whose unwillingness to recognise what 64% of us believe is helping to delay a solution.

Nothing could be further from the truth than your assertion that this 64% was persuaded by emotional propaganda to vote as they did. The fact is rather that their virile determination to remain free obliged the B.M.A. to carry out their policy.

A. B. C.

SIR,—The analyses of the B.M.A. plebiscite conceal the main issue. That issue is "the divergence between the principles of the profession and the provisions of the National Health Service Act."

On a matter of principle surely the opinion of one medical man is as good as another. Every medical man who registers his name becomes subject to a code of professional morality, whatever branch of the profession he pursues. Whatever his work, he may be called to serve on an ethical committee of the B.M.A. or on the G.M.C. It is the distinguishing feature of principles that they apply under all conditions: to test them, they must be tried under every kind of condition, or in this case in every branch of medical activity. Only when the sum of experience and judgment in every such branch is combined in a grand total can the validity of the principles be assessed.

To compare principles in one group with principles in another is undesirable and fallacious. It suffices to say that when the principles put forward by the council of the B.M.A. were viewed in the light of every kind of medical experience, 54% had voted for them and 46% against (by Dec. 16). To allow the judgment of 33% of the profession (the general practitioners) to weigh heavily in a judgment of principle is regrettable. To allow them to plead hardship is understandable; but it is doubtful whether their verdict outweighs that of all the remaining civilian practitioners (11,247 for negotiation, 9784 against), when it is claimed as a determinant of principle. When such a verdict may bring the profession as a whole into conflict with the principles of the British constitution it is most certainly one which needs confirming on appeal.

Hove, Sussex. WILLIAM BOURNE.

REGIONAL AREAS

SIR,—Your issue of Dec. 14 contained a number of comments, mainly favourable, from various individuals with regard to the proposed regional areas under the National Health Service Act 1946. I have been rather surprised not to find in later issues some attempt to draw attention to difficulties and disadvantages which must arise.

Hitherto it has generally been considered sound policy to integrate as closely as possible the practice of preventive medicine and the treatment of disease. The Local Government Act 1929 made a most valuable contribution towards the attainment of this ideal by bringing together, under the control of the county councils and county boroughs, the public-health and public hospital services of the areas over which they had jurisdiction. During my term of office at the London County Council we had considerable practical experience of the benefits to the inhabitants of the Administrative County of London which arose from this close integration under unit control.

Between the years 1930 and 1939 a first-class public service was gradually built up, which included all aspects of public-health and hospital work, the school medical service, maternity and child welfare, tuberculosis, and venereal diseases. Had it not been for the outbreak of war in 1939 we should have had by 1946 not only a first-class public-health and hospital service for the county of London but also harmonious coöperation with the metropolitan borough health services, the voluntary hospitals of London, and the health and hospital services of all the home counties.

Instead of that most desirable coöperation in the densely populated area of Greater London, without any interference with the autonomy of either the local-government authorities or the voluntary hospitals within the area, we are now faced with a scheme of regional areas which completely breaks up the highly efficient organisations which have been built up after many years of devoted work and after gaining a mass of invaluable practical knowledge and experience.

It is abundantly clear that this tragic disruption of the public-health and hospital work of local-government authorities has been brought about by men whose ideas and ideals have been completely dominated by clinical experience and who have no knowledge or practical experience of the health work, preventive and curative, of local authorities. It would be easy to illustrate in a hundred different ways how the division of the county of London, for example, into four regional areas must inevitably lead to confusion, chaos, and inefficiency. Adverse comment can be made with complete confidence with regard to the regional area for Wales, which is quite obviously designed not on practical day-to-day experience and knowledge but on purely political and nationalistic considerations.

I mention these two very different regional areas for the simple reason that I happen to know them intimately from personal experience; but I shall not be surprised to learn later that similar criticisms can justly be made with regard to most, if not all, of the other regional areas. Unless I am very much mistaken the years of 1948 and 1949 will reveal in a most unpleasant fashion the folly of breaking up well-established public-health and hospital organisations based upon equally well-established local-government areas, and replacing the latter by new regional areas based mainly (except in the case of Wales) upon clinical considerations.

London, W.8. FREDERICK MENZIES.

PENICILLIN FOR GONORRHŒA IN THE FEMALE

SIR,—Dr. Mascall's account of his failure with penicillin in female cases of gonorrhœa (Nov. 16) raises many interesting points. One is the number of films in which gram-negative extracellular diplococci are reported and are apparently assumed to be gonococci. I think it should be emphasised that gram-negative diplococci, whether intra- or extra-cellular, from the cervix, urethra, or anywhere else are not necessarily gonococci; and that all circumstances have to be considered carefully if the organism has not been cultured and identified. In other words, the microscopic examination of films warrants only a provisional diagnosis. Two cases will illustrate how easily mistakes can be made.

Some time ago I saw a child who had a slight vulvitis. The doctor took a slide, and the laboratory reported gonococci present. The vulvitis was very mild, amounting to little more than an irritation. I repeated the tests, with the addition of cultures: the slides showed gram-negative intra- and extra-cellular diplococci which were proved by culture to be of the catarrhalis type.

The second case was more important. I was asked by a doctor to see a woman whose husband, in the Services, reported a slight urethritis, which he was told was gonococcal. I gather that there was some doubt about the diagnosis on the first examination, as a second test was taken. He communicated with his wife, from whom he assumed he had contracted the condition, since there had been no extramarital intercourse. If his wife was the source of the infection, the incubation period was long—three weeks. I saw his wife, and on the first occasion could find no abnormality clinically and no gonococci. On a second examination there was slight patchiness about the cervix: films showed a few gram-negative extracellular diplococci; but the cultural appearances of these cocci were not those of gonococci, they did not ferment glucose, and in fact they were not gonococci. Incidentally, this organism was sensitive to penicillin.

I suggest that neither of these persons had gonorrhœa; but had the cultures failed to grow (which, I fear, happens too often) gonorrhœa would have been diagnosed in both husband and wife, with very serious consequences. I do not believe such cases are very rare.

Miss Sandes (Nov. 30) stresses the importance of gynæcological experience for V.D. officers. I would go further and suggest that all gynæcologists should take a short course of 130 hours or so in a V.D. department.

In conclusion, I think that we have been too optimistic in hoping for a cure of gonorrhœa from a single day's treatment with penicillin. I am having far greater success with a single injection of 300,000 units of penicillin in oil and wax, followed by a week's treatment with sulphonamide.

Birmingham, 3. E. W. ASSINDER.

A MORAL PROBLEM

SIR,—Your annotation of Nov. 30 has stimulated discussion both in the medical profession and in the lay press; and responsibility devolves on the profession for deciding on a matter likely to arouse increasing public concern. The decision should rest on a dispassionate view of the issues, and should so far as possible be unbiased by sentimentality.

There is, of course, no question of attempting to justify the experiments carried out by the Nazis. Examination, and even subsequent utilisation, of the results of those experiments in no way condones the cruelty which was a characteristic feature of Nazi pseudoscientific technique, nor entitles the perpetrators of crimes to expect any remission of punishment. However, precisely because of our determination that such experiments should never again be undertaken, it becomes crucial to discover whether facts are today at our disposal which may never again become available. Refusal to publish the results of these experiments may deprive medical science of information unobtainable in any other way.

Of all the arguments used against publication, that which commands most respect is the danger of establishing a precedent for future crimes against humanity in the name of medical science. Surely the reply to this argument is that to those so perverted as to contemplate resurrecting the concentration camp, with its attendant horrors, no precedent is required, and the absence of precedent would be no restraining force on the execution of their plans. The only possible safeguards against a recrudescence of cruelty on the scale of Nazi Germany lie in the establishment of a peaceful international order based on mutual trust and in the consequent raising of the moral standards of life throughout the world.

Valuable information has already been obtained by observation of victims systematically starved by their Nazi oppressors: yet no objection has been raised on moral, ethical, or political grounds. The published results have given us illuminating information about the clinical picture of starvation, the vitamin deficiencies, and disorders of the blood, and about the treatment of starvation: and the data will find application in many facets of medical practice. Here then is an unequivocal example of mankind benefiting from study of the effects of the inhuman treatment meted out to the victims of Nazi tyranny.

In conclusion may I suggest a practical approach to the problem? Since many of the German "experiments" appear to have been quite senseless, would it not be wise to commission a panel of experts to examine the material and to discard what is clearly valueless? This would, in addition, provide a further safeguard against the ventilation of ill-informed opinion offending the sensibilities of the public and vitiating the purpose of the investigation.

We cannot undo the damage done to human lives nor quicken the dead; but do we not owe it to those who themselves suffered so horribly to do all that we can to reduce the sum total of human suffering?

Preston Hall Hospital, Maidstone. SIDNEY M. HILTON.

CURARE AND POSTOPERATIVE CHESTS

SIR,—As you say in your leader of Dec. 21, when each new anæsthetic is introduced we are assured that here at last is an agent which will not "cause" postoperative emesis and pulmonary complications. Curare is no exception to this rule. In many quarters it seems to be regarded as proved that curare possesses these virtues, but no figures have been offered in support of the thesis. The results summarised in the table below have a special claim to significance as the series ran concurrently; consequently epidemiological factors need not be considered in their interpretation. The curare group contained more women than the other group. "A" chest complications were those associated with a temperature over 101° F or a respiratory rate faster than 24 per minute; they included cases of pneumonia and atelectasis. The remaining patients classed as having chest complications were those in whom a cough with expectoration appeared for the first time after an operation or who had an exacerbation of a pre-existing bronchitis. Only patients undergoing intra-abdominal operations were considered. With a single exception, the curare patients were anæsthetised with intratracheal nitrous oxide and oxygen after an 'Evipan' or 'Pentothal' induction; a few received a little ether in addition. All had fully recovered their reflexes and many could answer questions in a drunken fashion by the time they left the theatre.

Anæsthetic	*Cases*	*Total chest complications*	*"A" chest complications*
Curare	14	7	2
Other agents ..	19	8	3

This brief series offers no ground for hoping that curare will, more than any other agent, prevent postoperative pulmonary complications. This finding is far from unexpected, since it has now been shown, times without number, that the primary ætiological factors in these conditions are the operation and the condition for which it is performed.[1] The only other factor of any importance is pre-existing respiratory infection,[2] and it is against this that prophylaxis should be directed. Apart from the importance of having skilled anæsthetists for difficult cases,[3] modifications of the anæsthetic technique are unlikely to be of value.

Cheadle Hulme, Cheshire. A. R. HUNTER.

PART-TIME NURSES

SIR,—Your annotation of Dec. 14 stating that "Gloucestershire has solved the problem" of the infirmary care of the chronic sick is indeed tidings of great joy for the Christmas season. Honour to those who have been at work to get so great and yet so simple a scheme into being in the short space of time recorded.

While the profession and the press argue heatedly and long over the arrangement of medical services, it is well to be reminded that honest workers doing their daily job with intelligence and sympathy can find solutions ready to hand.

> "For forms of Government let fools contest
> Whate'er is best administered, is best."

Moor Park, Middlesex. ESTHER CARLING.

LIVER-FUNCTION TESTS IN JAUNDICE

SIR,—With reference to your second leader of Dec. 28, I should like to support your views as to the value of the flocculation tests in differentiating obstructive from infective jaundice, and to pay a tribute as a clinician to the usefulness of these tests in practice.

A test not apparently investigated along with the study of liver biopsies—namely, the serum colloidal gold reaction (Maclagan's modification)—has been of great value to me in the diagnosis of infective hepatitis even in the pre-icteric stage. I find that my last 50 cases of this condition have given strongly positive results, both in the colloidal gold and the thymol turbidity reaction.

I should like to stress the value of combining the results of a number of tests rather than relying on the result of any one. Very few experienced clinicians would change their diagnosis on one biochemical test, but I can recall two occasions on which I have recommended laparotomy for a jaundiced patient whose symptoms and signs suggested subacute hepatic necrosis but whose biochemical tests pointed to obstruction: both these patients had stones in the common duct. I have found the most useful and reliable combination to be the thymol turbidity, serum colloidal gold, serum bilirubin, direct and indirect, and serum alkaline phosphatase. In obstructive jaundice the flocculation tests have been negative, the direct serum bilirubin raised, and the serum phosphatase above 35 units, and this type of combination of results has appeared in a consecutive series of 20 proved cases. In the more difficult case of an infective jaundice with an obstructive element I have found the positive flocculation tests of value, as these tend to remain constantly positive while the bilirubin and phosphatase sometimes vary even from day to day.

There seems to be a healthy scepticism in the minds of physicians as to the clinical value of liver-function tests, and I think the time has come to suggest that the "empirical" flocculation tests mentioned here and in your leader be no longer called tests of liver function, especially as recent experience has shown that they are

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1. King, D. S. *Surg. Gynec. Obstet.* 1933, 56, 43. Brock, R. C. *Guy's Hosp. Rep.* 1936, 86, 191. Bird, H. M., Kilner, S. D., Martin, D. J. *Brit. med. J.* 1943, i, 754.
2. Campbell, S. M., Gordon, R. A. *Canad. med. Ass. J.* 1942, 46, 347.
3. Dripps, R. D., Deming, M. Van N. *Ann. Surg.* 1946, 124, 94.

often positive in diseases not apparently involving the liver. In spite of this, their place in the diagnosis of a jaundiced patient presenting a difficult clinical picture is, I believe, assured.

Ashford County Hospital,
Middlesex.
A. BARHAM CARTER.

DANGERS OF CALCIFEROL

SIR,—May I correct a small error in your leading article of Dec. 14? You say that Dowling and Prosser Thomas think that there will be no great risk of serious sequelæ with the maximal dosage they employ in lupus—150,000 I.U., or 3·75 mg., daily. In the article from which this expression of opinion is quoted (*Lancet*, 1946, i, 919) the actual words are: "With adequate precautions, and assuming that the patient is under regular observation, it seems unlikely that the administration of calciferol *for limited periods* in the dosage used by us, which has never exceeded 150,000 I.U. daily, would entail any great risk of causing calcification or other serious sequelæ. There is little doubt, though, that there is considerable individual variation in the toxic threshold."

In fact the dose of 150,000 I.U. daily for an indefinite period is by no means safe, though most patients will tolerate it for two or three months, and some for a longer period, without developing either an important rise in blood calcium or toxic symptoms. Unfortunately it would appear that the effective dose in lupus is often near the limit of tolerance.

I am sure that all dermatologists will agree that heavy dosage of vitamin D is not suitable for the treatment of such trivial complaints as chilblains; some might even go so far as to assert that it is useless.

London, W.1.
G. B. DOWLING.

LEPTOSPIROSIS CANICOLA

SIR,—In connexion with the interesting paper by Dr. Baber and Dr. Stuart (Oct. 26) I would recall that it was my teacher, Prof. Jan Lukes, who identified the *Leptospira canicola*; this was in 1923 at Brno, Moravia, during an extensive epidemic among dogs. He did not succeed in cultivating the organism, but he did transmit Stuttgart disease in animals.

Professor Uhlenhuth[1] has acknowledged the value of Lukes's work, which has been the basis for all subsequent investigations of the subject.

Institute of Morbid Anatomy, Slovak
University, Bratislava.
F. KLEIN
Acting Director.

ETHER ANÆSTHESIA IN 1846

SIR,—Dr. Douglas Guthrie's account (Dec. 21) of the administration of ether as an anæsthetic in 1817 is of great interest. For a long time it was thought that Liston's amputation on Dec. 21, 1846, was the first operation to be performed in Europe under ether. A recent paper by Dr. Ashworth Underwood claimed priority for an amputation in Dumfries a few weeks earlier.

I should like to place on record the details of a hitherto unpublished case which occurred in London, possibly before the Dumfries one. While engaged in some research on the ether centenary, I came across a letter in the collection of documents compiled by Dr. F. W. Cock in 1910, in which Dr. Henry Montague Duncan (1822–1915) gives a personal account of the inhalation of ether in November, 1846. The relevant portion of this letter, dated Oct. 23, 1910, reads as follows:

> "Your letter in the B.M. Journal of this date carries me back to the time of Robert Liston, my idolised teacher of surgery. Liston, who was celebrated for his remarkably quick and sure operations, was in 1846 a strong opponent of anæsthesia. As the first in Great Britain to inhale ether vapour, I, now in my 88th year, entered Univ. Coll. in 1846. By the friendship of Mr. Holme Coutts, late surgeon of St. Bart's, in the autumn of 1846 I gained admission to the meeting of the Medico-Chirurg. Soc. to hear George Johnson's lecture on the kidney. After the lecture, the assistant of Dr. Morton of Boston, U.S.A., exhibited his inhaling apparatus. A patient from Univ. Coll. Hosp. who had promised to appear, failed to do so. And as no one else wanted to submit to the trial, I offered myself. For during the enforced five years' apprenticeship of that time, I had studied the effects of nitrous oxide after the method of Sir H. Davy, and practised its effects on my young acquaintances so safely that I boldly and fully inspired the ether vapour, became unconscious, and awoke in full health and in presence of many anxious faces, the only inconvenience being an itching or stinging of my wrists, which showed that needles had been inserted (without my feeling their punctures at the time) and produced a little bleeding. The Boston visitor thanked me heartily and Mr. Liston was so convinced of the value of anæsthesia that he a few days later engaged the services of Mr. P. Squire, chemist, of Oxford Street, in the construction of an apparatus for administration of ether vapour."

Dr. Duncan thus becomes the first person to be anæsthetised in this country, although it was not for the purpose of an operation. He qualified M.R.C.S. and L.S.A. in 1849, and gained the M.D. Lond. in 1861. He was assistant surgeon to the North London Eye Infirmary. The *Transactions of the Medico-Chirurgical Society* show that the meeting which Dr. Duncan attended took place on Nov. 11, 1846.

London, W.1.
MASSEY DAWKINS.

MEDICAL ADMINISTRATION

SIR,—Your correspondent "F.R.C.S.," writing on Dec. 14 under the heading of Regional Boards, makes a very serious criticism in regard to medical administration of hospitals.

It should be remembered that medical superintendents have been forced to take a position of authority in certain hospitals owing to the backwardness of their own local authority in applying a democratic system of medical government in the hospital. It is such conditions which have caused the Medical Superintendents Society to press for reforms in hospital administration; and in the Manchester area, for example, the local authority, at the request of the medical superintendents, has improved its system of hospital management. The visiting staff form a medical staffs committee and minutes of the local-authority committee are forwarded to the secretary of the medical committee before the meeting of the local-authority committee at the hospital. A member of the medical staffs committee, other than the medical superintendent, can attend meetings of the local-authority committee.

The criticism of "F.R.C.S." against medical superintendents in the latter part of his remarks imputes to medical men a moral sense lower than that possessed by laymen. Surely if a medical superintendent can cancel out the medical committee's advice by a judicious word to the chairman of the local-authority committee such a course could also be followed by a lay superintendent. There is poor hope for medical progress unless members of the staff of a hospital are prepared to work in coöperation for the good of the hospital as a whole, and not to further the interests of one particular person, be he medical superintendent or member of the full-time or part-time specialist staff.

Manchester.
J. M. GREENWOOD.

AMPHETAMINE IN PULMONARY TUBERCULOSIS

SIR,—The article by Dr. Houghton and Dr. Corrigan (Dec. 14) is a valuable one; but I should like to comment on the sentence "Doses much larger than those which we have used can be given, and no ill effects have been found when amphetamine has been administered continually for two years or more."

About a decade ago I had a patient who was going through a period of great mental strain, based on a well-founded fear of professional ruin and social obloquy, and in order to continue with his work for as long as possible took amphetamine 15 mg. daily. After 18 months a rash appeared on the chest, and then he started what seemed to be an exfoliative dermatitis. Eventually the whole of his skin became severely fissured, and he was a prey alternately to intense irritation and to severe pain. No part of his skin escaped, except the scalp which shed epithelium so that when he brushed his hair he, in his own words, stood in a pile of snow.

Withdrawal of the drug and the application of active treatment led to a complete cure although the fear-complex persisted because the conditions causing it were still operative. Presumably therefore the skin condition was due to a toxic element and was not primarily sychogenic. One knows, of course, that individual liosyncrasies to drugs are continually observed, but in ny opinion this applies to amphetamine far more than o others.

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[1] Uhlenhuth, P., Fromme, W. Handbuch der pathogenen Mikroorganismen, Jena, 1930, vol. 7, p. 1568.

London, W.1. CHRISTOPHER HOWARD.

RELAPSING BENIGN TERTIAN MALARIA

SIR,—Dr. Johnstone (Dec. 7) in his interesting report on the treatment of relapsing benign tertian (B.T.) nalaria, showed that relapses are less frequent with quinine-pamaquin (15·6 %) than with 'Paludrine' (43 %). It is especially noteworthy that with paludrine the relapse-rate was the same whether 0·05 g. or the tenfold dose, 0·5 g., was given each day.

Your annotation of Dec. 14 says: "Against this achievement must be set the facts that quinine in the dosage advocated has unpleasant side-effects. . . ." You are right: gr. 30 (2 g.) of quinine—corresponding to 1400 mg. (sulphate) or 1640 mg. (hydrochloride) of quinine base—often causes unpleasant side-effects.

However, I believe the dosage of quinine advocated by Dr. Johnstone is unnecessarily high. I know that many British malariologists, especially in the tropical countries of your Empire, prescribe 2 g. daily. But with B.T. malaria (not with subtertian) a smaller dose suffices. Not only in Holland but also in Java B.T. malaria responds as quickly to gr. 12–15 of quinine sulphate as to gr. 20 or even gr. 30. Our malaria patients, including those from the endemic districts of Holland and the many thousands of repatriated military and civil internees from Java and Sumatra, are at present successfully treated as a routine with 0·75–1 g. (gr. 12–15) of quinine sulphate, combined with pamaquin naphthoate 50 mg. daily, without admission to hospital.

Amsterdam. C. W. F. WINCKEL.

AIDS TO THE DIAGNOSIS AND TREATMENT OF VENEREAL DISEASES

SIR,—I am most grateful to your reviewer (Dec. 14) for the kind things he says about my little book, but he is in error when he says I omitted to mention post-arsphenamine jaundice resulting from faulty sterilisation of syringes; if he will refer to page 115 he will see that I id not omit it. Of course it was not possible in the ace at my disposal to go into details, but in view of he fact that I was the person most concerned about the igh incidence of post-arsenical jaundice in the Army was very unlikely that I should forget to mention it.

Ashford, Middlesex. T. E. OSMOND.

SOLUBLE SULPHONAMIDE COMPOUNDS

SIR,—The soluble sodium salts of sulphapyridine, ulphathiazole, sulphadiazine, &c., introduced first in 939, have been exceedingly useful preparations for ntravenous injection, especially in the unconscious atient. Their great disadvantage, as is now well known, s their high alkalinity and consequent liability to cause rritation and even necrosis in the tissues unless they are ighly diluted. This property is occasionally dangerous, s when, by some inadvertence, these preparations are njected undiluted into the theca, the brachial artery in mistake for a vein), or the subcutaneous tissues (in nistake for a muscle). From these respective causes I ave seen permanent sciatic palsy, loss of an arm, and leep sloughing ulcers of subcutaneous tissue and skin. t would seem therefore that these preparations would y general agreement be superseded as soon as a neutral reparation, proved to be harmless and equally efficient, ould be obtained. This I consider has been done.

My colleagues and I have injected the preparation nown as 'Soluthiazole' (May & Baker) intravenously or intramuscularly whenever a sulphonamide injection was indicated in this hospital for over two years. We are quite satisfied that this preparation is harmless intravenously, intramuscularly, and even when injected, as sometimes happens, deeply into the subcutaneous tissue. The pH value is around 7. The solution is not, however, isotonic; it is hypertonic. Accordingly, we have not used it, nor indeed have had occasion to use it, in contact with mucous or serous membranes. The first preparation which we tried had a tendency to crystallise out in some of the ampoules, but I understand that the preparation now in use has been slightly modified to obviate this defect, and we have seen no trace of crystallisation in any of our ampoules for more than a year. The ampoules of 5 c.cm., each containing 1 g. of sulphathiazole, should be kept at room temperature, not in the cold.

In teaching students and postgraduates I have been struck by the almost universal ignorance of the existence of a soluble neutral sulphonamide preparation in concentrated form and completely satisfactory for intravenous and intramuscular injection. Hence this letter.

Park Hospital, London, S.E.13. H. STANLEY BANKS.

CORONARY DISEASE

SIR,—I too have considered the alternative and "generally accepted" view, which Dr. M. Symons (Dec. 28) puts forward, that the leucocytosis and increased erythrocyte-sedimentation rate (E.S.R.) in coronary occlusion are due to the myocardial infarction and resulting destruction of tissue, and not to a septic process. It would be interesting to know if Dr. Symons has records of cases in which it has been proved that the infarct in any site was simple and aseptic, and in which leucocytosis and an increased E.S.R. also occurred.

London, W.1. G. E. BEAUMONT.

Obituary

RICHARD ROBERT CRUISE

G.C.V.O., F.R.C.S.

Sir Richard Cruise, surgeon oculist to Queen Mary and surgeon to the Royal Westminster Ophthalmic Hospital, died in St. Mary's Hospital on Christmas Eve, after a short illness. Born at Purneah, in India, the son of the late Francis Cruise, he was educated at Harrow and at St. Mary's Hospital, whence he qualified in 1900. After holding a house-appointment at Bristol Eye Hospital he took his F.R.C.S. in 1903 and returned to London to obtain further experience in the specialty on which he was now decided. During the next five years he held clinical assistantships at the Royal Eye Hospital, Southwark, the Royal London Ophthalmic Hospital, and the Westminster Ophthalmic Hospital, where in 1909 he was appointed to the staff. During the 1914–18 war Cruise served with the R.A.M.C. in France and with the 3rd London General Hospital. He invented a visor of light chain mail to protect the eyes against injury, recommended by the Ophthalmological Society for universal use among the troops and adopted by the authorities in 1918. At the meeting of the society in 1919 he also described his plastic operation to prepare contracted sockets for the fitting of artificial eyes.

"Cruise," writes A. S. P., "will be remembered by generations of house-surgeons, by whom he was greatly loved, as the man who gave them their first cataract to do, and then stood by and gave them the confidence with which to do it. He never tired of teaching them, and they could have had no better master, for his confidence was unbounded and he inspired a like feeling in pupils and patients. His beautiful cataract results were achieved by cultivating the relationship between surgeon and patient, making the patient into his "assistant," and doing without most of the modern sutures and safeguards. Cruise taught simplicity and gentleness in operating, and when he did a cataract extraction things never looked like going wrong—'I do a simple extraction,[*] my boy, and don't forget the word *simple,*' he would say. And again of cataract surgery—'There are no sticky lenses, only sticky surgeons.'

"A courageous and lovable man, he was daunted by nothing, and made himself master of everything to which he set his hand. Never ruffled, he showed the same coolness at steeplechasing and golf, at both of which he excelled, as he did in his surgical work. He set himself a standard of achievement and never allowed himself to fall below it. To the last he maintained this fine standard of work and it was best that he should die in harness. He would not have liked to grow old."

Sir Richard, who was surgeon oculist to King George V, was appointed C.V.O. in 1917 and promoted K.C.V.O. in 1922 and G.C.V.O. in 1936.

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[*] i.e., a cataract extraction with iridectomy.

SIR WILLIAM COLLINS

In an appreciation of Sir William Collins, Z. L. P. writes: To those who knew him intimately in his home it was always a surprise to hear him described as "stiff" by those who knew him only officially. In the charming house on Beachy Head, which Lady Collins with her unerring instinct of a Scottish hostess had made perfect in every respect—not least in its cuisine—high thinking was combined with the most comfortable living. Though a spartan himself, Sir William found nothing too good for his wife. From the time they met at the London Temperance Hospital, where he was a surgeon, and she a sister, their devotion was something unique in my experience. During his time at the House of Commons she was his never-failing helper; but arthritis tried her even then, and this was what prevented him from standing for re-election. Though he carried on innumerable public and benevolent activities the best of his energies were given to saving her in every conceivable way, and he nursed her single-handed almost to the end.

Sir William's ethical standards were immensely high. In his political and public life he was always the uncompromising Victorian liberal, and neither hope of office nor fear of censure would make him swerve an inch where principles were concerned. An admirer of Emerson, a friend of Stopford Brooke, he would read aloud after breakfast on Sunday morning something from Martineau or another of the great Unitarians.

When I saw him a few weeks ago, he knew that at last the time had come for him to give up his various tasks. He had finished the course and kept the faith and he died "nursing an unconquerable hope."

Mr. C. E. A. Bedwell, chairman of the Federation of Associations in Metropolitan Area, writes: "Sir William Collins assisted in the promotion of the Central Council for District Nursing *for London*. The common omission of the two last words, as in your obituary (Dec. 28, p. 903), is unfortunate in causing confusion with the council of the Queen's Institute, which is the representative body for the service of district nursing throughout the country."

On Active Service

AWARDS

The following have been mentioned in despatches in recognition of gallant and distinguished services in Malaya in 1942:

I.A.M.C.

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Lieut.-Colonels.—E. G. HURDWOOD, W. G. KENNEDY, W. J. L. NEAL, O.B.E., M.C., L. T. PEARSON.

Majors.—K. F. ALFORD, L. FEINHOLS, S. G. NARDELL.

Captains.—ARORA, O. F. CAMPBELL, A. K. MARWAT, A. ROY.

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MARKHAM, WINIFRED M., B.SC. Birm., M.R.C.S.: resident aural registrar, Hospital for Sick Children, Great Ormond Street, London.

OWEN, G. A., M.R.C.S.: M.O., Gold Coast, Colonial Service.

Middlesex Hospital, London:
- HADLEY, G. D., M.D. Camb., M.R.C.P.: asst. physician.
- KEKWICK, ALAN, M.B. Camb., M.R.C.P.: asst. physician.
- KREMER, MICHAEL, B.SC., M.D. Lond., F.R.C.P.: asst. physician for diseases of nervous system.
- SELLICK, B. A., M.B. Lond., D.A.: anæsthetist.

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Notes and News

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A LECTURE to commemorate the first public administration of ether in Europe was given on Dec. 21 in the lecture theatre of the medical school of University College Hospital, by Dr. Massey Dawkins, honorary anæsthetist to the hospital and lecturer in anæsthetics to the medical school. In the absence (through illness) of Dr. A. D. Marston, president of the Association of Anæsthetists, the chair was taken by Dr. Stanley Rowbotham. The lecturer traced the progress of the practice of anæsthetics in the hospital through the days of John Snow, Clover, Barker, with his spinal injections, and Felix Rood, and he alluded to the work of Elliotson. Referring to preanæsthetic days he quoted the patient's view on the shock after operation—that "had he known what to expect he'd rather have died." The wooden operating-table, on which the patient lay while Liston performed the first operation in England carried out under ether, was exhibited. Dr. E. A. Barton, whose father had been present at operations of Liston's, recalled the paternal recollections of the "shrieks and screams which accompanied operation before the use of anæsthetics."

THE ACT AND THE FUTURE

In *Now for Health*,[1] written during the penultimate stages of the passage of the National Health Service Act through Parliament, Dr. Stark Murray, vice-president of the Socialist Medical Association, assumes a little prematurely that all argument about the early establishment of a National Health Service is over, and that attention will now be concentrated instead on finding the best ways in which to implement the Act. For himself, he seems to believe that the departures that the Minister has made from Socialist doctrine are wise ones, and that the Act is the best the country could be given at present. The one concession which he does still regret is the retention of the right of the doctor inside the service to practise privately as well.

For the rest he believes that we should turn from our debates on the dangers of this or that section, and concentrate on the opportunities the Act offers, and how these can be translated into practice to the best advantage of profession and public. We can but agree that this is now a very necessary stage, and hope that the present medico-political impasse will not long prevent attention to it. Particularly in such spheres as regional hospital planning, the establishment of a specialist service, and the provision of health centres no clear or generally acceptable picture has yet emerged, and it must soon do so if we are not to waste time and effort over impracticable schemes.

For illustration we need look no further than Dr. Murray's own book, to the chapter he devotes to health centres; for few would agree that the enormous, elaborate, all-purpose centre that he favours really represents for the patient the best type.

Although Dr. Murray's book is intended to make its main appeal to the lay public, it will also repay examination by the doctors; and if it stimulates constructive argument it will serve a very useful purpose.

THE SOCIAL MISFIT

CHILD-GUIDANCE clinics can do much for children with behaviour problems if they see them early; but, as Dr. John Bowlby pointed out at the recent conference on mental health,[1] clinics today are often flooded with children already in serious difficulties—children whose school work is years behind their mental age, children with phobias, persistent truants, unmanageable and destructive children, delinquents, and children who are chronically too good. Often their emotional difficulties are so serious that they will respond only to skilled treatment over a long period—which is hard to get and very expensive.

In the United States, according to Dr. D. M. Levy,[2] the picture is slightly different: there the child-guidance clinics have done well with behaviour problems, but in treating delinquency, he considers, psychiatry has not made notable progress. The psychiatrists are not necessarily to blame; there, as here, they can advise, but must rely for success on the abilities of the court, of the available professional staff, and of the institutions for delinquents. Like us, they are short of trained staff for this work; many times the present numbers are needed. But Dr. Levy sees prospects of development. Group psychotherapy in informal social gatherings promises good results; and a few examples of a new type of institute are beginning to appear in New York State. In these, every member of the staff, "from elevator man to director," has an understanding non-authoritarian attitude. Delinquent children who have previously been treated with pure discipline are confounded at first by the change; they look for the weak spots, suspect a trap, run amok, or run away. But once they have discovered that no-one is trying to get the better of them they settle down and respond to it. Such institutions are likely to be few for many years to come, because staff of this quality is harder to find than any other. Levy thinks that in England we have developed the care of the delinquent relatively well, bringing in courts, probation officers, directors of institutions, teachers, social workers, and all prison personnel. We have succeeded better than Americans, he considers, in gaining freedom from politics in the selection of personnel and the coöperation of legal, administrative, and professional workers; but Americans have developed more thoroughly the psychiatric study and treatment of delinquency.

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[1] Now for Health. By D. Stark Murray and L. C. J. McNae. London St. Botolph Publishing Co. Ltd. Pp. 78. 4*s.* 6*d.*

[1] Arranged by the Provisional National Council for Mental Welfare, and held in London on Nov. 14.

[2] The Salmon Lecture, New York Academy of Medicine, Nov. 13

When it comes to the adult criminal, he suspects that it would hardly do to give the psychiatrist a free hand: "on the whole, if a psychiatrist were in charge," he says, "I believe that a number of prisoners now released after a few years would remain in prison for life."

LOUIS PASTEUR

"ONE of the great splendours of his genius is to be found in the enthusiasm with which, all his life, he hurried off to those who made any call upon his knowledge. This laboratory worker, whose discoveries were to turn men's beliefs upside down, sought passionately for immediate and practical results from studies on the fermentation of beer, the making of vinegar, the diseases of silkworms. He worked in breweries, in silkworm nurseries, among distillers, mulberry growers, and the shepherds of the plains. Then see him in the hospitals: for the wise man the distress of the sick is an appeal. Pasteur responded."

Prof. Robert Debré, member of the Académie de Médecine, thus celebrates the 50th anniversary of Pasteur's death.[1] His splendid curiosity, his accuracy and logic, and his fine simplicity of character, set Pasteur forever among the great examples to students of science. When, in 1856, he was asked about the fermentation of beetroots he set about studying the question with characteristic ability and thoroughness. He made a medium capable of fermenting, sterilised it by heat, and sealed it; naturally it remained unchanged indefinitely. Then he inoculated part of it with a trace of pure yeast, and as the yeast grew the medium fermented. Here, in one simple experiment, he laid down a fundamental principle of technique. Between 1857 and 1865 he carried out the series of researches which wholly changed scientific ideas on fermentation and established firmly the bacterial theory, which was to revolutionise surgery, medicine, and public health.

But hard as he worked at research, he found it easier to discover a great truth than to get it accepted. Professor Debré tells how in the course of that long battle for belief a speaker at one scientific discussion declared that the organism of puerperal fever could never be found. Pasteur flung himself towards the blackboard and drew the organism "en chapelet de grains," crying: "Tenez, voici sa figure." He won his battle and lived to be honoured as he deserved, but that made little difference to a man whose interest was in doing things rather than in what others thought of his doings. Prof. Henri Mondor[2] tells how, when he came to die, he said—as a sort of sublime excuse—"I can do no more." It can be said of Pasteur, as of few others, that he had done enough.

HOSPITAL FOR ETHIOPIA

Miss Sylvia Pankhurst, hon. secretary of the Princess Tsahai Memorial Hospital Fund, informs us that more than £80,000 has been raised towards the £100,000 required for the new hospital at Addis Ababa. Of this, £40,000 has been collected in Ethiopia itself. The building, with the addition of the outpatient, theatre, and kitchen blocks generously designed by Mr. Lionel Pearson, F.R.I.B.A., is nearing completion. The interior equipment is being *purchased in this* country and some of it is now ready for shipment. Applications for positions on the medical and nursing staff will shortly be considered by the medical committee.

Correspondence should be addressed to Miss Pankhurst at 3, Charteris Road, Woodford, Essex.

University of London

The title of professor emeritus in the university has been conferred on Mr. G. Grey Turner on his retirement from the chair of surgery at the British Postgraduate Medical School.

Mr. J. E. Roberts, D.SC., has been appointed to the Joel chair of physics *tenable at the Middlesex Hospital medical* school, as from Oct. 1. He succeeds Prof. Sydney Russ, D.SC., on whom the title of professor emeritus has been conferred.

Miss Meave Kenny has been appointed to the university readership in obstetrics and gynæcology tenable at the British Postgraduate Medical School, as from Oct. 1.

Miss Kenny studied medicine at the Lady Hardinge Medical College, New Delhi, and the London School of Medicine for Women, qualifying M.B. Punjab in 1931 and M.R.C.S. in 1934. She became M.R.C.O.G. in 1935, and held appointments as obstetrical and gynæcological house-surgeon at the Royal Northern Hospital, and as resident medical officer at the isolation block, Queen Charlotte's Maternity Hospital, London. In 1937 she was appointed first assistant in the department of obstetrics and gynæcology at the British Postgraduate Medical School. She was elected F.R.C.O.G. in 1945. Miss Kenny was associated with Dr. Leonard Colebrook, F.R.S., in pioneer work on the treatment with sulphonamides of puerperal sepsis and urinary-tract infections, and has also reported on the radiology of contracted pelvis. She is the author of a novel, *I'll Change the Colour*, published in 1935, and of books of poems in Spanish.

The title of reader in physiology in the university has been conferred on Dr. C. C. N. Vass, in respect of the post held by him at St. Thomas's Hospital medical school.

University of Durham

On Dec. 20 the following degrees were conferred:

M.B., B.S.—Irene O. Blankley, Alan Ross; Diana L. Priest, Peter Wise (in absentia).

Prof. R. C. Browne, first holder of the Nuffield chair of industrial health, will deliver his inaugural lecture in King's Hall, King's College, Newcastle-on-Tyne, on Friday, Jan. 24, at 5.30 P.M. Tickets are obtainable from the registrar of the college.

Royal College of Surgeons of England

The following Hunterian lectures will be delivered at the college at 5 P.M. on Thursdays in January: 9th, Mr. J. B. Macalpine, Growths of the Renal Pelvis and Ureter; 16th, Mr. R. H. Franklin, Congenital Atresia of the Œsophagus; 23rd, Mr. H. A. Haxton, Regeneration after Sympathectomy, and its Effects in Raynaud's Disease; and 30th, Mr. John Howkins, Movement of the Diaphragm after Operation. A course of lectures in ophthalmology will be held at the college from Jan. 20 to 27.

Royal College of Surgeons of Edinburgh

At a meeting of the college on Dec. 20, with Mr. James Graham, president, in the chair, the following were admitted to the fellowship:

L. W. Aldridge, M.B. Birm.; D. R. Beaton, M.B. Edin.; E. N. Brockway, M.B. Lond.; J. T. Brown, M.B. Glasg.; J. E. Buck, M.B. Edin.; D. R. Cairns, M.B. Belf.; A. M. Gilchrist, M.B. Glasg.; William Girdwood, M.B. Witw'rsrand; S. C. Gupta, M.B. Calcutta; A. E. Khan, M.B. Sydney; Louis Kobrinsky, M.D. Manitoba; M. M. Kriseman, M.B. Witw'rsrand; V. P. McAllister, M.B. Dubl.; H. C. McLaren, M.B. Glasg.; M. A. Margo, M.R.C.S.; Elizabeth T. Mess, M.B. Lond.; R. F. Moody, M.B. N.Z.; H. D. Moore, M.B. Sydney; J. C. Morris, M.B. Manc.; J. D. Muir, M.B. L'pool; K. G. Pascall, M.B. Lond.; W. I. Paterson, M.B. Edin.; H. E. Pearse, M.D. Brist.; Richard Percy-Lancaster, M.B. Edin.; C. J. T. Pinto, M.B. Bombay; Bernard Polonsky, M.B. L'pool; C. I. Raeburn, M.B. St. And.; G. J. Ralston, M.B. Edin.; William Reid, M.B. Glasg.; A. St. C. Robertson, M.B. Edin.; T. B. Russell, M.B. Edin.; A. W. B. Strahan, M.B. Edin.; E. J. Tamblyn, M.B. Adelaide; Pieter Theron, M.B. Aberd.; C. K. Warrick, M.B. Lond.; C. D. Weir, M.B. Edin.; George Winchester, M.B. Edin.

Joint Tuberculosis Council

At its last meeting the council adopted a report dealing with the National Health Service Act and ordered it to be forwarded to the Minister of Health's Standing Advisory Committee on Tuberculosis. The report, which is not being published now, emphasises the council's view that tuberculosis is a disease requiring a special organisation. The committee on nutrition reported that they had studied the effect of bread-rationing on tuberculous persons and had also considered whether dietaries for the tuberculous should be reinvestigated; they had decided that no action was at present required in either case.

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1. "Extinfor," no. 1818, a leaflet from the French Minister of Informat
2. Ibid, no. 11

SIR WILLIAM COLLINS

IN an appreciation of Sir William Collins, Z. L. P. writes: To those who knew him intimately in his home it was always a surprise to hear him described as "stiff" by those who knew him only officially. In the charming house on Beachy Head, which Lady Collins with her unerring instinct of a Scottish hostess had made perfect in every respect—not least in its cuisine—high thinking was combined with the most comfortable living. Though a spartan himself, Sir William found nothing too good for his wife. From the time they met at the London Temperance Hospital, where he was a surgeon and she a sister, their devotion was something unique in my experience. During his time at the House of Commons she was his never-failing helper; but arthritis tried her even then, and this was what prevented him from standing for re-election. Though he carried on innumerable public and benevolent activities the best of his energies were given to saving her in every conceivable way, and he nursed her single-handed almost to the end.

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Majors.—K. F. ALFORD, L. FEINHOLS, S. G. NARDELL.

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- CLARKE, A. R., M.S. Lond., F.R.C.S.: surgeon.
- ESSEX-LOPRESTI, P. G. L., F.R.C.S., D.A.: asst. surgeon.
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When it comes to the adult criminal, he suspects that it would hardly do to give the psychiatrist a free hand: "on the whole, if a psychiatrist were in charge," he says, "I believe that a number of prisoners now released after a few years would remain in prison for life."

LOUIS PASTEUR

"ONE of the great splendours of his genius is to be found in the enthusiasm with which, all his life, he hurried off to those who made any call upon his knowledge. This laboratory worker, whose discoveries were to turn men's beliefs upside down, sought passionately for immediate and practical results from studies on the fermentation of beer, the making of vinegar, the diseases of silkworms. He worked in breweries, in silkworm nurseries, among distillers, mulberry growers, and the shepherds of the plains. Then see him in the hospitals: for the wise man the distress of the sick is an appeal. Pasteur responded."

Prof. Robert Debré, member of the Académie de Médecine, thus celebrates the 50th anniversary of Pasteur's death.[1] His splendid curiosity, his accuracy and logic, and his fine simplicity of character, set Pasteur forever among the great examples to students of science. When, in 1856, he was asked about the fermentation of beetroots he set about studying the question with characteristic ability and thoroughness. He made a medium capable of fermenting, sterilised it by heat, and sealed it; naturally it remained unchanged indefinitely. Then he inoculated part of it with a trace of pure yeast, and as the yeast grew the medium fermented. Here, in one simple experiment, he laid down a fundamental principle of technique. Between 1857 and 1865 he carried out the series of researches which wholly changed scientific ideas on fermentation and established firmly the bacterial theory, which was to revolutionise surgery, medicine, and public health.

But hard as he worked at research, he found it easier to discover a great truth than to get it accepted. Professor Debré tells how in the course of that long battle for belief a speaker at one scientific discussion declared that the organism of puerperal fever could never be found. Pasteur flung himself towards the blackboard and drew the organism "en chapelet de grains," crying: "Tenez, voici sa figure." He won his battle and lived to be honoured as he deserved, but that made little difference to a man whose interest was in doing things rather than in what others thought of his doings. Prof. Henri Mondor[2] tells how, when he came to die, he said—as a sort of sublime excuse—"I can do no more." It can be said of Pasteur, as of few others, that he had done enough.

HOSPITAL FOR ETHIOPIA

Miss Sylvia Pankhurst, hon. secretary of the Princess Tsahai Memorial Hospital Fund, informs us that more than £80,000 has been raised towards the £100,000 required for the new hospital at Addis Ababa. Of this, £40,000 has been collected in Ethiopia itself. The building, with the addition of the outpatient, theatre, and kitchen blocks generously designed by Mr. Lionel Pearson, F.R.I.B.A., is nearing completion. The interior equipment is being purchased in this country and some of it is now ready for shipment. Applications for positions on the medical and nursing staff will shortly be considered by the medical committee.

Correspondence should be addressed to Miss Pankhurst at 3, Charteris Road, Woodford, Essex.

University of London

The title of professor emeritus in the university has been conferred on Mr. G. Grey Turner on his retirement from the chair of surgery at the British Postgraduate Medical School.

Mr. J. E. Roberts, D.SC., has been appointed to the Joel chair of physics tenable at the Middlesex Hospital medical school, as from Oct. 1. He succeeds Prof. Sydney Russ, D.SC., on whom the title of professor emeritus has been conferred.

Miss Meave Kenny has been appointed to the university readership in obstetrics and gynæcology tenable at the British Postgraduate Medical School, as from Oct. 1.

Miss Kenny studied medicine at the Lady Hardinge Medical College, New Delhi, and the London School of Medicine for Women, qualifying M.B. Punjab in 1931 and M.R.C.S. in 1934. She became M.R.C.O.G. in 1935, and held appointments as obstetrical and gynæcological house-surgeon at the Royal Northern Hospital, and as resident medical officer at the isolation block, Queen Charlotte's Maternity Hospital, London. In 1937 she was appointed first assistant in the department of obstetrics and gynæcology at the British Postgraduate Medical School. She was elected F.R.C.O.G. in 1945. Miss Kenny was associated with Dr. Leonard Colebrook, F.R.S., in pioneer work on the treatment with sulphonamides of puerperal sepsis and urinary-tract infections, and has also reported on the radiology of contracted pelvis. She is the author of a novel, *I'll Change the Colour*, published in 1935, and of books of poems in Spanish.

The title of reader in physiology in the university has been conferred on Dr. C. C. N. Vass, in respect of the post held by him at St. Thomas's Hospital medical school.

University of Durham

On Dec. 20 the following degrees were conferred:

M.B., B.S.—Irene O. Blankley, Alan Ross; Diana L. Priest, Peter Wise (in absentia).

Prof. R. C. Browne, first holder of the Nuffield chair of industrial health, will deliver his inaugural lecture in King's Hall, King's College, Newcastle-on-Tyne, on Friday, Jan. 24, at 5.30 P.M. Tickets are obtainable from the registrar of the college.

Royal College of Surgeons of England

The following Hunterian lectures will be delivered at the college at 5 P.M. on Thursdays in January: 9th, Mr. J. B. Macalpine, Growths of the Renal Pelvis and Ureter; 16th, Mr. R. H. Franklin, Congenital Atresia of the Œsophagus; 23rd, Mr. H. A. Haxton, Regeneration after Sympathectomy, and its Effects in Raynaud's Disease; and 30th, Mr. John Howkins, Movement of the Diaphragm after Operation. A course of lectures in ophthalmology will be held at the college from Jan. 20 to 27.

Royal College of Surgeons of Edinburgh

At a meeting of the college on Dec. 20, with Mr. James Graham, president, in the chair, the following were admitted to the fellowship:

L. W. Aldridge, M.B. Birm.; D. R. Beaton, M.B. Edin.; E. N. Brockway, M.B. Lond.; J. T. Brown, M.B. Glasg.; J. E. Buck, M.B. Edin.; D. R. Cairns, M.B. Belf.; A. M. Gilchrist, M.B. Glasg.; William Girdwood, M.B. Witw'rsrand; S. C. Gupta, M.B. Calcutta; A. E. Khan, M.B. Sydney; Louis Kobrinsky, M.D. Manitoba; M. M. Kriseman, M.B. Witw'rsrand; V. P. McAllister, M.B. Dubl.; H. C. McLaren, M.B. Glasg.; M. A. Margo, M.R.C.S.; Elizabeth T. Mess, M.B. Lond.; R. F. Moody, M.B. N.Z.; H. D. Moore, M.B. Sydney; J. C. Morris, M.B. Manc.; J. D. Muir, M.B. L'pool; K. G. Pascall, M.B. Lond.; W. I. Paterson, M.B. Edin.; H. E. Pearse, M.D. Brist.; Richard Percy-Lancaster, M.B. Edin.; C. J. T. Pinto, M.B. Bombay; Bernard Polonsky, M.B. L'pool; C. L. Raeburn, M.B. St. And.; G. J. Ralston, M.B. Edin.; William Reid, M.B. Glasg.; A. St. C. Robertson, M.B. Edin.; T. B. Russell, M.B. Edin.; A. W. B. Strahan, M.B. Edin.; E. J. Tamblyn, M.B. Adelaide; Pieter Theron, M.B. Aberd.; C. K. Warrick, M.B. Lond.; C. D. Weir, M.B. Edin.; George Winchester, M.B. Edin.

Joint Tuberculosis Council

At its last meeting the council adopted a report dealing with the National Health Service Act and ordered it to be forwarded to the Minister of Health's Standing Advisory Committee on Tuberculosis. The report, which is not being published now, emphasises the council's view that tuberculosis is a disease requiring a special organisation. The committee on nutrition reported that they had studied the effect of bread-rationing on tuberculous persons and had also considered whether dietaries for the tuberculous should be reinvestigated; they had decided that no action was at present required in either case.

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[1] "Extinfor," no. 1818, a leaflet from the French Minister of Information.

[2] Ibid, no. 1817.

Society of Apothecaries of London

The court of assistants recently met under the chairmanship of Dr. C. T. Parsons, master of the society. Dr. J. P. Hedley was reappointed as the society's representative on the General Medical Council.

Common hall discussed lately the proposal to admit medical women to the yeomanry and livery of the society. The result of the vote was reported to the court, who have decided that medical women shall be admitted.

D. C. Norris was clothed with the livery of the society. The following were admitted to the freedom of the society: by gift, the Rev. M. F. Foxell; by redemption, H. A. Byworth, R. J. Willan, A. J. Wrigley, H. J. B. Atkins, and B. Hamilton Hogben; and by servitude, G. P. West, S. P. Berkeley Way, E. W. R. Clark.

The following were sworn in as examiners: anatomy, John Kirk; pathology, R. W. Scarff.

The following diplomas were granted upon examination:

Master of Midwifery.—J. G. Hunt.

Industrial Health.—F. H. Tyrer, J. B. Lynch.

L.M.S.S.A.—I. J. R. Musson, H. F. Goldman, H. M. Price, J. G. Kelsey, G. A. May, A. H. J. Whitehouse, H. Freeman, Sodipo, R. M. Holmes, T. C. McC. Gilmore, S. L. O. Jackson.

London Council of Social Service

A conference on Special Forms of Catering for the Aged, Invalids, and Infirm will be held at the Bonnington Hotel, Southampton Row, W.C.1, on Saturday, Jan. 18, at 10.30 A.M.

Streptomycin Used against Bubonic Plague

Streptomycin is reported to have been used successfully in a recent outbreak of bubonic plague at Buenos Aires. The first two cases to be treated says B.U.P., recovered completely with streptomycin after hope of their surviving had been abandoned.

Hospital for Tropical Diseases, London

This hospital, which was closed during the war, has now been reopened at 23, Devonshire Street, W.1 (Tel.: Welbeck 8371). The hospital is open to all patients suffering from tropical diseases. There is an outpatient department, for which appointments should be made by telephone or letter.

Serviceable Books

The National Council of Social Service have compiled a list of the 208 books which they consider best describe the British social services. The books are divided into three groups: general books; books about services which cater for special sections of the community, such as the handicapped, mothers, and children; and books about special types of service which are available for the whole community, such as communal feeding, education, and the health services. Copies of the list may be obtained (post free 8*d.*) from the National Book League, 7, Albemarle Street, London, W.1.

Empire Rheumatism Council

As announced last week, the council's annual general meeting was held in London on Dec. 18, when Lord Horder, the chairman, announced a plan to investigate factors in the causation of rheumatoid arthritis. Sir George Elliston, proposing a vote of thanks to the chairman, said it would be hard to over-emphasise the importance of the announcement by Sir Wilson Jameson, at the council's tenth anniversary reception in October, that the rheumatism service would in future provide employment for all young doctors who wished to enter it. Sir George was concerned that this remark had not been given enough publicity; the many hundreds of demobilised young doctors who had not yet decided on their future would be welcome and valuable recruits in the campaign against rheumatism. These men, he concluded, should be secured for a service whose importance is steadily growing.

Presentation to Sir George Elliston

On Dec. 19 at a luncheon held at the Guildhall a presentation was made to Sir George Elliston, formerly secretary of the Society of Medical Officers of Health, on the completion of his third term of office as chairman of the health committee of the corporation of the City of London. The toast of the Lord Mayor and Corporation was proposed by Sir Allen Daley. In his reply, Sir George Aylwen, a sheriff of the City and treasurer of St. Bartholomew's Hospital, declared that the hospital's relation with the corporation had been an object lesson to local authorities and voluntary hospitals alike. Among the services which the hospital willingly rendered to the City he mentioned the provision of clinics for the treatment of tuberculosis and venereal diseases, and a welfare clinic for mothers and babies. He hoped that under the National Health Service there would be opportunity to continue this successful partnership.

Glaucoma Prize

The American National Society for the Prevention of Blindness is offering a prize of $500 for the best original paper adding to existing knowledge about the diagnosis of early glaucoma or the medical treatment of non-congestive glaucoma. The criteria may be obtained from the society, 1790 Broadway, New York 19, N.Y.; entries must be submitted by next December.

Diary of the Week

JAN. 5 TO 11

Tuesday, 7th

LONDON ASSOCIATION OF THE MEDICAL WOMEN'S FEDERATION
8.30 P.M. (B.M.A. House, Tavistock Square, W.C.1.) Dr. Inne Pearse: Peckham Health Centre.

Wednesday, 8th

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
2.30 P.M. *History of Medicine.* Dr. A. P. Cawadias: Clinical Science in the Light of History.
4.30 P.M. *Physical Medicine.* Mr. T. Holmes Sellors: Rehabilitation of Patients following Chest Surgery.
BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck Street, W.1
5 P.M. Prof. W. V. Mayneord: Applications of Atomic Physics in Medicine. (Second of six lectures.)
MEDICAL SOCIETY OF THE L.C.C. SERVICE
4.30 P.M. (County Hall, Westminster Bridge, S.E.1.) Mr. G. F. Stebbing: Organisation of Cancer Treatment.

Thursday, 9th

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
5 P.M. Mr. J. B. Macalpine: Growths of the Renal Pelvis and Ureter. (Hunterian lecture.)

Friday, 10th

ROYAL COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS, 58, Queen Anne Street, W.1
5 P.M. Mr. S. J. Folley, D.SC.: Lactation.
LONDON CHEST HOSPITAL, Victoria Park, E.2
5 P.M. Dr. R. A. Beaver: Anæsthesia in Thoracic Surgery.
ROYAL MEDICAL SOCIETY, 7, Melbourne Place, Edinburgh
8 P.M. Prof. Charles Cameron: Tuberculosis as a Problem in Diagnosis.

Births, Marriages, and Deaths

BIRTHS

ARCHER.—On Dec. 23, at Eastbourne, the wife of Captain R. M. Archer, R.A.M.C.—a daughter.

DOCKRAY.—On Dec. 24, the wife of Dr. J. V. Dockray, O.B.E.—a daughter.

FRANKLIN.—On Dec. 19, at Glasgow, the wife of Mr. V. M. Franklin, F.R.C.S.—a daughter.

GOTTLIEB.—On Dec. 27, at Sheffield, the wife of Dr. I. Gottlieb—a son.

HARKINS.—On Dec. 22, in London, the wife of Dr. Denis Harkins—a son.

MARTIN.—On Dec. 20, the wife of Dr. A. J. Martin—a son.

RICHARDS.—On Dec. 15, the wife of Dr. E. Allwyn Richards—a daughter.

RITCHIE.—On Dec. 23, at Sanderstead, Surrey, the wife of Dr. T. H. W. Ritchie—a son.

WOOD.—On Dec. 21, at Oxford, the wife of Dr. D. R. Wood—a son.

WOOD.—On Dec. 14, at Penshurst, Kent, the wife of Dr. L. A. G. Wood—a daughter.

MARRIAGES

CRUICKSHANK—LEDINGHAM.—On Dec. 20, in London, James Durno Cruickshank, lieut.-colonel R.A.M.C., to Isabel Catherine Ledingham.

PORRITT—PECK.—On Dec. 20, in London, Arthur E. Porrit O.B.E., F.R.C.S., to Kathleen Mary Peck.

DEATHS

BISSHOPP.—On Dec. 26, at Tunbridge Wells, Francis Robert Bryan Bisshopp, M.A., M.D. Camb., M.R.C.P., aged 87.

BURKITT.—On Dec. 22, in Dublin, Roland Wilks Burkitt, F.R.C.S. late of Nairobi, Kenya, aged 74.

CRUISE.—On Dec. 24, in London, Sir Richard Cruise, G.C.V.O. F.R.C.S.

HASKINS.—On Dec. 21, at Worthing, Nicholas Hopkins Henr Haskins, M.C., M.B. Dubl., late lieut.-colonel R.A.M.C.

LANDER.—On Dec. 25, at Gillingham, Dorset, Charles Llewelly Lander, D.S.O., M.C., B.SC., M.B. Lond.

MCKENZIE.—On Dec. 22, in London, Harry Valentine McKenzie M.D. Edin., aged 79.

MANSELL.—On Dec. 19, at Farnborough, Hants, Arthur Rodne Mansell, L.R.C.P.E.

MATTHEW.—On Dec. 21, Frederick Crichton Matthew, M.D. Edin. F.R.C.S.E.

PUGH.—On Dec. 19, Charles Grant Pugh, B.SC., M.D. Lond., D.P.H

SCOTT.—On Dec. 9, at Sydney, Australia, David Jobson Scott O.B.E., M.C., M.D. Edin., D.P.H., barrister-at-law.

SMITH.—On Dec. 18, at Dunfermline, Harry Emslie Smith, M.D Aberd., D.P.H., D.T.M. & H., lieut.-colonel I.M.S.

WATERS.—On Dec. 19, at Stroud, Sir Harry Waters, M.R.C.S. D.P.H., D.T.M. & H., aged 78.

WEST.—On Dec. 25, John Hardstaff West, M.R.C.S., D.A.

WHITE.—On Dec. 29, at Hindhead, William Harold White, M.R.C.S.

WOODS.—On Dec. 17, at Taunton, Somerset, Alfred Annesley Woods, L.R.C.P.I., D.P.H.

REST VERSUS ACTIVITY IN THE TREATMENT OF A FRACTURE*

GEORGE PERKINS
M.C., M.Ch. Oxfd, F.R.C.S.

On the therapeutic side, one problem confronts the orthopædic surgeon throughout his professional life—whether to rest or not to rest. The answer depends on the cause of the lesion, the effects of the lesion on the tissues, and the reaction of the tissues to the lesion. One or more of these may be in doubt; but, even when all three factors are known, it is not always easy to decide between rest and activity.

In the case of injury, the cause is definite and non-continuing, the effect is obvious, and nature's method of repair is, we think, known to us. Even so, the problem looms large—so large that I shall not have time to deal with injuries to ligaments, injuries to muscles, or even with bone injuries involving joints. I shall confine myself to fractures not involving joints.

When considering rest and activity in the treatment of a fracture of a shaft, we have to decide (1) whether to encourage or to forbid normal use of the limb; (2) whether to move the joints; (3) whether to allow weight-bearing—i.e., the transmission of force through the broken bone; (4) whether to keep the bone ends immobile or to let them move on one another; and (5) whether to activate the muscles or to let them lie dormant.

MOVEMENT OF THE LIMB

Nowadays everyone agrees, I think, that normal function is to be encouraged. The patient with a Colles's fracture is no longer allowed to mope about with her arm in a sling but is kept under the eye of a masseuse until she is using her hand. Nevertheless I do not believe the enormous advantages to be derived from activity of the limb are sufficiently realised. One still sees the hand immobilised for a fracture of the scaphoid, with the thumb abducted in the plane of the palm instead of at right angles to the palm. This faulty position renders it impossible for the patient to oppose thumb and fingers and seriously curtails use of the hand. And one still sees—all too frequently—a foot immobilised in slight equinovarus instead of in the plantigrade position. With a foot in equinovarus a patient has great difficulty in walking.

The advantages of encouraging activity of the limb are that rehabilitation can proceed hand in hand with bone repair, and that the harmful effects of splintage are minimised. Who nowadays finds it necessary to apply an Unna's paste bandage after the removal of a plaster for a fractured tibia and fibula? Post-plaster swelling has disappeared from the practice of those who make their patients walk normally while wearing a plaster cast. We saw it in the old days when a patient pivoted along on a Böhler iron, for then he only used his hip muscles, the remainder of the leg being in a state of physiological rest—in other words, growing rusty.

MOVEMENT OF THE JOINTS

On this again, I believe, there is general agreement. All joints not immobilised by splintage should be moved actively by the patient. Since movement is so desirable, the splint should be shortened to its minimum so as to free as many joints as possible. This is not a popular recommendation, for a surgeon rises in the estimation of his patients according to the multiplicity and complexity of his apparatus. I have on more than one occasion lost a patient for not having applied a splint to a fracture.

WEIGHT-BEARING

Anyone who believes, as I do, that longitudinal compression of the bone ends is the essential stimulus for repair by bone (as opposed to fibrous tissue) will favour early weight-bearing. Indeed, I think most surgeons would advocate early weight-bearing were it not for fear of overriding of the fragments. In my experience overriding is little to be feared. I grant, however, that weight-bearing is a potential danger in a transverse fracture when the two fragments are not parallel: for a force which is not perpendicular to the line of fracture tends to angulate the fragments. Angulation distracts the raw bony surfaces from one another, and distraction is the stimulus par excellence for the production of fibrous tissue.

The stimulus to callus formation by weight-bearing on a fracture that is not angulated is demonstrated in figs. 1–4.

Fig. 1*a* shows a fracture of the shaft of the femur, eight months old. Note the absence of callus. I removed the Thomas splint and applied a plaster cast reaching from behind the heads of the metatarsals to the groin, and got the patient first to lift his leg off the bed and then to walk.

Fig. 1*b* shows the amount of union four months later, when he discarded his plaster. Note the amount of callus, the preservation of alignment, and the fact that the lower fragment has not ridden up.

Fig. 2*a* shows a fracture of the tibia, sustained seven months previously. There was a painless hinge at the site of the fracture. The painlessness indicated that union had taken place; the hinge that the union was fibrous and not bony. Bony repair could not be expected until the fibrous tissue between the fragments had been removed.

Accordingly I cut down on the fracture, removed the fragment lying athwart, and inserted the cortex of the lower fragment into the medulla of the upper fragment. At the end of ten days the patient was got up in the original plaster, for the first time since his injury.

Fig. 2*b* shows the state of affairs five weeks after the operation. Note the amount of external callus, the absence of overriding, and the preservation of alignment.

The radiogram shown in fig. 2*c* was taken five months after the operation, when all splintage was discarded. Removal of the intervening fragment added to his shortening, but he had an amputation of the thigh on the other side, so I could make the fractured leg what length I liked. There was no doubt about his taking weight on the broken leg, for it was the only leg he had to stand on.

Fig. 3*a* shows a fracture of the tibia after the taking of a graft. The leg was put into plaster and the man made to walk.

Fig. 3*b* shows the fracture ten weeks later, when the plaster was discarded. Note again the amount of callus, the preservation of alignment, and the absence of overriding.

Fig. 4*a* shows a fracture of the shaft of the femur with delayed union and slight angulation. Under an anæsthetic I straightened the leg and applied a plaster from behind the heads of the metatarsals to the groin.

Fig. 4*b* shows the position obtained. Note that the plaster extends only to the groin, and is well moulded on the outer side to counteract the tendency to outward angulation.

Fig. 4*c* was taken three months after the manipulation, when the plaster was discarded. Note the preservation of alignment and the massive amount of organised external callus.

All these radiograms show early and massive external callus, and I believe the rapidity of repair was due to making the patient take weight through the fracture.

It is not enough to make the patient walk: he must be made to walk as naturally as possible, so that he uses the muscles of the leg in the same manner as he would in ordinary walking. To obtain a natural gait, the plastered foot must be at right angles to the leg and plantigrade, and the loss of ankle movement must be compensated for by rockering the sole of the plaster over-boot.

MOVEMENT OF THE BONE ENDS

Splintage is not always necessary for the repair of a fracture. When a dog breaks a bone he treats himself without a splint. There are no orthopædic surgeons in the dog world; which is perhaps just as well, for otherwise the poor animal might have to go to a rehabilitation centre to recover from its treatment. The dog hops along on three legs for a while and then gingerly resumes weight-bearing. *On the other* hand, an adduction type of transcervical fracture of the neck of the femur will not unite without splintage. Can we explain this contradiction ?

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* Presidential address delivered to the British Orthopædic Association on Oct. 12, 1946.

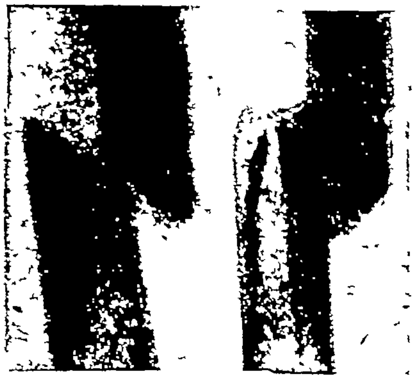

(a) (b)

Fig. 1—Fracture of shaft of femur: (a) 8 months old, treated with Thomas splint, showing absence of callus; (b) 4 months after substitution of ambulant plaster (from metatarsals to groin) for Thomas splint, showing callus, good alignment, and no overriding.

First of all, neither of the two statements is true. The dog's bone is splinted (though the splint is not visible) and the neck of the femur does unite (though not with bone). Let us consider the two statements.

In the case of the dog's bone, the muscles that have their origin on one fragment and their insertion on the other form an internal splint which not only holds the bone ends immobile but also forces the bone ends against one another and so supplies the requisite stimulus for repair by bone. I grant this is only supposition, for one *cannot prove that it is the activity of the muscles that* promotes osseous, as opposed to fibrous, union. The evidence in its favour is that, whenever there is an absence of muscle splintage, fibrous union is the usual outcome. Three examples come quickly to mind: a fracture of the neck of the femur, a fracture of the internal malleolus, and a fracture of the scaphoid. In a transcervical fracture of the neck of the femur there are no muscles attached to the central fragment; in a fractured internal malleolus none to the distal fragment; and in a fractured scaphoid no muscles are attached to either fragment. In these three fractures natural internal fixation by muscle splintage is absent, and fibrous u is certain unless the bone ends can be immobilised external splintage or by surgical internal splintage.

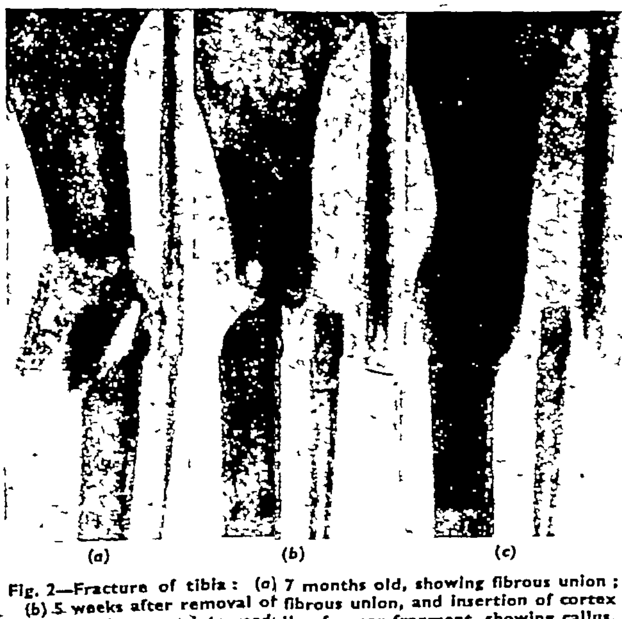

(a) (b) (c)

Fig. 2—Fracture of tibia: (a) 7 months old, showing fibrous union; (b) 5 weeks after removal of fibrous union, and insertion of cortex of lower fragment into medulla of upper fragment, showing callus, good alignment, and no overriding; (c) 5 months after operation.

I am not advocating dispensing with external splin whenever there is natural internal fixation by the musc for external splintage has another function to perfor the preservation of correct alignment. Splintage may be unnecessary to secure bony union, yet may be essential *to secure union in a good position. When we are using* a splint for a fracture we should be quite clear in our minds why we are using it: is it to preserve alignment, or is it to immobilise the bone ends, or is it for both purposes ? If splintage is required to immobilise the bone ends, then indeed it must be PURE: P for protracted, U for uninterrupted, R for rigid, and E for extensive. I maintain, however, that splintage is rarely required for this purpose. (Incidentally, when it is required for this purpose it is often inadequate—witness the poor results from plaster splintage for a transcervical fracture of the neck of the femur.) If splintage is only required to preserve alignment it need not be protracted, uninterrupted, rigid, or extensive.

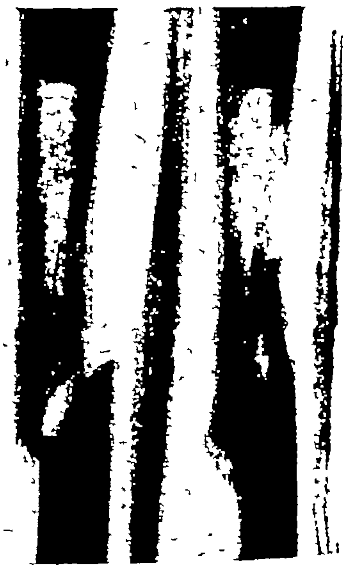

(a) (b)

Fig. 3—(a) Fracture of tibia on taking a graft; (b) 10 weeks later, after treatment with ambulant plaster, showing callus, good alignment, and no overriding.

Fig. 5a shows a transverse fracture of the shaft of the humerus. Such a fracture joins without difficulty, provided the muscles are free to act and are encouraged to act. Alignment, however, *is not so easy to* maintain.

The surgeon decided that the alignment could best be secured in this case by rigid internal fixation. Accordingly he plated the fracture and did not use any external splint. The arm was supported in a sling and, before the stitches were out, the patient was sent to the physiotherapy department for exercises.

In the department the patient was made to flex and extend his elbow, and to abduct his shoulder by his own voluntary effort. Twenty days after the operation, when lifting his arm vigorously, he heard a snap, and the arm became painful.

The radiogram (fig. 5b) shows that the plate had broken. Whereupon the surgeon argued thus: "I did not use the plate to keep the bone ends immobile, for the muscles can be relied on to do that. I used the plate only to secure alignment. Alignment has been secured, and there is now no danger of the fragments becoming displaced. The plate therefore has done its work, and I need not worry about its breaking."

Accordingly he disregarded the incident of the broken plate *and made the patient continue his active exercises.* Five weeks after the original accident the patient had to all outward appearances a normal arm (fig. 5c). Note the amount of external callus.

At this stage many might ask: "Why bother about whether splintage is being used for alignment or for immobilisation ? Why not always play for safety and always use PURE splintage ?" Because PURE splintage is an evil, a necessary evil at times, but nevertheless an evil, and therefore to be shunned whenever possible.

Consider the four attributes of PURE splintage:

(*P*) *Protracted* splintage conduces to a permanent loss of joint range. We recognise this in joints where move-

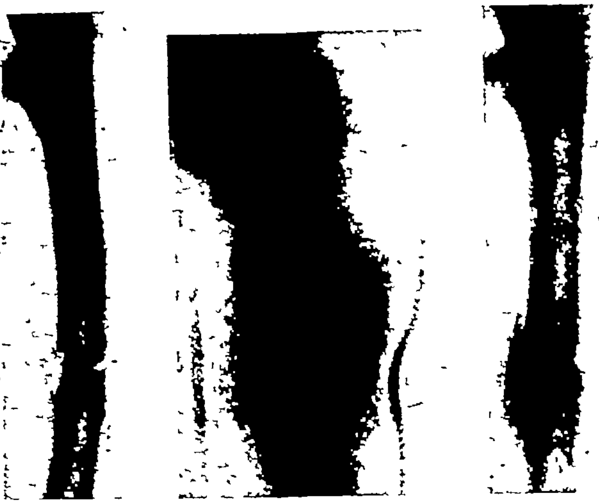


Fig. 4—Fracture of femur: (a) before manipulation, showing delayed union and slight angulation; (b) after correction of alignment and application of plaster, well moulded on outer side to overcome tendency to outward angulation; (c) 3 months after manipulation, showing good alignment and callus.

ment is vital for function, but tend to overlook it in joints where stiffness is not so obviously disabling. In the case of the knuckle-joints, for example, movement is so important, and the range of stiffness from splintage so great, that one book on fractures declares it to be criminal to splint these joints for longer than ten days. The corresponding joints in the foot suffer equally from splintage, but loss of function from stiffness of the toes is not so obvious, and many surgeons do not mind immobilising them in plaster for months on end.

(*U*) *Uninterrupted.*—I have no objection to uninterrupted splintage. If splintage is required, by all means let it be uninterrupted.

(*R*) *Rigid.*—Many surgeons believe that non-union, by which they mean fibrous union, is commoner today, now that we use plaster casts, than it was in the olden days, when we padded wooden splints. This may be true. But, if so, we must beware that we are truly linking cause and effect and comparing like with like. Possibly the greater length of time required for bony union nowadays is explained by a change in the nature of the fracturing force; road accidents and industrial accidents are responsible for many more fractures than in the past. I can see no advantage in loose splintage over rigid splintage, provided that the latter is comfortable. An unpadded plaster, so long as the circulation is unimpeded, is never so tight that it prevents the muscles underneath from acting. I do, however, deprecate not using stockinet under a plaster. Plaster applied direct to the skin enmeshes the hairs and so fixes the skin, and the patient may be inhibited from using his muscles because muscular action pulls on the hair-fixed skin and causes pain.

(*E*) *Extensive.*—The last requisite for PURE splintage is that it should be extensive. The word needs definition. Our forefathers have instructed us, in the treatment of a fracture, to splint the joints above and below. Now, tradition is a mighty fine thing. After many generations have declared the earth to be flat, one hesitates to venture the opinion that it may be round. The wisdom of the ages is not to be lightly discarded. However, there is no harm in investigating the matter, for the world might turn out to be round after all. In like manner our surgical forebears may be right—probably are right—about the necessity for including in the splint the joint above and the joint below the fracture; but there is no harm in appraising the instruction.

Consider a fracture of the forearm, and imagine the limb has been put into a plaster cast with the elbow extended and the wrist straight. We have obeyed the instructions by including in the splint the joints above and below the fracture. But we have not immobilised the fractured ends, since they are free to rotate on one another. To prevent rotation the elbow must be flexed and the wrist dorsiflexed. Our forefathers' instruction to splint the joints above and below needs altering therefore to "extend the splint until it can be angulated above and below the fracture." This is the definition of "extensive" in PURE splintage. Unless the splint is extensive in this sense it cannot immobilise the bone ends.

Often it is not feasible to make the splint extensive: for example, in the treatment of a fracture of the neck of the femur by a plaster spica, though rotation of the lower fragment can be controlled by keeping the foot at a right angle, the upper fragment is uncontrolled, because the body part of the plaster cannot be extended sufficiently to be angulated. This explains the frequent failure of PURE splintage to achieve its object—namely, the immobilisation of the fractured ends. We are not often aware of this failure, because we do not realise how seldom it is necessary truly to immobilise a fracture; for, as I hope I have made plain, immobilisation is only necessary when the muscles are unable to do the splinting.

Now, it is the necessity for making the splint extensive—i.e., for including two angles, one above and one below the fracture—that makes PURE splintage so harmful.

Alignment.—We sometimes consider ourselves unfairly judged when a patient criticises the result of a fracture on the score that the radiogram does not show perfect alignment. But is it not lucky for us that the patient does judge the result on the radiogram, since often he cannot read the radiogram—an unreduced Colles's fracture looks much the same to him as a reduced Colles's fracture. What if he starts assessing results in terms of function? Heaven forbid that he should do so, but ought not we to judge our results on this basis? After a fracture of the shaft of the femur it is wrong to be content with bony union in good alignment. The important criteria are the amount of shortening and the range of knee movement. Similarly in a bumper fracture the things that matter are the degree of stability of the knee and its range of movement. By all means let the patient amuse himself with the radiograms; let us concentrate on function. One need never fear being landed in a court of law for wrong alignment if the patient has regained perfect function. Of course, if wrong alignment is combined with loss of function, we become vulnerable, because the ill-informed layman

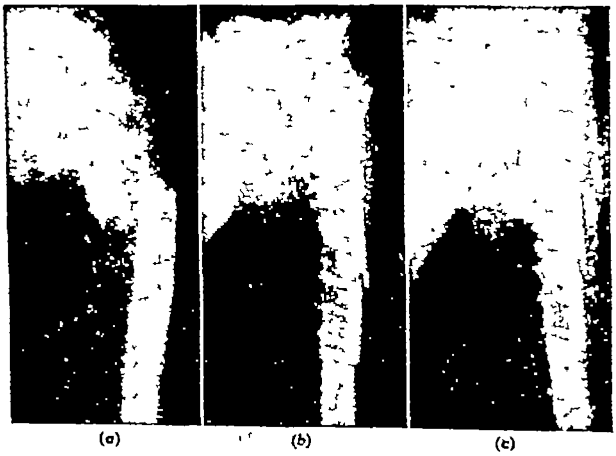


Fig. 5—Transverse fracture of humerus: (a) before plating; (b) 20 days after operation, showing plate broken accidentally by physical exercise but good alignment of bone; (c) 2 weeks after fracture of plate, exercises having been continued, showing good callus and preservation of alignment.

without a splint. There are no orthopædic surgeons in the dog world ; which is perhaps just as well, for otherwise the poor animal might have to go to a rehabilitation centre to recover from its treatment. The dog hops along on three legs for a while and then gingerly resumes weight-bearing. On the other hand, an adduction type of transcervical fracture of the neck of the femur will not unite without splintage. Can we explain this contradiction ?

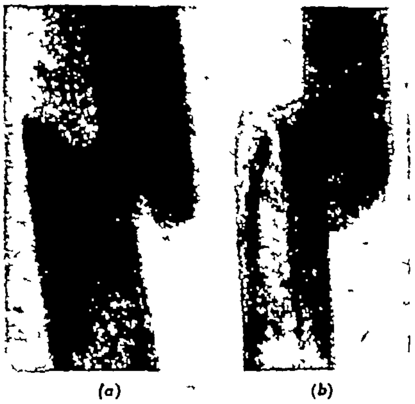


Fig. 1—Fracture of shaft of femur : (a) 8 months old, treated with Thomas splint, showing absence of callus ; (b) 4 months after substitution of ambulant plaster (from metatarsals to groin) for Thomas splint, showing callus, good alignment, and no overriding.

First of all, neither of the two statements is true. The dog's bone is splinted (though the splint is not visible) and the neck of the femur does unite (though not with bone). Let us consider the two statements.

In the case of the dog's bone, the muscles that have their origin on one fragment and their insertion on the other form an internal splint which *not only* holds the bone ends immobile but also forces the bone ends against one another and so supplies the requisite stimulus for repair by bone. I grant this is only supposition, for one cannot prove that it is the activity of the muscles that promotes osseous, as opposed to fibrous, union. The evidence in its favour is that, whenever there is an absence of muscle splintage, fibrous union is the usual outcome. Three examples come quickly to mind : a *fracture of the neck of the femur, a fracture of the internal* malleolus, and a fracture of the scaphoid. In a transcervical fracture of the neck of the femur there are no muscles attached to the central fragment ; in a fractured internal malleolus none to the distal fragment ; and in a fractured scaphoid no *muscles are attached* to either fragment. In these three fractures natural inter fixation by muscle splintage is absent, and fibrous u is certain unless the bone ends can be immobilised external splintage or by surgical internal splintage.

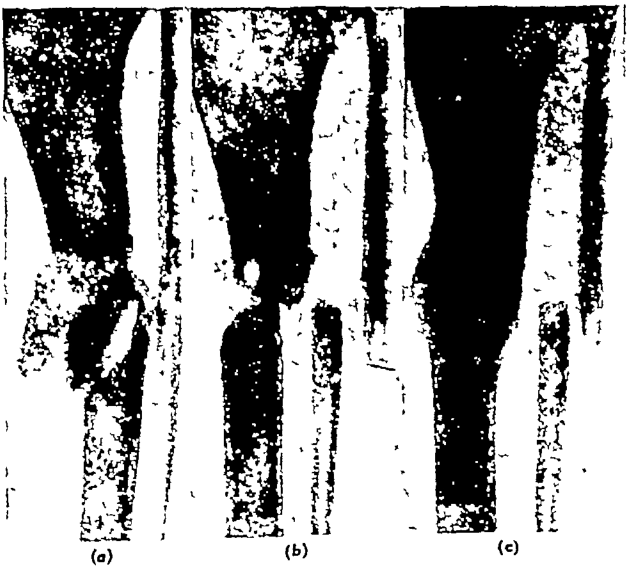


Fig. 2—Fracture of tibia : (a) 7 months old, showing fibrous union ; (b) 5 weeks after removal of fibrous union, and insertion of cortex of lower fragment into medulla of upper fragment, showing callus, good alignment, and no overriding ; (c) 5 months after operation.

I am not advocating dispensing with external splin whenever there is natural internal fixation by the musc for external splintage has another function to perfor the preservation of correct alignment! Splintage may b unnecessary to secure bony union, yet may be essent to secure union in a good position. When we are us a splint for a fracture we should be quite clear in o minds why we are using it : is it to preserve alignment, is it to immobilise the bone ends, or is it for both pu poses ? If splintage is required to immobilise the bon ends, then indeed *it must be* PURE : P *for protracted*, U for uninterrupted, R for rigid, and E for extensiv I maintain, however, that splintage is rarely required for this purpose. (Incidentally, when it is required for this purpose it is often inadequate—witness the poor results from plaster splintage for a transcervical fracture of the neck of the femur.) If splintage is only required to preserve alignment it need not be protracted, uninterrupted, rigid, or extensive.

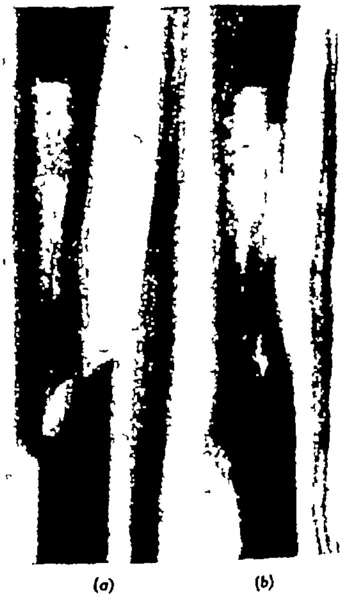


Fig. 3—(a) Fracture of tibia on taking a graft ; (b) 10 weeks later, after treatment with ambulant plaster, showing callus, good alignment, and no overriding.

Fig. 5*a* shows a transverse fracture of the shaft of the humerus. Such a fracture joins without difficulty, provided the muscles are free to act and are encouraged to act. Alignment, however, is not so easy to maintain.

The surgeon decided that the alignment could best be secured in this case by rigid internal fixation. Accordingly he plated the fracture and did not use any external splint. The arm was supported in a sling and, before the stitches were out, the patient was sent to the physiotherapy department for exercises.

In the department the patient was made to flex and extend his elbow, and to abduct his shoulder by his own voluntary effort. Twenty days after the operation, when lifting his arm vigorously, he heard a snap, and the arm became painful

The radiogram (fig. 5*b*) shows that the plate had broken Whereupon the surgeon argued thus : "I did not use the plate to keep the bone ends immobile, for the muscles can be relied on to do that. I used the plate only to secure alignment Alignment has been secured, and there is now no danger of the fragments becoming displaced. The plate therefore has done its work, and I need not worry about its breaking."

Accordingly he disregarded the incident of the broken plate and made the patient continue his active exercises. Five weeks after the original accident the patient had to all outward appearances a normal arm (fig. 5*c*). Note the amount of external callus.

At this stage many might ask : "Why bother about whether splintage is being used for alignment or for immobilisation ? Why not always play for safety and always use PURE splintage ?" Because PURE splintage is an evil, a necessary evil at times, but nevertheless an evil, and therefore to be shunned whenever possible.

Consider the four attributes of PURE splintage :

(P) Protracted splintage conduces to a permanent loss of joint range. We recognise this in joints where move-

for the intuition of that pioneer of orthopædic surgery, Hugh Owen Thomas, in devising for a fracture of the femur a splint that was not tethered to the bed.

Extensive splintage, which is implicit in PURE splintage—the kind of splintage that must be used to hold the fractured ends immobile—is, I repeat, disabling. That is my answer when you say: Why not be on the safe side and employ PURE splintage in every case of fracture? Indeed PURE splintage may be so crippling in its effect that it is often better, when, by reason of the absence of internal muscle splintage, it is required, to substitute for it rigid internal splintage obtained at open operation. This is the universal practice in the case of an adduction type of transcervical fracture of the neck of the femur.

Gist of the Arguments.—(1) External splintage is of two kinds (*a*) alignment splintage, whose purpose is to maintain good position, and which need not be protracted or uninterrupted or rigid or extensive; and (*b*) "PURE" splintage, whose purpose is to hold the bone ends immobile, and which must be protracted, uninterrupted, rigid, and extensive.

(2) When there are muscles attached to both fragments, the muscles form a natural splint that holds the bone ends immobile, and alignment splintage only is needed.

(3) When there are no muscles attached to one fragment, PURE splintage is essential to hold the bone ends immobile.

(4) PURE splintage induces so much joint stiffness that it ought not to be used unless absolutely necessary.

(5) On occasions when PURE splintage is indicated, it is often better, because of its disabling effects, to substitute rigid internal splintage.

FIBROUS UNION

The two ends of the fractured neck of the femur are joined by fibrous tissue—the kind of tissue that nature ordinarily uses for soldering. When we inquire into how nature sets about mending things, we are struck by the remarkable fact that bone is the only structure in the body that when broken joins by bone. This would not be surprising if other structures were joined by material similar to their own, muscle to muscle by muscle, nerve to nerve by nerve. But all divided structures except bone join by fibrous tissue. In its earliest phase all repair tissue is the same, and there must be an explanation why this embryonic repair tissue develops usually into fibrous tissue and only exceptionally into bone.

I suggest a physical explanation: that undifferentiated repair tissue is stimulated to transform itself into fibrous tissue when subjected to distraction, and is stimulated to transform itself into bony tissue when subjected to compression. I bring evidence in support of this contention: (1) it fits in with the observed facts, for all structures except bone gape after division, whereas after a fracture the ends of the bones are drawn together by the pull of the overlying muscles; (2) the more the muscles are activated during the repair of a fracture, the more the bone ends are compressed, and the greater the amount of ensheathing callus; (3) when compression between the ends of a fractured bone is abolished, either by excessive traction or by holding the ends apart with a plate, the embryo repair tissue at the fracture site develops into fibrous tissue and not into bone.

Fig 6*a* shows a fractured femur which had been plated five months previously. Note the comparative absence of callus. Directly the plate broke the longitudinal muscles were able to compress the ends of the bone against one another, and in consequence the fracture united with bone.

Fig. 6*b* was taken two and a half months, and fig. 6*c* sixteen months, after the plate had broken.

The rapidity of bone repair after the breaking of the plate could not be attributed to the stimulating effects of weight-bearing, because the man was walking about before and after the plate broke; the only difference in treatment being that, after the plate had broken, the leg was straightened under an anæsthetic and a plaster applied to prevent angulation.

MOVEMENT OF MUSCLES

If hitherto I have been half-hearted in my advocacy of activity, let me now be downright positive. As regards the muscles, is it to be rest or activity? Activity every time and all the time. Muscle activity confers three blessings: (1) it promotes a normal circulation in the limb (nobody disputes this); (2) it preserves the extensibility of the muscles and so avoids joint stiffness (this I have already spoken about); and (3) it stimulates the formation of callus.

Figs 1–9 show how the laying down of callus is promoted by activity. Fig. 7*a* shows a fracture of the humerus due to a gunshot wound. The bone has refractured. The man arrived the day after the refracture, with the arm encased in plaster.

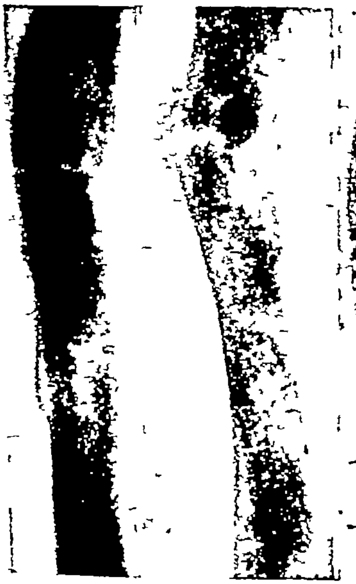

(*a*) (*b*)

Fig. 7

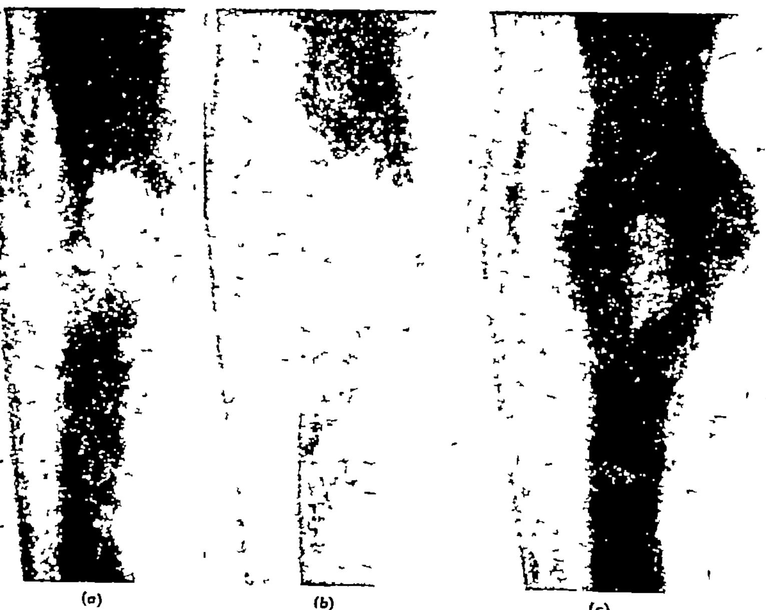

(*a*) (*b*) (*c*)

Fig. 8

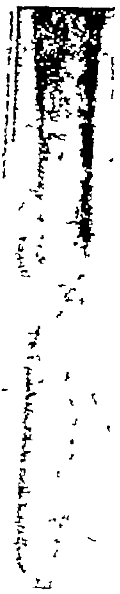


Fig. 9

Fig. 7—Gunshot fracture of humerus: (*a*) refracture in plaster; (*b*) 5 weeks after substitution of sling for plaster, showing formation of callus.

Fig. 8—Gunshot wound of tibia: (*a*) which had refractured while patient was ambulant without splint; (*b*) 3 weeks later, showing callus; (*c*) 12 weeks after refracture, showing bony union.

Fig. 9—Humerus of amputated arm: 1½ in. of bone had been removed to obtain a pseudo-arthrosis, and active movement was encouraged; but instead bony union was effected.

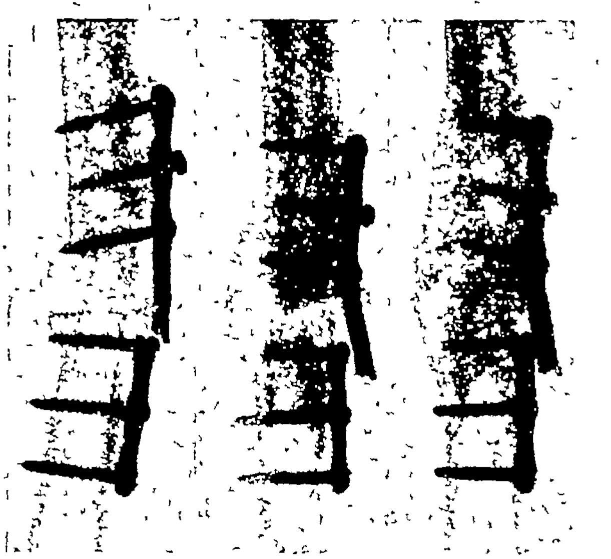

(a) (b) (c)

Fig. 6—Fracture of femur : (a) 5 months after plating and just after fracture of plate, showing very little callus ; (b) 2½ months after fracture of plate has allowed compression of bone ends, showing callus now being formed ; (c) 16 months after fracture of plate, showing bony union and good alignment.

associates the two as cause and effect. But is it only the layman who is guilty of this error of logic ? Do not we surgeons often fall into the same error and consider that poor alignment is necessarily associated with poor function and good alignment with good function ? A year or two ago we listened to several papers on fractures of the shaft of the femur. Dozens of radiograms and diagrams were shown to depict the alignment obtained ; yet never once was the ultimate range of knee movement mentioned. We have all been taught, and we all teach, the importance in a fracture of the tibia and fibula of securing a horizontal ankle-joint to avoid any lateral strain on the ankle during weight-bearing. Yet the ankle is well able to stand up to lateral strains, as witness the many people who habitually walk with their heels in pronounced varus or valgus ; the ankle-joints of all these people are continuously subjected to lateral stresses and seem none the worse for it. I do not want to belittle the importance of good alignment, but I do want to emphasise that function depends more on other factors than on alignment.

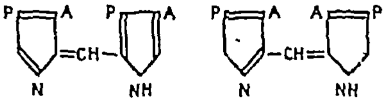
Joint Stiffness.—Surely the most important of these factors is the restoration of full movement to all the joints of the limb. This leads to a further question : why should a healthy uninjured joint stiffen when splinted ? Several likely explanations suggest themselves : the opposing layers of synovial membrane might adhere together from lack of lubrication ; the capsule might lose its elasticity ; and, above all, the muscles might lose their extensibility. I want to focus your attention on the last. Muscles have two attributes : they shorten, as is well known ; what is not so readily appreciated is that they also lengthen. A muscle held lengthened for a time loses its power of shortening, as is well exemplified in infantile paralysis. We say that it has been overstretched, and in our treatment we take care to avoid this overstretching by holding the muscle relaxed in its shortened position. Similarly, a muscle held shortened for a time loses its power of lengthening, also well exemplified in infantile paralysis. We say that the muscle has developed a contracture, and we take care to avoid it by putting the joints through their full range of movement once a day, thereby stretching the muscles to their full.

Now, I believe that the main reason why a healthy joint stiffens as a result of splintage is that the muscles lose their power of lengthening. Because the consequen is apparent in the joint we are inclined to blame t joint, though in fact the fault lies in the muscles. Th joint stiffness after splintage is mainly the result of l of extensibility in the muscles is an hypothesis diffic to prove. An argument that weighs heavily with me that, after the knee has been immobilised in a plast for a fracture of the tibia and fibula, there is rarely a difficulty in regaining full movement at the kne whereas, when the knee is immobilised during t treatment of a fracture of the shaft of the femur, perm nent limitation of movement of the knee is a comm sequel. The important rôle played by the muscles so-called joint stiffness was brought home to me dramat cally just after the war 1914–18, when the surgeon f whom I was then devilling operated for a stiff kne Instead of forcibly bending the knee under an anæstheti as I thought he would, he elongated the quadricep tendon. Immediately this was done the knee, whic before had only a few degrees of movement, bent withou difficulty to a right angle. I realised with amazemen *that the limitation of movement was caused not b* anything in the knee but by too short a quadriceps— a quadriceps which had lost its extensibility owing t prolonged splintage.

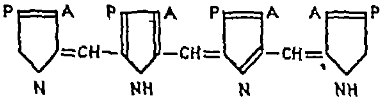
Assuming that joint stiffness is caused by the muscle losing their extensibility, can extensibility be preserve during splintage ? I believe a muscle retains its powe of lengthening if it is made to contract and relax periodi cally throughout the period of immobilisation. It is no necessary for the muscle to be stretched to its full exten (which could only be done by removing the splint an putting the joint through its full range). Consider th treatment of a fractured scaphoid. The wrist can be immobilised for six weeks, three months, or even si months without becoming stiff, provided the patien uses his fingers. In so doing the patient contract synergically his wrist flexors and extensors. Similarl a patient with a fracture of the tibia, when he lifts hi *leg off the couch, contracts the flexors and* extensors o the knee synergically. It is, I believe, the synergi action of the muscles that preserves the power o lengthening and so prevents joint stiffness.

A muscle under a splint will continue to act in a synergic capacity, provided that at least one of th joints over which it spans is free to move. Most muscle concerned with movement (in contradistinction to thos concerned with fixation, such as the muscles that blen with the capsule of the shoulder-joint) span more tha one joint, and, when all the joints over which the musc spans are immobilised, synergic action is abolished. Thi is the reason why PURE splintage is so disabling. Th surest way of stiffening a knee is to apply a long spic plaster. Most of us at one time or another have had th humiliation of aiming at an arthrodesis of the hip, and o *getting a stiff knee and an unsound ankylosis* of the hip— a crippling combination. In the treatment of a fractur of the shaft of the femur, if the knee and hip are bot immobilised—as they must be if the splint is to keep th fractured ends from moving—the thigh muscles canno act synergically, because their origins and insertions ar both fixed. The consequence is a stiff knee. If, on th *other hand, the hip is not splinted, and the* patient i encouraged to lift his leg, the synergic action of the thig muscles is retained, and the knee does not stiffen.

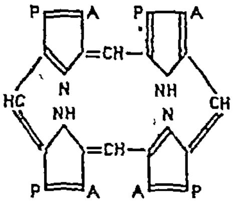
The contention that joint stiffness is the result of los of muscle extensibility, and that this extensibility ca be preserved by making the muscle *act synergically*, has if correct, an important practical bearing. To preserv *a mobile knee during the treatment* of a fracture of th shaft of the femur it is not necessary to make the patien bend his knee ; it suffices to make him lift his leg. Thi altogether changes our approach to the problem and make it much more simple. It fills one with renewed admiration porphobilin if the urine is acid. Waldenström and Vahlquist (1939) concluded that the structural formulas of these substances were as shown in the figure.



Porphobilinogen, a mixture of two dipyrryls
P = propionic acid A = acetic acid



Porphobilin, a tetrapyrryl



Uroporphyrin III

The urine of patients with acute porphyria usually darkens on standing because its reaction is most often acid and the porphobilinogen is consequently transformed into uroporphyrin III and porphobilin. This process may take place in the bladder, for which reason the urine may be coloured when freshly voided. If, however, the urine is made alkaline by giving the patients sodium bicarbonate, it remains the natural yellow colour. Alkali therapy however does not reduce the excretion of porphobilinogen (*Waldenström and Vahlquist 1944*) and consequently has no therapeutic value. If the darkness of the urine is due to some other cause, its colour will not be changed by the administration of alkali.

In cases in which the urine is of normal colour, the diagnosis has to be made by demonstrating porphobilinogen in the freshly voided urine. If porphobilinogen is not found, the patient cannot have an attack of acute porphyria, but he may have latent porphyria.

Porphobilinogen is demonstrated by Ehrlich's benzaldehyde reaction; it gives the same reaction as urobilinogen with Ehrlich's reagent but is easily differentiated from this substance by the fact that it is insoluble in ether, whereas urobilinogen is readily extracted with ether in an acid medium. If the fresh urine gives the benzaldehyde reaction, about 2 ml. of 50% acetic acid is added to about 20 ml. of fresh urine in a separating funnel and extracted twice with about 40 ml. of ether. If the extracted urine still gives the benzaldehyde reaction, porphobilinogen is present.

The diagnosis may be confirmed by demonstrating the porphyrin; but this is unnecessary because porphobilinogen is pathognomonic of acute porphyria. If the porphyrin concentration is sufficiently high, the urochlor reaction (Waldenström 1937) is positive:

To 1 ml. of urine 2 ml. of concentrated hydrochloric acid is added; if the reaction is positive, a red colour is seen, which, on addition of a drop of 3% hydrogen peroxide —not too old a solution—in a few minutes gives way to yellow and later becomes grass-green and ultimately fades.

This reaction is common to all porphyrins and is positive also in symptomatic and congenital porphyrias.

If the urochlor reaction is negative, the porphyrin may be demonstrated after chromatography of the urine on anhydrous aluminium oxide. The procedure is described by Waldenström (1935) and by Jørgensen and With (1945).

If closer chemical analysis is aimed at, more complicated procedures are required. For the isolation of uroporphyrin III, Waldenström (1937, p. 34) has developed a fractional extraction with ether and acetic ether at pH 3·2. After extraction, spectroscopic identification can be carried out, but this is not necessary in ordinary clinical work. Direct spectroscopic examination of the urine without previous purification is useless and may be misleading.

QUANTITATIVE ESTIMATION

Vahlquist (1939) has worked out a method for the quantitative determination of porphobilinogen in the urine.

The urine is made alkaline by giving the patient sodium bicarbonate and is extracted with ether after the addition of acetic acid. The red colour of the benzaldehyde reaction of the extracted urine is measured in the Pulfrich photometer (filters S.55 or S.53). Since porphobilinogen has not been isolated in the pure state the result is expressed in extinction units (P.U.). According to Vahlquist (1939) 1 P.U. is the concentration of a solution which gives the same extinction with the benzaldehyde reagent as does a urobilinogen solution containing 1 mg. per 100 ml., whereas according to Waldenström and Vahlquist (1944) 1 P.U. is the amount of porphobilinogen present in 100 ml. of such a solution of porphobilinogen. In our case-records the latter definition is used.

With this method of analysis Waldenström and Vahlquist (1944) observed the excretion of porphobilinogen in latent and manifest cases of acute porphyria. In two manifest cases the excretion was observed during longer periods after an attack and found to be fairly constant. We have made quantitative determinations in two cases: in a latent case the porphobilin excretion was observed during its disappearance and reappearance, and in a manifest case until the death of the patient. It is noteworthy that the excretion measured in P.U. was of the same order of magnitude in these two cases and in the two manifest cases reported by Waldenström and Vahlquist (1944).

CASE-RECORDS

CASE 1 (latent porphyria).—A diabetic man, aged 53, in the hospital from May 20 to July 17, 1944. No history of diseases suspect of acute porphyria in his family or himself. No diseases of importance up to 1934, when diabetes mellitus was diagnosed and treated by diet and insulin. During March, 1944, symptoms of neuritis developed in the legs. Examination showed no paresis but slight disturbances of sensibility pointing to a diabetic neuritis. Further clinical examination showed nothing abnormal except diabetes of moderate severity and porphyrinuria.

Soon after his admission to hospital it was noted that his urine was dark red and showed a strongly positive benzaldehyde reaction, which persisted after extraction with ether in an acid medium. The urochlor reaction was negative and after chromatographic concentration only doubtfully positive.

Careful investigation of the patient's consumption of medicine showed that he had taken 0·09 g. of phenobarbitone daily during two weeks in April, 1944. Quantitative determination of porphobilinogen after the urine had been made alkaline —by which it lost its red colour—showed the following values:

June 4.—5·3 P.U. per 100 ml. in 24-hour urine, and 52·3 P.U. per 24 hours.

June 5.—The different portions of urine were analysed separately and gave the following figures: 0 hr. 40 min., 10·2 P.U. per 100 ml.; 5 hr. 15 min., 4·6 P.U. per 100 ml.; 19 hr. and 21 hr. 30 min., only 0·04 P.U. per 100 ml.

June 6.—0·02 P.U. per 100 ml.

June 7.—0·01 P.U. per 100 ml.

After that the reaction was too weak for quantitative measurement.

The observations were made apparently just as the porphobilinogen excretion was disappearing—a process which mainly took place in a single day. After the disappearance of the porphobilinogen the administration of sodium bicarbonate was discontinued and the urine became acid, but the porphobilinogen did not reappear.

Provocative doses of barbiturates were then given. Starting from June 23, phenobarbitone 0·045 g. was given thrice daily, and allylisopropylbarbituric acid 0·1 g. in the evening. As the patient became very sleepy, 'Prominal' (*n*-methylphenylethylbarbituric acid) 0·06 g. was given thrice daily from June 26 instead of the phenobarbitone. On the 30th the urine was red and gave a strong positive reaction with benzaldehyde. The same day the barbiturates were discontinued and the administration of alkali was begun. From July 4 the urine was colourless, and quantitative determinations gave the following results.

We removed the plaster, put the arm in a sling, and started active exercises.

The radiogram in fig. 7*b* was taken five weeks later, when the patient was again using the arm normally. The original fracture had been treated with a shoulder spica plaster; note the meagre callus. The refracture was treated by putting the arm in a sling and encouraging movements; note the greater amount of callus. The man has a stronger arm now than he had before the refracture.

Fig. 8*a* shows a gunshot wound of the tibia. The patient was up walking about, when suddenly he felt pain in his shin. Radiography was thought to show nothing abnormal. The man was reassured.

I saw him three weeks later, when radiography showed callus formation (fig. 8*b*). When the original radiogram was re-examined, a linear crack extending through both halves of the bone could be seen. As the man had been walking about without any splint, it seemed unnecessary at this stage to apply one; so he was again reassured, and his symptoms soon disappeared.

The radiogram taken twelve weeks after the refracture shows consolidation (fig. 8*c*). The refracture in this patient, as in the previous case, had been beneficial in giving a much stronger bone. Compare again the amount of callus resulting from the two opposing lines of treatment: rest producing little callus, activity producing a great deal.

Fig. 9 shows the humerus of an amputated arm. My colleague, Mr. L. Gillis, had excised $1\frac{1}{2}$ in. of bone with the object of getting a pseudo arthrosis. After the operation the patient was encouraged to move the false joint; the result was the opposite to that intended—bony union instead of a pseudo-arthrosis.

* * *

In the controversy on rest versus activity it must be apparent on which side my sympathies lie. It would be too much to hope that I have converted you to my point of view, but I shall be content if the next time any of you imposes a splint on a patient you pause a moment to ask yourself: "Why am I using this splint? What good will it do—and what harm?"

I am indebted to Mr. F. Durbin, of Exeter, for the radiograms shown in fig. 5.

ACUTE PORPHYRIA

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In the last few years our views on porphyrin diseases have undergone considerable development thanks to investigators in Scandinavia (Waldenström 1935, 1937, 1939, 1940, 1944, Waldenström and Vahlquist 1939, 1944), but their communications have almost all been published in German, so a brief review in English may be of interest. For details the reader is referred to the original papers cited and to the reviews of Vannotti (1937) and Dobriner and Rhoads (1940).

Porphyria is divided into symptomatic, congenital, and acute forms. *Symptomatic porphyria* is the pathological excretion of porphyrins as a symptom of known diseases (infections, anæmias, lead poisoning, &c.) and the only porphyrin excreted is coproporphyrin I. *Congenital porphyria* is a rare condition characterised by accumulation of uroporphyrin I in the blood and organs, especially the bones and skin, and excretion of this substance in the urine; small amounts of uroporphyrin III may also be present (Waldenström 1937, pp. 15 and 31). The condition has no hereditary connexion with acute porphyria.

Acute porphyria, so-called, is the most important of the porphyrin diseases; it has been divided into toxic and idiopathic forms, but according to Waldenström (1937, 1939) this distinction is unnecessary. The disease manifests itself in acute attacks of abdominal pain, vomiting, and constipation, often accompanied by nervous symptoms and dark urine; but *the underlying condition is a chronic disorder of pyrrole metabolism*, which is latent between attacks. The term "acute porphyria" is therefore misleading. The nervous symptoms of acute porphyria have been reviewed by Waldenström (1939), and the abdominal symptoms are wel known and need not be discussed here. It is a diseas of adults and has not been observed before fifteen year of age.

The symptom suggesting the diagnosis of acute porphyria is usually the dark urine, and it is therefor important to know that the urine may be of entirel normal appearance in this disease. This is due to th fact that in acute porphyria the porphyrin is not excrete as such, but as a chromogen, named porphobilinoge (Waldenström and Vahlquist 1939), originally calle chromogen by Waldenström (1937), which is stable i alkaline urine but changed to a mixture of uroporphyrin II and the red pigment porphobilin in acid urine. Smal amounts of uroporphyrin I may, however, occur, and Grinstein et al. (1945) and Watson et al. (1945), of whose papers we have seen only brief extracts, have found considerable amounts of uroporphyrin I. The abnormal substances are found only in the urine and—contrary to what happens in congenital porphyria—not in the blood or the organs. In fatal cases necropsy practically always shows nothing abnormal.

Some cases of this chronic metabolic disorder never give rise to clinical symptoms and are known as latent porphyria; in such cases the excretion of porphobilinogen is most often permanent but may be intermittent (Waldenström 1944). The investigations of Waldenström (1937) in Sweden have shown that acute porphyria is hereditary, probably of dominant mendelian type, and in investigations of the heredity it is important to recognise the latent cases.

ÆTIOLOGY

Acute porphyria seems to have a universal distribution. Most of the cases described have been German or Swedish (Waldenström 1937), but cases are known to occur in many other countries: Denmark (Jørgensen and With 1945, Buch and Faarup 1945); France (Courcoux et al. 1929, Roger et al. 1939); Italy (Micheli and Dominici 1930, Massa 1935, Maugeri 1936); Netherlands (van Buchem and van der Zoo de Jong 1927); Norway (Wiig 1940). From England and U.S.A. a few cases have been published (Chandler et al. 1939, Rau 1940, Mason and Farnham 1931, Mason et al. 1933, Dobriner 1936, Turne 1938, Palmer 1940, Ford and Ulrich 1941). Some cases from South Africa have also been reported (Barnes 1945)

It is well known that sulphonal and trional may giv rise to attacks (toxic porphyria), and Waldenström (1939, 1940) is of the opinion that barbiturates als may provoke attacks in persons with latent porphyria As attacks of acute porphyria are often fatal, it i important to avoid barbiturates in this condition especially in manifest cases Waldenström (1940) foun a case-mortality of 2 cases out of 36 when no barbiturates were given, as against about half the cases i most other published series, in which barbiturates wer freely used.

Since the clinical picture of acute porphyria varie and may simulate other diseases, physicians, surgeons psychiatrists, and neurologists *should be on the look-out* for the disease and be able to diagnose it wit certainty. This can be done only by urine analysis which is quite simple.

BIOCHEMISTRY AND CHEMICAL DIAGNOSIS

The chromogen porphobilinogen is specific to acute porphyria and is found in this disease only (Waldenström and Vahlquist 1944) It is stable in alkaline urine but is transformed into the pigments uroporphyrin III and land and of a committee set up by the department of health in New South Wales (1945).

The Australian inquiries suggest that there is some connexion between the stage of pregnancy at which the mother contracts rubella and the type of malformation in her child. Swan and colleagues found that the average duration of pregnancy at the time of the rubella in the mothers of children with cataract was 1·4 months, in the mothers of children with heart lesions 1·5 months, and in mothers of deaf children 2·3 months. Carruthers (1945) concludes that if infection occurs in the first six weeks fœtal damage will be widespread and may include the eyes, both divisions of the ears, the heart, and perhaps many other parts; after the sixth week the eyes and heart may escape and the semicircular canals be normally developed, but the cochlea is likely to be damaged and growth may be retarded; after the third month damage to the fœtus is rare.

In the last two years congenital defects associated with maternal rubella have been reported from the United States, though the number of cases has been small, the largest series being the 11 cases reported by Erickson (1944). So far deaf-mutism has been an unusual finding, but this may again be an effect of early reporting, since most of the cases published have been in children under two years of age. Of 45 reported cases of congenital malformations following maternal rubella in pregnancy the main lesions were cataract in 39 cases; heart defects in 35 cases; and deaf-mutism and undescended testicles each in 2 cases (Reese 1944, Erickson 1944, Perera 1945, Adams 1945, Altmann and Dingmann 1945, Albaugh 1945, Rones 1944, Greenthal 1945, Krause 1945, Long and Danielson 1945, Conte et al. 1945): In all but one of these 45 cases the mothers had had their rubella in the first three months of pregnancy; in the one exception it occurred in the twenty-eighth week (Conte et al. 1945).

Several American writers suggest that a particularly virulent strain of rubella virus, responsible for the congenital malformations in Australia, was imported by troops into the U.S.A., leading to the appearance of similar defects there.

TABLE II—FINDINGS ON EXAMINATION IN CHILDREN AT CUCKFIELD ON MARCH 30, 1946

Case no.	Age yr.	Age m.	Height ft.	Height in.	Weight st.	Weight lb.	Circumference of head (in.)	Degree of deafness	Other abnormalities
1	5	6	3	5½	2	7	18¾	Mod	Nil
2	5	6	3	7¼	2	7½	18	Sev	Poor muscle tone; pale mottled skin; wide arch to upper jaw, very narrow lower arch
3	5	5	3	7¼	2	11½	19¼	Sev	Systolic bruit in 2nd left intercostal space; slightly pot-bellied
4	5	7	3	10½	3	6	20¾	Sev	Pigeon-chested
5	5	5	3	6½	2	4	19	Mod	Grossly defective muscle tone
6	5	7	3	8	3	1	20½	Mod	Nil
7	5	7	3	10	2	12½	19½	Slight	Slightly pigeon-chested
8	5	6	3	8½	3	5	19⅞	Sev	Pot-bellied; slight postural valgus; internal squint
9	12	6	5	1½	5	10	20½	Sev	Wide arch to upper jaw; narrow lower arch

INQUIRIES IN ENGLAND

It seemed important to find out whether there was an association between rubella and congenital defects in England, because here at last was a possible cause for previously inexplicable malformations, and a cause which might be preventable. Simpson (1944) had reported 2 cases of congenital cataract in West Country children whose mothers had German measles in pregnancy, but otherwise there were no British papers on the subject.

A simple way of approaching the question was to inquire for a history of German measles in the mothers of children in schools for defective children. Though such an inquiry will not tell us what proportion of mothers

TABLE I—SUMMARY OF ANSWERS RECEIVED TO QUESTIONARIES

No. and sex	Address of mother	Date of birth	Date of rubella	Week of pregnancy	Severity	Seen by doctor	Birth-weight lb.	Birth-weight oz.	Feeding difficulty	First tooth at (month)	Walked at (month)
Cuckfield											
1 F*	Essex	Oct. 3, 1940	Feb. 10, 1940	7	Mod	Yes	6	0	Breast-fed: poor appetite for other food	20	14
2 F*	Berks	Oct. 2, 1940	Feb. 14, 1940	7	Sev	Yes	4	2	Very slow in gaining	6	16
3 F	Yorks	Oct. 26, 1940	March, 1940	8–12	Mild	Yes	6	0	Very difficult	10	18
4 M*	Surrey	Aug. 24, 1940 (3 wk. prem.)	March, 1940	12–16	V mild	No	5	13	Easy on bottle	9	11
5 F	Wilts	Oct. 15, 1940	Mar. 15, 1940–Apr. 15, 1940	10–14	Mild	Yes	4	4	Very poor feeder	17	20
6 M*	Somerset	Aug. 29, 1940	Feb. 25, 1940	14	Mod	Yes	6	12	Very difficult for 3 months	1	12
7 F*	Sussex	Aug. 28, 1940	Feb. 10, 1940	12	Sev	Yes	6	0	Very difficult: suspected cœliac disease	4	23
8 F	London	Sep. 20, 1940	Mar. 7, 1940	12	Mod	No	6	2	Breast-fed easily	12	21
9 F	Hants	Sep. 27, 1933	Mar. 17, 1933 (probable†)	13	V mild	No	6	8	Bottle-fed: very slow eater after weaning	V late	V late
Manchester											
10 F*	Cheshire	Oct. 12, 1940	Apr. 3, 1940	13	..	Yes	7	8			
11 F*	Middx	Dec. 7, 1940	Apr. 29, 1940	7	..	Yes	6	12			
12 F*	Lancs	Jan. 26, 1941	July, 1940	8–12	..	Yes	6	0			
Birmingham											
13 F	Worcs	Feb. 16, 1941	August, 1940	12–14	Mild	No	..				
14 M	Glos	Oct. 8, 1940	Feb. 26, 1940	8	..	No	..				
15 M	Glos	Oct. 6, 1940	March, 1940	9–13	Mod	Yes	..				
16 M*	London	Nov. 6, 1940	April, 1940	9–13	Mild	No	..				
17 F	Oxford	Oct. 5, 1940	Feb. 15, 1940	7	..	No	..				
Doncaster											
18 F	Sussex	Nov. 7, 1940	Apr. 22, 1940	12	Mod	Yes	..				
19 F	Surrey	Oct. 16, 1940	April, 1940	12–14	Mod	Yes	..				
20 F	Yorks	Oct. 16, 1940	Mar. 20, 1940	11	Mod	Yes	..				

* The nine cases marked with an asterisk were included in Miss Sylvian Martin's series.

† This mother said: "A rash appeared after about 3 months of pregnancy and lasted for 3 days; it might quite easily have been German measles, but feeling well otherwise I did not call a doctor."

July 4.—13·6 P.U. per 100 ml., and a minimal excretion of 20·4 P.U. per 24 hours (some urine had been lost).
July 5.—6·0 P.U. per 100 ml., and 36·0 P.U. per 24 hours.
July 7.—9·6 P.U. per 100 ml., and 134·4 P.U. per 24 hours.
July 9.—7·2 P.U. per 100 ml., and 86·4 P.U. per 24 hours.
July 10.—8·0 P.U. per 100 ml., and 80·0 P.U. per 24 hours.

Owing to the "people's strike" against the Germans in Copenhagen (restrictions of electricity) no more determinations could be carried out.

CASE 2 (manifest porphyria).—A housewife, aged 32, with no history of diseases suggestive of acute porphyria in her family or herself, and no other previous diseases of importance, was in the medical department from Dec. 22 to Dec. 29, 1944. On Dec. 10 she had begun to take allobarbitone 0·12 g. daily for nervousness; apart from this she took no other medicaments. On the 16th she had had an attack of dizziness, followed by two hours' unconsciousness. On the 17th she had had a similar attack, accompanied by transitory respiratory paresis. Her husband, an electrician who had been present at electric accidents and given artificial respiration, treated her with artificial respiration during several hours before she was able to breathe spontaneously.

On the 18th she had had an attack of abdominal colic and been admitted to a surgical ward, where her symptoms rapidly disappeared and her general condition ameliorated; but, as dark urine was observed, she was admitted to our department. Here, on the first evening of her stay, she was erroneously given soluble barbitone 0·35 g. as a hypnotic—the only dose of barbiturates taken since the 18th. Later only opiates were used as hypnotics.

On the 23rd an attack of diffuse uncharacteristic abdominal pain, general hyperæsthesia, and rapidly progressive paresis of all four limbs developed, with pronounced weakening of the tendon-reflexes. A neurologist examined the patient and thought that the pareses were of muscular origin. The breathing was in periods of gasping, with intervals of complete cessation of respiration. Paresis of the sphincters developed; on the 26th the bladder reached the umbilicus, and from that time daily catheterisation was necessary.

Lumbar puncture on the 28th showed normal cerebrospinal fluid with a negative Wassermann reaction. Electrocardiograms on the 23rd and 27th were also normal.

On the 29th the patient died from progressive respiratory paralysis accompanied by fever (104° F) and tachycardia. Necropsy showed nothing abnormal except bronchopneumonia in the right lower lobe.

Quantitative determinations of porphobilinogen carried out after the urine had been made alkaline gave the following values:

Dec. 26.—14·5 P.U. per 100 ml., and 145 P.U. per 24 hours.
Dec. 27.—9·5 P.U. per 100 ml., and 385 P.U. per 24 hours.
Dec. 28.—7·6 P.U. per 100 ml., and 118 P.U. per 24 hours
Dec 29 —9·5 P.U. per 100 ml., and 207 P.U. per 24 hours.

The volume of urine passed was 1000–4050 ml. per 24 hours, which is exceptionally large for this disease. Chromatography was performed, and the urochlor reaction was positive in the eluate. Examination of the fresh urine of two sisters of the patient showed no porphobilinogen.

SUMMARY

Recent progress in our knowledge of the so-called acute porphyria is reviewed.

This disease has hitherto attracted too little attention in the Anglo-Saxon countries.

There is strong evidence that barbiturates exert a harmful effect on patients with porphyria, even when it is latent. Two cases illustrating this effect are reported.

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RUBELLA AS A CAUSE OF CONGENITAL DEAFNESS IN ENGLAND

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THE association between maternal rubella in the early months of pregnancy and congenital cataract was first noted by Gregg (1941) among New South Wales children who had been in the early months of fœtal life in June-August, 1940, when there was an extensive outbreak of rubella in Australia. The association was later confirmed by Swan and his associates in South Australia, who found that of 101 children whose mothers had had rubella in pregnancy 78 were born with various defects, mainly cataract, deaf-mutism, and heart lesions (Swan et al. 1943, 1944, Swan 1944, Swan and Tostevin 1946). Of the 78 mothers of defective children, 69 had had rubella in the first three months of pregnancy, 8 in the fourth, fifth, or sixth month, and only 1 in the last three months (seventh). They concluded from their findings that if a woman contracts rubella in the first two months of pregnancy the chances of her child being born defective are about 100%; if she contracts the exanthem in the third month the chances are about 50%; whereas later in pregnancy the chances are very low.

Evidence from the United States suggests, however, that women who contract the disease in the first two months of pregnancy may have normal children, and that the dictum of Swan and colleagues was unduly pessimistic—at least when applied to other parts of the world. Fox and Bortin (1946) investigated 152 cases of rubella in married women, notified in Milwaukee during 1942–44, and found that 11 had been pregnant at the time of the rubella, 5 in the first two months, 4 in the third or fourth month, 1 in the seventh month, and 1 in the ninth month. Of the 12 babies born (there was one set of twins) only 2 were abnormal, one of these being a stillborn hydrocephalic and the other a "blue" baby with a hydrocephalus that subsided spontaneously.

In his original paper Gregg (1941) did not mention the hearing of the affected children, but at the time when the paper was read (October, 1941) most of the children were only eighteen months old and none was older than two years, at which age deafness may well be overlooked, especially in children who are blind or otherwise defective. In 1942 and 1943 Gregg learned of more and more cases of deaf-mutism (Gregg 1945), and Swan and colleagues found 38 cases of deafness (4 doubtful) among their 78 children with various defects. Carruthers (1945) expects that severe defects of hearing will ultimately be detected in over half of the Australian children whose mothers had rubella early in pregnancy. The frequency of deafness associated with maternal rubella has been brought out by the inquiries of Welch (1945) in Queens-positive" children at Cuckfield School. The children were also examined clinically, and Mr. Maxwell Ellis estimated their hearing-loss with a 'Maico' audiometer. The replies to the supplementary questions and clinical findings are summarised in the tables.

Age and Parity of Mothers.—Of the 9 mothers of whom inquiry was made, 5 were under and 4 over 24 years when the affected child was born. All but 1 child were the first children of the family.

Severity of Rubella.—Table I shows that of the 15 cases where the severity could be estimated, the attack was severe in 2, moderate in 7, mild in 4, and very mild in 2 cases (including 1 where the diagnosis remains in doubt). There is no obvious relation between the severity of the mother's rubella and the degree of the child's defects.

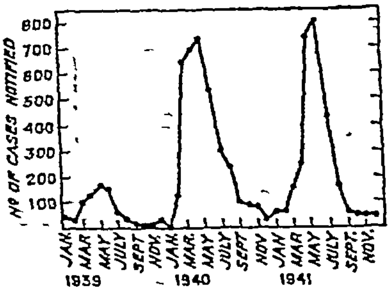

Fig. 4—Monthly incidence of rubella in Manchester.

Maturity.—There was no obvious tendency to premature birth among the children: of the whole series 15 were born at full term and the remainder 2–4 weeks prematurely.

Birth-weights.—A low birth-weight was a common finding. of the 12 cases where the weight was known, in 2 it was under 4½ lb, in 6 others it was under 6¼ lb., and in only 4 was it 6½ lb. or over.

Feeding Difficulties—Of the Cuckfield cases, in which feeding difficulties were inquired for, only 2 had been fed easily and had gained weight normally from birth (cases 4 and 8). In the others the usual complaint was that it was hard to get the baby to take its feeds. A typical reply (case 3) to the question regarding feeding was: "She was very difficult to feed, as she refused to suck at the breast and only with a great deal of persuasion would take a bottle. She was also very difficult to suit. Many foods disagreed with her."

The poor appetite of these children seems often to have continued beyond the infant stage, and in cases 1 and 7 the mother remarks that the child is still a poor feeder. In case 7, after severe feeding difficulties in infancy, the child was suspected of having cœliac disease at the age of 2 years.

Teeth and Jaws.—Of 7 cases where the information is available, the first tooth did not appear until the child was a year old or older in 3 cases, and the average time of eruption was eleven months. No evidence of delayed eruption of the second teeth was noted on examination, and there did not seem to be any abnormal tendency to caries. In 2 cases (2 and 9) there was a well-marked deformity of the jaw, consisting in each case of gross narrowing of the mandibular arch, with a widely curved maxillary arch, producing crowding of the lower, and wide spacing of the upper, incisors. It should be noted, however, that case 2 was one of those in which feeding had been particularly difficult and breast-feeding had not been possible. In case 9 (the doubtful case) the baby was bottle-fed without difficulty, though from the weaning period to 6 years "she would not chew her food and held it in her mouth for hours."

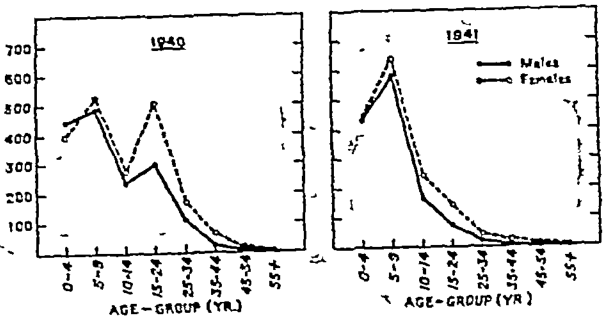

Fig. 5—Age- and sex-distribution of rubella in Manchester.

Walking.—If we take fifteen months as the average age at which the normal child can walk well enough for there to be no doubt about it (Jewesbury 1932), walking was delayed in 5 out of 8 children, and grossly delayed (twenty months or later) in 3 cases.

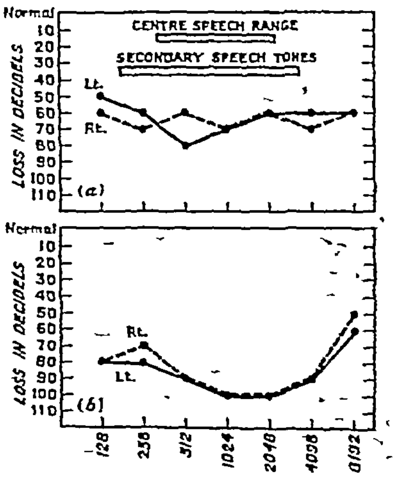

Fig. 6—Two examples of audiograms from children with a maternal history of rubella in early pregnancy: (a) case 1; (b) case 6.

Size of Head.—The circumference of the children's heads ranged from 18 in. to 20½ in. Hutchison (1925) gives 20 in. as the normal circumference of the head of a five-year-old child, so case 2 must be looked on as small-headed, case 1 as less definitely so, and only 3 of the children (cases 4, 6, and 8) as normal in this respect.

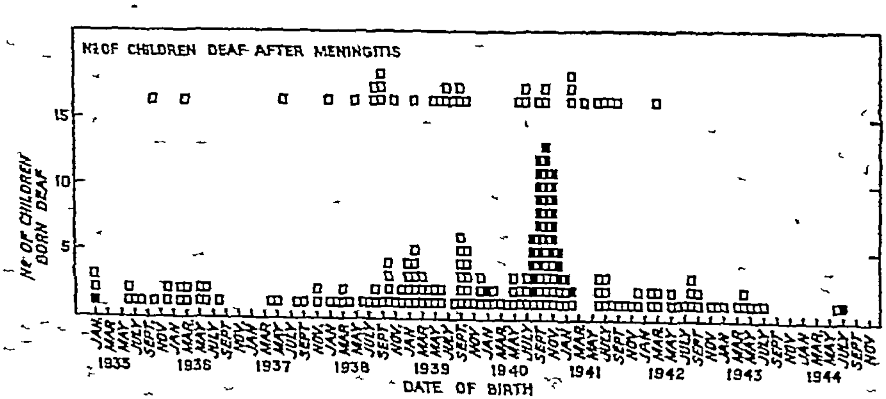

Fig. 2—Miss Martin's series: cases with maternal history of rubella are shown in solid black. Beyond the limits of the chart there were 10 children born deaf in February, 1929; February, 1930; March, 1931; August, 1931; May, 1932; June, 1932; March, 1933; January, 1934; August, 1934; and October, 1934; and 1 child, born in December, 1928, became deaf after meningitis.

Hearing.—The deafness, in all cases where it could be tested, was of the inner-ear type. In all cases the hearing defect was bilateral, and its degree was usually much the same in the two ears. The audiograms, of which two examples are given in fig. 6, showed no evidence of islands of hearing, and the loss was as a rule fairly uniform throughout the frequency range. In at least 5 of the 8 children tested there was only a partial loss of hearing.

When was the Deafness Noticed?—The answers to this

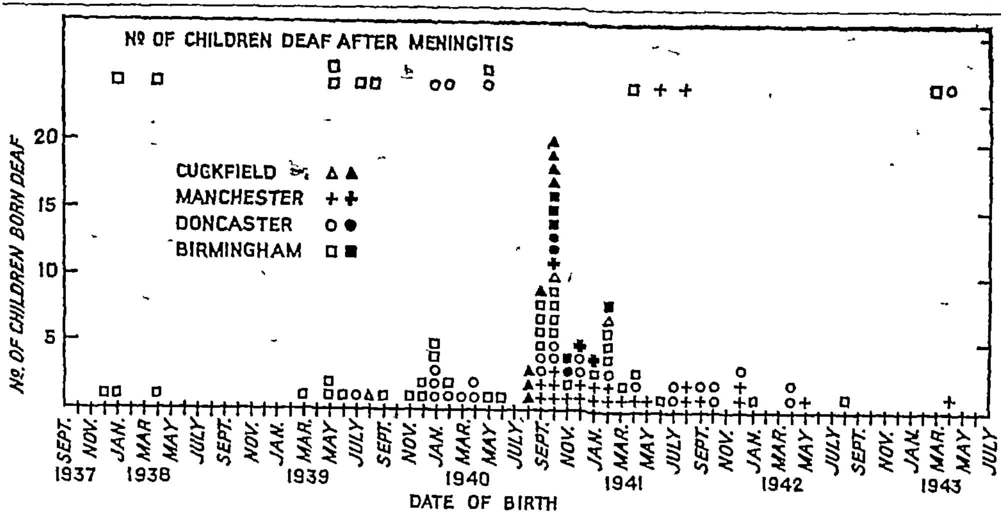

Fig. 1—Present inquiry: cases with maternal history of rubella are shown in solid black. Beyond the limits of the chart there were 6 Cuckfield children born deaf in October, 1929; June, 1930; August, 1932; September, 1933 (rubella positive); and September, 1935 (two).

who get German measles early in pregnancy give birth to defective children—this figure could only be learnt by a much larger and protracted inquiry—it should give a rough indication of the need for the application of preventive measures. It was decided to start with schools for the deaf.

The questionary drawn up for circulation to the mothers was intended to produce the essential information without giving any hint that it was for German measles that we were searching. The questions adopted were as follows:

(1) Name and home address of your child with defective hearing.
(2) Date and place of baby's birth.
(3) Was the baby premature? If so, how many months?
(4) How old was the baby when you first noticed the deafness?
(5) Did you have any illness during that pregnancy?
(6) *If so, what was the illness? (If you are uncertain of its name, please say what it was like.)*
(7) Did a doctor see you in that illness? If so, please give his name and address.
(8) Date of the illness. (If you cannot remember the date, can you say how long before baby was born it occurred?)

In the first place the form was circulated to the mothers of children at Cuckfield House Oral School for the Deaf, a small private school in Sussex. The replies were startlingly positive. Of the 18 children in the school, a history of rubella in the mother was obtained in 8, with a ninth probable and a tenth possible. Moreover, in all the positive cases (including the probable one) the rubella had been in the first four months of pregnancy (table I). Another striking point was the birth dates of the children with a definite maternal history of rubella; these *all lay between August 24 and Oct. 26, 1940*, whereas the birth dates of the other children in the school were scattered between 1929 and 1941.

The questionaries were next circulated in three larger schools for the deaf—the Royal Residential Schools for the Deaf, Manchester; the Yorkshire School for the Deaf, Doncaster; and the Royal School for Deaf Children, Birmingham.

The results at the three larger deaf schools were as follows:

School	*No. of deaf children*	*No. with maternal history of rubella in pregnancy*
Manchester	29	3
Doncaster	35	3
Birmingham	59	5
Total ..	123	11 (*8·9%*)

Once again in every positive case the mother had had the rubella in the first four months of pregnancy (table I); and once again there was a remarkable similarity in the birth dates, all 11 lying between Oct. 5, 1940, and Feb. 16, 1941, with 6 cases in October, 1940, whereas there was a wider scattering in the birth dates of the children with no maternal history of rubella (see fig. 1).

If one excludes all children in which the deafness was known, or strongly suspected, to have followed meningitis, measles, or other illness in the child after birth, the *total number of children at* the three schools falls to 97 and the proportion with a maternal history of rubella rises to 11·3%; 72 of the 97 children were born in 1940–41, so a history of maternal rubella was obtained in 15% of the deaf children born in these epidemic years.

Miss Martin's Inquiry.—While this small inquiry was in progress, Miss Sylvian Martin (1945) briefly summarised the results of a rather similar investigation she had carried out among the children attending her speech-therapy clinic at the Infants Hospital, Vincent Square, and at various deaf schools throughout England. I have since analysed her material.

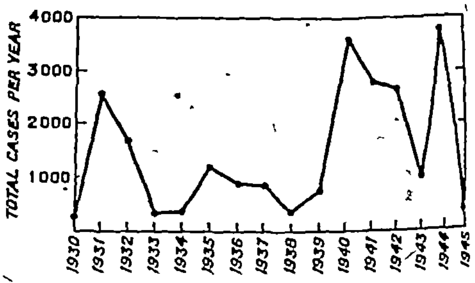

Fig. 3—Annual notifications of rubella in Manchester.

In Miss Martin's questionary the mothers were asked specifically: "During pregnancy, did you have German measles?" Altogether she received replies from 239 mothers, and 38 (15·9%) gave a history of German measles in the first four months of pregnancy. In no case was there a history of German measles later in pregnancy than the fourth month. The birth dates of the children are charted in fig. 2, which shows that there is again a striking grouping of the rubella-positive children between August, 1940, and February, 1941.

In a further brief report Miss Martin (1946) summarised her findings among children born in 1940–41 as follows:

	Boys	*Girls*	*Total*
Deaf children born in 1940–41	64	38	102
History of maternal rubella in first 4 months of pregnancy	16	20	36 (*35%*)

Hughes (1945) has reported a case of unilateral cataract, deaf-mutism, and *patent interventricular* septum in a child born on Nov. 21, 1940, whose mother had had rubella in the second month of pregnancy.

FINDINGS IN MORE DETAIL

The necessity for avoiding leading questions in drafting the questionary for circulation to deaf schools made it impossible to ask for details of the attack of German measles in positive cases. Some *supplementary questions* were therefore circulated to the mothers of the "rubella-

As Parsons (1946) remarks, "the evidence produced is sufficiently convincing to make it unwise for expectant mothers—especially in the early months of pregnancy—to be exposed to the risk of infection with German measles and perhaps with other exanthemata also." This is a strong argument for making the work done on rubella widely known to the public, for the worst damage is done at a stage of pregnancy when most women will not have consulted a doctor or midwife—often indeed before they know themselves to be pregnant. Even when the risk is known, however, the explosiveness of rubella outbreaks and the triviality of the illness it produces will make avoidance of infection very difficult to ensure.

It seems clear that even at some expense, inconvenience, and trouble to the patients and their attendants all pregnant women who are not immune because of a previous attack should be protected against rubella at least during the first four months of pregnancy, and preferably for six months. The suggestion has been made that all girls should be infected with rubella, by contact with a case, before they reach the child-bearing age. But if this were feasible, which is doubtful, serious complications of rubella, though rare, are not unknown, and a few mishaps would soon bring the measure into disrepute. Passive immunisation seems more immediately feasible, and there is urgent need for research to devise a suitable and effective technique. The work of Barenberg et al. (1942) in children's wards in New York suggests that the injection of 30 c.cm. of human plasma will protect a child against rubella for at any rate a few weeks, but their findings cannot be said to be conclusive, even for children. On the analogy of measles, convalescent serum would be expected to be more effective. But normal adult and convalescent serum both carry the risk of homologous serum jaundice. Gamma globulin seems to be free from this risk, the dose is small, and the reactions it sometimes produces are rarely severe. Gamma globulin, preferably prepared from convalescent serum, therefore seems the most promising immunising agent, though its efficacy in rubella has, of course, still to be demonstrated. One injection would probably not protect for more than a month or so, but most mothers would not object to an injection repeated two or three times to tide them over the critical period once the need for protection was explained to them.

If a woman does contract rubella during the first four months of pregnancy the question will arise whether the pregnancy should be terminated, but, especially in view of the findings of Fox and Bortin (1946), doctors in this country will no doubt require more convincing evidence of the genuineness of the risk than is yet forthcoming before advising such a drastic step—Parsons (1946), for instance, finds the evidence insufficient to justify the termination of pregnancy. Moreover, the clinical diagnosis of rubella would often be too uncertain to be relied on; a complement-fixation or other sero- [illegible] hich will provide a reliable diagnostic [illegible] pregnant women is badly needed (the presence of Türk cells in the blood is not confined to rubella). As the law stands, it is doubtful whether an abortion on these grounds would be legal in the United Kingdom (*Lancet* 1946).

SUMMARY

The association established in Australia between maternal rubella in the first three months of pregnancy and congenital defects—mainly cataract, deaf-mutism, and heart lesions—has been confirmed in the United States.

An inquiry has therefore been made in schools for the deaf, to see whether a similar association could be demonstrated in England.

At one school with 18 children, 8 mothers gave a definite and 1 a probable history of rubella in the second to fourth months of pregnancy. The 8 children with a definite maternal history were all born between August and October, 1940.

In three larger schools a maternal history of rubella in pregnancy—always in the first four months—was obtained in 11 out of 123 children; and in the positive cases the children were all born between October, 1940, and February, 1941.

Deaf children with a maternal history of rubella were found to have a bilateral, incomplete, inner-ear deafness usually fairly uniform throughout the frequency range. Difficulty in feeding during infancy was commonly reported, and examination showed a tendency to deformity of the jaw, pigeon-chest, and atonic musculature; intelligence seemed to be normal, and no cataract or definite heart lesion was detected.

Notifications at Manchester show that the rubella epidemic of 1940 was peculiar in involving an unusually high proportion of young women.

An attempt should be made to protect pregnant women against rubella in the first four months of pregnancy.

Inquiry should be made into the efficacy of gamma globulin prepared from convalescent serum for this purpose.

My thanks are due to Mr. Maxwell Ellis, F.R.C.S., for the audiometer charts; to Dr. A. H. Gale, of the Ministry of Education, and Mr. John Spalding, Mr. E. S. Greenaway, and Mr. F. W. Cockersole, the headmasters, for allowing me to include the figures for the Manchester, Doncaster, and Birmingham schools; to Dr. C. Metcalfe Brown, M.O.H. for Manchester, for the notification figures; to Dr. Margaret N. Jackson for her help with the inquiry; to Miss Corbishley and her staff for facilities at Cuckfield; and to Miss Sylvian Martin for allowing me to analyse her series.

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THE Association of British Chemical Manufacturers, o 166, Piccadilly, London, W.1, has produced a new edition o their directory, "British Chemicals and their Manufacturers," the first since 1939. The directory contains the names an addresses of the members of the association, followed by 60-page classified list of their products and a separate list o proprietary and trade names. The lists include drugs an microscopic stains as well as chemicals used in industry The directory will be sent free to anyone likely to purchas chemicals.

question ranged from six months to four and a half years of age, as follows:

Case no. ..	1	2	3	4	5	6	7	8	9	10
Age (yr.) ..	1	2	1¼	2	4½	1¼	1¼	½	1⅔	1

Case no. ..	11	12	13	14	15	16	17	18	19	20
Age (yr.) ..	1¾	1½	1½	¾	1¼	1¾	1¾	½	3	¾

Other Abnormalities.—Except cases 2 and 5, the affected children looked in good general health and well nourished. Cases 2 and 5 were thin, with atonic muscles and a tendency to lordosis, but such children are common among the general school population. Cases 3 and 8 were pot-bellied, and case 8 also had a postural valgus. Cases 4 and 7 had a definite though slight pigeon-chest.

No definite *heart lesions* could be detected, the only abnormal cardiac finding being in case 3; this girl had a soft blowing systolic bruit best heard in the second left intercostal space and transmitted up into the neck; there was no thrill or clinically detectable cardiac enlargement.

The only *eye lesion* detected was in case 8, a girl with an internal strabismus of the left eye.

Intelligence.—The mistresses at Cuckfield School agreed that all the affected children were normally intelligent.

NOTIFICATIONS OF RUBELLA IN MANCHESTER

In this country there is no general notification of rubella, so the incidence and age-distribution are unknown. Some evidence on these points, however, has been obtained from Manchester, the only area in England in which rubella is now notifiable. Unfortunately the notifications only reveal the general trend, since an unknown number of people with rubella do not call a doctor, and even when they do so the diagnosis is often too uncertain to be relied on.

The Manchester notifications for 1930–45 are charted in fig. 3. The monthly notifications in the epidemic years of 1940 and 1941 are compared with those in 1939 in fig. 4. It will be seen that in 1940 the incidence was high in March–June, with the peak in May, and in 1941 it was high in May–July, with the peak in June. If this monthly trend was common to the rest of England, and if we accept that rubella damages the hearing during the second to fourth months of fœtal life, we should expect to find unusual numbers of deaf-mute children being born in the autumn of 1940, and in the winter of 1941–42. Figs. 1 and 2 support this forecast as regards 1940, but not as regards 1941–42.

The explanation of this difference seems to be that the outbreak of 1940 affected women of child-bearing age more than did that of 1941. When the notifications for the two years are set out in sex- and age-groups (fig. 5), it is seen that in 1940 the figure for women of 15–24 years is almost as high as that for children aged 5–9, whereas this secondary peak is absent in 1941; the figure for women of 25–34 is also considerably higher for 1940 than for 1941.

DISCUSSION

The findings leave little doubt that the 1940 epidemic of German measles in England was responsible for many cases of congenital deafness by attacking the fœtus during the second to fourth months of uterine life. There seems to be no other explanation for the disproportionate number of children in deaf schools who were born between August and November, 1940, and whose mothers give a history of rubella at this particular stage of pregnancy.

The Manchester figures for age- and sex-distribution of notified cases show that this epidemic was peculiar in attacking a high proportion of women of child-bearing age, and this may be the sole reason why the deaf schools can produce only an occasional example of deaf children born in other years with a maternal history of rubella in pregnancy. It must remain doubtful, however, whether the 1940 epidemic differed in some more fundamental respect from those of other years—in short, was the 1940 disease rubella, perhaps in an unusually virulent form, or some other disease, with a similar clinical picture but a dissimilar tendency to damage the fœtus in utero? This doubt was raised in Australia, and Swan et al. (1943, 1944) made a laborious inquiry into the illnesses which the mothers in their series had had in pregnancy. Memories were naturally faulty, but the picture that emerged was fairly typical of rubella as seen in adults, and Parsons (1946) says in his Blair-Bell lecture: "In my opinion it should be accepted that the disease was rubella." In the present series the brief accounts of the mothers pointed to the same conclusion, and in 13 of the 20 mothers their illness was diagnosed by a doctor at the time. But in the absence of a diagnostic test for rubella some doubt must remain.

As was noted in the Cuckfield children, the deafness associated with maternal rubella is rarely, if ever, complete. Carruthers (1945), who made a detailed study of 18 cases of deaf-mutism with a maternal history of rubella, found that many of the children gave some evidence of hearing over the tone range 512 to 2048 vibrations per sec. He tested the caloric labyrinthine reactions in 9 cases, and found them slightly reduced; in only 1 case—and then in only one ear—was there no nystagmus on caloric stimulation. It was, however, notable that none of the rubella group was made sick by caloric stimulation of the labyrinth, even when pronounced nystagmus was produced. In Carruthers's view the semicircular canals are largely spared in these cases, the main damage being to the cochlea. In an infant whose mother had rubella during the first month of pregnancy, and who died aged six and a half months with congenital cataracts and a patent ductus arteriosus, the outstanding feature of the inner ear at necropsy was the total absence of any differentiation of the primitive cells to form the organ of Corti in the cochlea. The eighth nerve and spiral ganglia were well formed, as were the bony and membranous semicircular canals, though the receptor end-organs (the crista) showed the same lack of cell differentiation as did the organ of Corti.

To explain the production of malformations by the rubella virus acting early in fœtal life, it has been assumed that the cells which are in active division at the time of the virus attack are affected, while fully formed organs and quiescent primordia tend to escape (Mann 1944). On this view there is a critical period in the development of each organ at which it is susceptible to attack. The most rapid differentiation of the cochlea is taking place at about the 7th week. In the Australian series the average duration of pregnancy at the time of the rubella in the mothers of deaf-mutes was 2 months (Carruthers 1945) or 2·3 months (Swan et al. 1943, 1944); and, as would be expected from the embryology, these children mostly had some hearing, since the cochlea would be partly formed by that period. On the other hand, in the case whose necropsy findings are recorded by Carruthers, the mother had rubella during the first month of pregnancy, and the total absence of an organ of Corti suggests that this child would have been totally deaf. The tympanic cavity separates in the 9th week, and the drum and final stages of the meatus and external ear form after that; the fact that they escape damage must depend on factors other than those of development, since otherwise one would expect malformations of the middle and external ear in children born to mothers who had rubella in the 3rd or 4th month of pregnancy. To explain this we must postulate a local tissue susceptibility, which is, of course, a familiar feature of infection in the body. It must be assumed, too, that the fœtus as a whole develops a resistance to virus attack by the 3rd or 4th month, even though active differentiation is still proceeding in certain organs.

contents are carefully but completely excised. The small wound can be closed with a few interrupted 'Nylon' sutures.

Surgical excision is the only form of treatment that should be advised in these cases. X-ray and radium therapy are useless in the treatment of intracystic papillomata, because these tumours are not radio-sensitive, and the only effect of radiation therapy is fibrosis of the breast, leading to a painful functionless gland.

On the other hand, local excision of the breast is to be equally condemned, especially in young women. The patients grow introspective and depressed, and tend to become chronic invalids. I have case-records of 25 unmarried women under the age of 30 who have lost their breasts because of a bloodstained discharge from the nipple. All these women consider that they are not normal and cannot marry, and it is very difficult indeed to get them to alter this firm conviction.

Of my 62 cases of intracystic duct papilloma, I have "follow-up" records of 45, and in not one case has there been any malignant disease after local excision. The war period made "follow-up" records difficult, but the police have given me a great amount of help in finding out what has become of past patients, especially during the blitz on London and other cities; 8 of my old patients died in the various air-raids on this country.

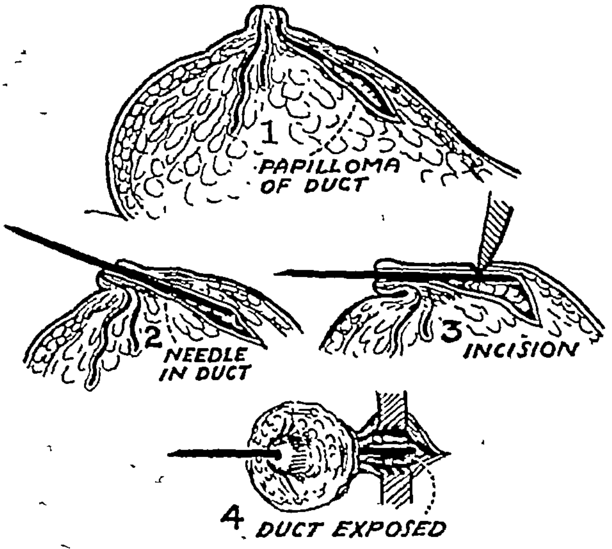

Fig. 4—Stages in excision of intracystic papilloma of breast (after Badcock).

SUMMARY

The commonest cause of a bloodstained discharge from the nipple is an intracystic duct papilloma.

Intracystic duct papillomata of the breast are benign growths and very rarely become malignant.

Local excision of the tumour and not local excision of the breast is the required treatment.

AT a session of the general council of the Union Internationale de Secours aux Enfants, held last September at Geneva under the presidency of Dr. Pierre Depage, president of the Belgian Red Cross Society, the U.I.S.E. was amalgamated with the Association Internationale de Protection de l'Enfance (of Brussels) to form a new body, the Union Internationale de Protection de l'Enfance, to be based at Geneva. This U.I.P.E. has adopted as its basic principles the League of Nations "Déclaration des Droits de l'Enfant" of 1925; and its aims are to obtain recognition of these principles, or rights of the child, in every country in the world; to encourage the physical and moral welfare of children everywhere; and to collect funds to enable it to carry out its intentions.

PENICILLIN IN AGRANULOCYTIC ANGINA

REPORT OF A CASE

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THE literature on agranulocytosis shows at once that there is no definite or complete agreement about its ætiology and treatment.

Wintrobe (1942) agrees that, though a large proportion of cases are due to amidopyrin and other drugs able to diminish the number of circulating leucocytes, other cases are of undiscovered ætiology. He quotes reports which give the number of such "essential" cases as 44% (Jackson 1934), 38% (Rohr 1939), or far less (Kracke 1931, Plum 1937) but adds that in some such cases a more satisfactory history would have revealed the cause. On the other hand, Wilkinson (1945) considers it probable that all cases of agranulocytosis are due to exposure to, or the use of, drugs or poisons to which the individual's leucopoietic tissues react abnormally. Abicht and Wienbeck (1939) reported a case of puerperal agranulocytosis which was thought to be due to hormonal activity; when death took place nine months after discharge from hospital, necropsy confirmed the diagnosis of essential agranulocytosis. Israëls and Wilkinson (1937) reported 5 cases of agranulocytosis, in 3 of which no ætiological agent could be discovered.

Of the many forms of treatment advocated and tried in this condition, the use of nucleic acid derivatives ('Pentnucleotide') has for many years enjoyed the widest popularity. Jackson and Tighe (1939) found that the mortality (35%) in cases treated with pentnucleotide was half of that in untreated cases, but Plum (1937), Fitz-Hugh (1938), and Rohr (1939) did not confirm these results and were disposed to attribute the successes to spontaneous remissions and prohibition of the offending drug. Wilkinson (1945) still recommends the use of pentnucleotide in conjunction with prohibition of all drugs which may be causal factors, whole blood-transfusion, and, in cases in which there is severe sepsis, requiring treatment, penicillin. Nixon et al. (1943) reported 3 cases of severe agranulocytosis due to sulphadiazine which were subsequently cured by continued administration of large doses of the same drug, and recommend the continued use of sulphonamides, preferably sulphadiazine, in agranulocytosis developing during sulphonamide therapy until the normal protective functions of the bone-marrow are again in action; this Wilkinson (1945) considers to constitute an unjustifiable risk until more evidence has been produced about its safety.

CASE-RECORD

An English-speaking German prisoner-of-war was admitted to the wards about 4 P.M. on July 6, 1946, with headache, lumbar backache, and sore throat. He had been quite well until two days previously, when he noted what he described as a heaviness in the legs and, a little later, shivering and headache; as he had been out in heavy rain on the day before and had got very wet, he thought that he was succumbing to an attack of "flu."

On the morning of the 5th he had reported sick, remained in bed, and had been given one aspirin tablet; subsequently he had taken one 'Askit' powder, which was his own property. He had been seen on the 6th by a medical officer of the R.A.M.C. who had noted that the temperature was 103·5° F but, apart from a doubtfully palpable spleen tip, had not discovered any other abnormality on physical examination.

On admission his temperature was 104·8° F and his pulse-rate 120 per min. He did not look very ill and, apart from his flushed appearance and profuse perspiration, was in no way distressed. He was now complaining of backache, heaviness in his legs, and some discomfort in his throat on swallowing. The throat was congested and very œdematous, and he appeared to have two developing quinsies; there was no

DUCT PAPILLOMATA OF THE BREAST

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During the last five years I have been distressed to see, serving in H.M. Forces, a large number of young women under the age of 25 who have had one or both breasts removed because of bleeding from the nipples. I am quite sure in my own mind that very many of these mammary amputations were quite unnecessary. It will be agreed that a discharge of blood from the nipple is always alarming to the patient and often to the practitioner in charge of the case. Though a bloodstained discharge from the nipple may be due to carcinoma, it is far more often due to an intracystic papilloma of the nipple.

In the thirty years 1915–45 I have seen 119 patients who complained of a bloodstained discharge from the nipple. An analysis of these cases is as follows:

Diagnosis	*No. of cases*
Intracystic papillomata	62
Mastodynia	20
Scirrhous carcinoma	16
Duct carcinoma	10
Paget's disease of nipple	8
Encephaloid carcinoma	2
Sarcoma of breast	1

It will be seen that by far the commonest cause of a bloodstained discharge from the nipple is an intracystic papilloma.

In my series of 62 cases, most of the papillomata were situated near the nipple, but 5% were at the periphery of the breast tissue (fig. 1). In 1 case the papilloma was in the axillary tail.

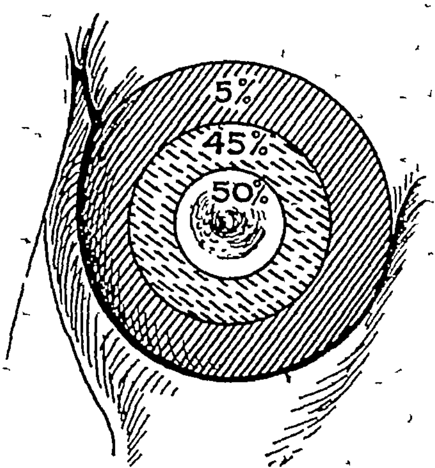

Fig. 1—Situation of papilloma of breast in 62 cases.

CLINICAL DIAGNOSIS

There is today far too great a tendency for the younger generation of doctors to avoid a careful clinical examination, the diagnosis being made simply on observation, a clinical sign or symptom, a radiological examination, or a certain pathological report. I do not decry the importance of the modern aids to diagnosis, but there seems to be a lack of the clinical acumen which was the hallmark of physicians and surgeons fifty years ago. It is bad practice to say that, because a woman has a bloodstained discharge from her nipple, she has carcinoma of the breast and therefore should have her breast amputated. Yet this is the practice of some doctors.

A careful clinical examination is essential. Most duct papillomata are situated in the central zone near the nipple: in some cases the nipple may be retracted, whereas in others it may protrude as compared with the opposite side. In 2 cases the nipple appeared to be flattened, owing to large intracystic papillomata beneath it. On the whole, the papillomata are usually small, about the size of a split pea. The cyst cavity in which the papilloma is situated may vary in size up to that of a large cherry, making it easy to palpate the tumour with the flat of the hand. The tumour is soft or cystic according to the degree of distension of the cyst. It is freely movable, and on pressure a serosanguineous fluid may be expressed from the nipple.

As a rule these tumours are not painful and there is no enlargement of the axillary glands. However, if the tumour is situated at the periphery of the breast, especially in the axillary tail, the glands may be enlarged, owing to pressure on the lymphatics of the outer quadrant of the breast.

The age-incidence is from 20 to 60 years, with a peak between 40 and 45 years.

The clinical course of these cases is interesting, as the papillomata grow very slowly and may continue for years. The hæmorrhagic discharge from the nipple is intermittent and may be serous, with no sign of blood.

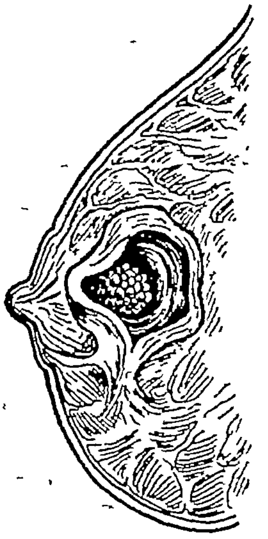

Fig. 2—Intracystic duct papilloma of breast (museum specimen).

PATHOLOGY

Intracystic papillomata are always encapsulated growths (fig. 2). The small papillomata are seen within a cyst, whose wall is made up mainly of fibrous tissue. In some cases the growth fills the cyst cavity, whereas in others the growth has a stalk, and some pathologists refer to them as "single-stalk" papillomata.

TREATMENT

There can be no doubt that the treatment of choice is a local excision of the papilloma through a small single radiating incision from the nipple (fig. 3). An incision is made over the tumour, and the papilloma is excised from within the cyst; the cyst wall is then removed, together with a small portion of breast tissue. It is most important that the tissue removed should be subjected to microscopical examination to confirm the diagnosis.

In some cases, where the tumour is not so obvious, a small probe or the blunt end of a straight surgical needle can be inserted into the dilated duct and passed into the cystic cavity containing the papilloma. An incision is made on to the needle and the intracystic tumour exposed (fig. 4). With small-rake retractors the cyst and its

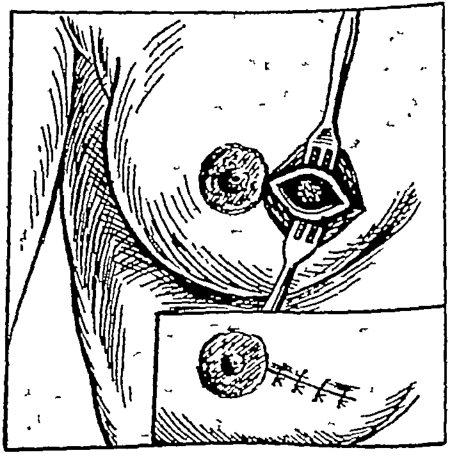

Fig. 3—Local excision of duct papilloma of breast: inset shows small radiating incision necessary for this operation.

30th Mrs. D and the children ate the remainder of the pie for breakfast and developed more serious symptoms 1½–4 hours later. Mr. D had recovered by then, but the remaining three patients were admitted to hospital. Mr. E ate a portion of the pie on Sept. 29 for breakfast and developed similar symptoms.

The doctor called in to these cases tasted a portion of the pie and developed similar symptoms.

The hospital reports, obtained for me by Dr. R. C. Matson, pathologist, are all very similar.

Mr., Mrs., and Miss A, and the younger daughter of Mr. and Mrs. D vomited so profusely as to bring up blood. Diarrhœa was very acute in all cases. All patients were prostrate and collapsed and were treated in a similar way with mist. kaolin 1 oz., repeated 3-hourly, and 'Pethidine' 100 mg. intramuscularly.

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The presidential address by Mr. PERKINS is published on another page.

membrane, but the apices of the abscesses appeared to be hæmorrhagic. There was no ulceration and no necrosis. The tongue was clean and fairly moist, and there were no lymph-nodes palpable except some small ones in the groins. No abnormality could be detected clinically in the chest, and this was confirmed almost immediately by radiography; physical examination of the remaining systems gave entirely negative results.

Thick and thin blood films were taken to exclude malaria, and a white-cell count was made. The total leucocytes numbered only 1500 per c.mm., and in examining 500–600 white cells not one single representative of the granular series was seen; the differential count showed monocytes 65%, the remaining cells being large and small lymphocytes in about equal numbers. No malaria parasites were found and the red cells showed no abnormality.

In view of the severe sepsis in the throat, penicillin 30,000 units was given intramuscularly, and the same dosage was continued at three-hourly intervals throughout the night and following days. (Unfortunately, owing to the admission to the ward of other serious cases at this time, penicillin therapy was instituted before a throat swab and blood for culture had been taken.) At 10.30 P.M. further blood films were examined, and one granular cell was seen—a large immature cell which may have been a basophilic polymorphonuclear leucocyte or a myelocyte.

On the 7th patient's general condition appeared to be much improved; temperature 101·8° F. The throat was still very painful, though the swelling of the quinsies had subsided and both had burst; there was a profuse discharge of pus.

Differential white-cell counts carried out at 10 A.M., 10.30 A.M., and 12.30 P.M. showed respectively 6%, 14·5%, and 21·5% neutrophil polymorphs, all very immature, while the corresponding proportions of monocytes were 70%, 54%, and 38·5%. At 10.30 A.M. the white cells totalled 5000 per c.mm.

Urinalysis showed the presence of albumin ("one plus") and some granular casts; sp. gr. 1·026.

At 2.30 P.M. sternal puncture was performed, and examination of Leishman-stained films of the bone-marrow showed considerable scarcity of cells of the granular series (myeloblasts and myelocytes). Such polymorphonuclear cells as were seen were of extremely primitive types. There appeared to be a normal number of erythroblasts.

By noon on the 8th the temperature had come down to normal, and it has since remained between 97° F and 98° F; the pulse-rate has followed the temperature very closely. The throat infection had subsided, though a little pus was still exuding; there was much less pain, even on swallowing.

The white-cell count was now 5200 per c.mm., 45% being neutrophil polymorphs; most of these were still immature, but some poly-lobed forms were seen. The monocytes had now fallen to 19%.

By the 11th patient was feeling fully recovered and was looking very well. Penicillin was discontinued, after 1,200,000 units had been administered, and a differential count showed neutrophil polymorphs 53%.

On the 14th the white cells totalled 6800 per c.mm., of which 59% were of the granular series, 24% lymphocytes, and 17% monocytes. Urinalysis at this time revealed no abnormality, the albumin and granular casts having entirely disappeared.

DISCUSSION

In this case the appearance of the blood film, considered in conjunction with the profound leucopenia, suggested an aleukæmic leukæmia of the monocytic type; in view of the throat condition, however, the diagnosis of agranulocytosis was preferred. The question then arose whether it was wiser to attempt to raise the polymorphonuclear leucocyte count with pentnucleotide or to attack the infection. The patient's rapid improvement in both physical condition and leucocyte count seems to show that the latter course was correct.

The question remains whether this case was a primary essential agranulocytosis, with severe sepsis in the throat constituting one of its manifestations, or an agranulocytosis due to profound toxæmia with a specific action on the bone-marrow, in the presence of a severe throat and possibly generalised infection (Meakins 1944). Primary agranulocytosis is suggested by the rather typical onset of the illness, and by the fact that throat manifestations did not appear until the illness was fully two days old, whereas the other type of agranulocyto is suggested by the absence of any ulceration or necro of the throat.

It is doubtful if, even in a susceptible subject, the contents of one askit powder (aspirin 0·6 g., phenacetin 0·49 g., caffeine citrate 0 125 g., magnesium trisilicate 0·015 g.) could have produced such severe effects. Whatever the cause, the sepsis was rapidly and effectively controlled by penicillin, while the leucopoietic tissues recovered their normal activity without further stimulus.

I wish to thank Dr. Joseph Bryant, resident physician, for his advice and assistance in the conduct of this case; and Dr. F. N. Smartt, medical superintendent, and the Department of Health for Scotland for permission to publish the report.

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STAPHYLOCOCCAL FOOD-POISONING BY MEAT-PIE JELLY

F. A. BELAM
T.D., M.D. Lpool, D.P.H.
MEDICAL OFFICER OF HEALTH, GUILDFORD

A LIMITED outbreak of food-poisoning occurred in the borough and rural district of Guildford at the end of September, 1946.

On Sept. 30 information was received from Dr. Peter Milligan, of Guildford, that he had visited four cases of suspected food-poisoning and had arranged for their removal to the Royal Surrey County Hospital. The patients, Mr. and Mrs. A, both aged 47, Miss A, aged 19, and Mrs. B, aged 25, all came from the same household and had similar symptoms: vomiting, diarrhœa, and abdominal pain. They were in a state of collapse.

The other occupants of the house were Mr. B (husband of Mrs. B), child B, aged 2$^{1}/_{2}$ years, and Mr. and Mrs. C. All meals taken by the occupants were exactly the same except supper on Sept. 29, of which only the four patients and Mr. B partook.

This supper consisted of tea, bread and butter, and a portion of meat pie, weighing about $^{3}/_{4}$ lb. and purchased from a multiple firm on Sept. 28. All five persons ate a portion of the pie, but Mr. B took only a very small portion and did not eat either the pastry or the jelly surrounding the meat. The meal was taken at about 10 P.M., and the first person to become ill was Mr. A, who developed symptoms of food-poisoning at about 11.30 P.M. The other three patients became ill at short intervals after him, and by 12.30 A.M. all three were very poorly. Dr. Milligan was called in by the police at about 2 A.M. and immediately arranged for the patients' removal to hospital. A small quantity of the crust and jelly of the pie left by Mr. B was sent for analysis.

On the same day (Sept. 30), at 2.30 P.M., five cases of suspected food-poisoning were reported from the Guildford rural district. The patients were Mr. and Mrs. D, their two daughters, and Mr. E. Mrs. D, aged 42, and the daughters, aged 11 and 7 years, were admitted to hospital with acute abdominal pain, vomiting, and diarrhœa.

These people had also purchased pies from the multiple firm. Mr. D ate a portion of meat pie for breakfast on Sept. 29 and developed symptoms in 2 hours. On the

30th Mrs. D and the children ate the remainder of the pie for breakfast and developed more serious symptoms $1^{1}/_{2}$–4 hours later. Mr. D had recovered by then, but the remaining three patients were admitted to hospital. Mr. E ate a portion of the pie on Sept. 29 for breakfast and developed similar symptoms.

The doctor called in to these cases tasted a portion of the pie and developed similar symptoms.

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Mr., Mrs., and Miss A, and the younger daughter of Mr. and Mrs. D vomited so profusely as to bring up blood. Diarrhœa was very acute in all cases. All patients were prostrate and collapsed and were treated in a similar way with mist. kaolin 1 oz., repeated 3-hourly, and 'Pethidine' 100 mg. intramuscularly.

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Reviews of Books

Surgery of the Hand

(2nd ed.) R. M. HANDFIELD-JONES, M.S. Lond., F.R.C.S. Edinburgh: E. & S. Livingstone. Pp. 156. 20*s*.

IN this country the treatment of hand injuries and infections has too long been left to the care of newly qualified house-surgeons with little specialised knowledge. In this respect we have lagged behind. Some general hospitals now have hand clinics, and some special hospitals pay close attention to the subject. With the advance of industrial medicine this tendency will doubtless grow—with untold benefit to the worker. The appearance of the second edition of Handfield-Jones's little book is therefore timely. A short, clear, well-illustrated monograph, ideally suited for the young surgeon, it will also teach the practitioner the complexity of the hand problem, and should lead to earlier transference of hand cases to suitable clinics. It deals with infections and injuries at some length, and has a short section on congenital defects and tumours. Penicillin is recommended only as an adjunct to proper surgical understanding and treatment. The author has thought it wise to say little of reconstructive surgery, an enormous field receiving daily notice in books and journals. The better the early treatment the less the need for reconstruction. The importance of restoring function is emphasised throughout.

The Medical Annual 1946

(64th year.) Editors: Sir HENRY TIDY, K.B.E., D.M. Oxfd, F.R.C.P.; A. RENDLE SHORT, M.D. Lond., F.R.C.S. Bristol: John Wright. Pp. 426. 25*s*.

NOW in its 64th year, the *Medical Annual* maintains its high standard. Selection may become more difficult, but the two veteran editors, with their distinguished company of contributors, continue to produce a review that is serviceable to all ranks of the profession. The time, however, is coming when more than one volume will be needed. The space now given to surgical problems is out of proportion to the main interests of most readers, and surgery and its branches might perhaps have a volume to themselves. In the present issue a chapter is devoted to medical films, and outstanding contributions include reviews of advances in medicine and surgery during the late war by Sir Alexander Biggam and Sir Heneage Ogilvie. In a section on "fatigue in civilian life," Prof. A. E. Barnes makes a valiant attempt to discuss the whys and wherefores of "that tired feeling" which we all know so well.

Seven Pamphlets on Parent Guidance

6*d*. each.

Children without Homes

Memorandum of Evidence presented to the Curtis Committee. RUTH THOMAS, senior psychologist to the National Association for Mental Health. Pp. 127. 3*s*. 6*d*

All published by the association, 39, Queen Anne Street, London, S.W.1.

A MONTH or two ago the former Provisional National Council for Mental Health became incorporated as the National Association for Mental Health. This change of name symbolises not only a change in the status of the association but is also an official acknowledgment of the adult status of psychology. The provisional council has played its part in collecting the data that give psychology this standing, but an equally important part of its work has been in disseminating psychological knowledge in a form and a language that can be understood by the uninitiated. These, the first publications of the association, show the two aspects of its work. On the one hand the careful solid fact-finding of the memorandum of evidence, on the other the light simple words of one syllable of the pamphlets. The pamphlets are light but not slight; theirs is the art that conceals art and the thought that conceals thought. They are the outcome of a careful study of young children in the light of modern psychological theory and an equally careful search for the best way of making their principles acceptable. In many respects methods advocated on psychological grounds run counter to those which were taught to doctors, nurses, and the "older generation" of parents. The evidence in support is far as yet from being common knowledge. Hence the need for something more than logical argument in presenting them. The pamphlets deal with problems that occur in the upbringing of every child. They should be of great help to health workers in their task of advising mothers and to the mothers invaluable.

Children without Homes complements and supplements the Curtis report. Not that it is not full of tragic case-histories and accounts of institutions as bad as those found in the official inquiry. It has, however, two encouraging features. In the first place it describes a series of residential homes well run not by accident but by design; in the second, it makes a most thorough analysis of the problem of running substitute homes for "homeless" children with constructive and concrete proposals as to what needs to be done. Any body that earned the censure of the Curtis Committee and now really wishes to do well by its children will find here complete instru tion in how to do it. It will find that its main need personnel, and that suitable staff are not to be had f the advertising. The Curtis Committee pointed out th there was no appropriate course of training for chil care. Miss Thomas and her associates have devised on That is to say, they have set forth the principles selection and training, and wisely suggest that the exac course of study and length of training should vary wit the previous education and experience of the individu candidates. This work is exacting and should no they consider, be a life's work but only an episode i a career devoted to various aspects of child welfare.

Miss Thomas deserves great credit for the production of this memorandum. She is deeply aware tha her story is painful and moves the imagination, bu she never sentimentalises, under-estimates difficulties, o gives way to wishful thinking. Her future pupils an all others concerned with the care of children will fin here a really first-class handbook.

Jonathan Hutchinson, Life and Letters

HERBERT HUTCHINSON, foreword by J. JOHNSTON ABRAHAM, F.R.C.S. London: W. Heinemann. Pp. 257 12*s*. 6*d*.

THIS book cannot add to J. H.'s standing as a worthy disciple of the J. H. of the Hunterian Museum, but it enables the medical reader to see what the man was like. His son gives us a vivid and arresting picture which can be filled in from the letters. Bred of yeoman farmers who left the Fens for Selby to market their flax Hutchinson was brought up in a Yorkshire home segregated from the community, but one in which the discipline of life was always that of individual conscience warmed by a glowing affection. It must have been then that he contracted the two remarkable qualities that fashioned his later conduct. The inborn museum habit of his mind was fed by contact with the elementa things of nature undisturbed by the usual childish interests. And the domestic harmony led to a habit of reasoned statement which loved discussion and eschewed controversy. Even in lecturing he did not dominate his audience; attendance should be optional he held; he just stood up and with eyes cast down he told what he had observed and what conclusions he had come to. Without eloquence he collected and held a roomful of students as large as any in London. As a "suggestive teacher," Byers remarked, he was unrivalled. It was in the year of his election to the surgical staff of the London Hospital that Darwin published *The Origin of Species* and far from upsetting his universe it gave him the text ("in heredity nothing is ever lost") for a new belief in immortality which carried him courageously through life. Many of the letters to his wife, printed in this book, witness his longing to share his philosophical background with her; yet here again there is no pressure in his insistence. The turning point in Hutchinson's career was his surrender in 1890 of the presidency of the Royal College of Surgeons after failing to persuade his surgical colleagues to make Hunter's museum the educational instrument of his own conception. He then began to transform the barn and cowsheds of his Haslemere property into the galleries of a museum where he spent more and more of his time teaching natural history for a purpose; and (his biographer adds) the purpose was religious.

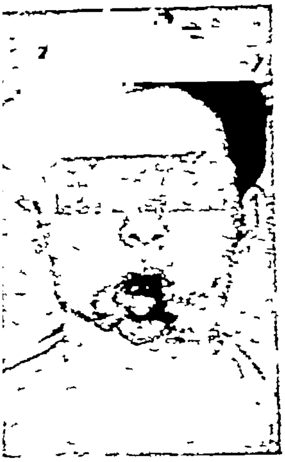

Fig. 1

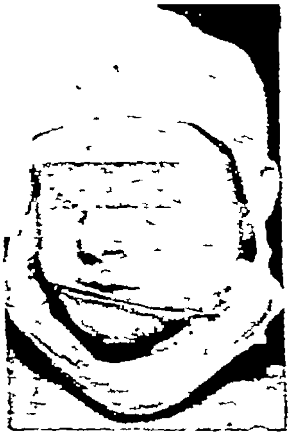

Fig. 2

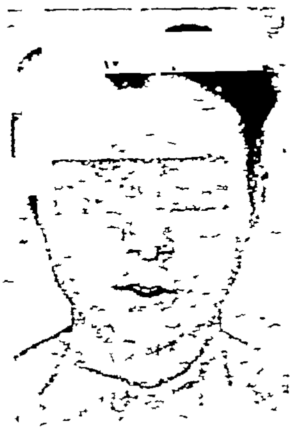

Fig. 3

LOSS OF SOFT TISSUE OF CHIN AND OF MANDIBLE

Gypsona as an adjuvant in reparative surgery

CASE-HISTORY—The patient was injured in July, 1941, when his ship was bombed and machine gunned. Examination showed the lower lip divided and a loss of soft tissue of chin and of mandible from right molar region to left incisors. On August 29th, 1941, two tube pedicles were raised on the neck. These were lengthened four weeks later. On October 22nd the scars were excised from the face and the two pedicles attached.

November 11th, 1941.—The pedicles divided.
February 24th, 1942.—A bone graft was inserted.
June 26th, 1942.—An acromio thoracic tube pedicle was raised.
July 22nd, 1942.—The pedicle lengthened.
July 31st, 1942.—The pedicle attached one end.
September 24th, 1942.—The pedicle attached the other end.
February 19th, 1943.—A further bone graft was inserted with Gypsona P.O.P. headcap and plaster between each pair of pins.
October 20th, 1943.—Chin dimple made.

The details and illustrations are of an actual case. T. J. Smith & Nephew Ltd., manufacturers of Elastoplast, are privileged to publish this instance typical of many in which their products have been used with success in the belief that such authentic records will be of general interest.

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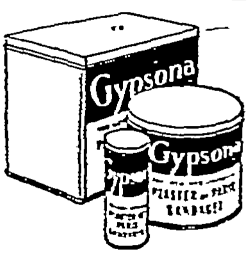

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THE LANCET

LONDON: SATURDAY, JAN. 11, 1947

Three Possible Courses

ARE we not in danger of thinking too much about the doctor and too little about the patient? Current discussions on the Act suggest that this is so. Yet the doctor, after all, is chiefly a means to an end. The essential fact to be kept in mind is that everyone who has studied medical practice in this country agrees that the patient is not getting anything like the full benefit obtainable from modern medicine. In many hospitals he has to be content with care which by modern standards is second-rate or worse; and general practice, for all its excellences, too often resembles the small business which sells the customer what it has in stock rather than what he needs. Briefly, inadequate diagnosis and inadequate treatment are commonplace, and we are barely in sight of the promised land where health will be actively promoted. To create an orderly system in which everything that can be done for the patient really *will* be done is the object of the National Health Service scheme. This scheme is not an invention of the present Government but rather the final outcome of general discussion and planning over many years, and it embodies many of the features of schemes it has superseded. Some of the earlier versions of the service would have been less disturbing to the profession; but none of them offered the same prospect of radically improving the hospital system within a measurable time. Mr. BEVAN's Act has withstood criticism in Parliament because, considering the many conflicting interests that must be taken into account, it is on the whole as sound and courageous a measure as one could hope for. It holds the field today because protracted exploration of alternatives has shown that in present circumstances there is no more comfortable means of getting the desired results. It also holds the field because it is an Act of Parliament. In announcing the B.M.A. council's provisional decision not to negotiate on its application, Dr. CHARLES HILL is reported as hinting that the association will now have to put forward their own scheme. We may be sure that if they do so it will be found to have many merits: but at this stage it would take a miracle-worker to substitute a new plan for the one which has obtained the acquiescence of everyone else concerned and which has become the law of the land. Failing a miracle, only three courses are open to the profession: (1) acceptance of the present Act, including any regulations the Minister in his wisdom may care to make; (2) negotiation on the present Act, so as to secure the best possible arrangements for both patient and doctor; or (3) rejection of the Act. Rejection, if it took the form of pressure on individual doctors to abstain from joining the service, would be a form of direct action intended to defeat the wishes of Parliament. As such it might be pleasing to those who have reasons of their own for wanting a change of administration, but it would alarm anyone who respects the constitution of our country.

The first of the three possible courses—to take no part in shaping a service we mean eventually to join—has nothing to commend it. Are there really sufficient grounds for turning down the second in favour of the perilous third? It is perfectly true that a service which was bad for the doctor would in the long run prove bad for the patient, and that the price of rationalisation would be too high if it meant the loss of what is called professional freedom. But many of the fears expressed about this arise from misunderstanding or unreasonable mistrust. The letters exchanged this week between the Minister of Health and the presidents of the Royal Colleges should go far to restore a proper perspective, especially since they display Mr. BEVAN's genuine desire to "negotiate freely" on the regulations which will make or mar the whole scheme. His letter states as a principle of the service that "there should be no interference with the clinical freedom of any doctor," and it will also reassure consultants about the continuance of independent practice and about their position on hospital staffs. Its outline of the Minister's views on the vexed questions of basic salary, appeal to the courts, "direction," and the filling of vacant practices suggests that these features of the scheme could usefully be debated on a rather lower emotional level than has lately been customary: some of them, such as the manner of remuneration, the Act itself leaves fluid, while the hardship inflicted by others might be made negligible. There are of course many further matters on which reassurance and modification would be welcome, and are indeed necessary; but acceptable arrangements are more likely to be produced by round-table discussions than by ultimatums. A condition of success for such discussions is that our representatives should address themselves to the technical problems of serving the patient—not regarding themselves, or allowing others to regard them, as a political bulwark.

Unfortunately no Minister, however conciliatory, could quite remove our anxiety lest organisation should somehow spoil the personal quality of medicine, which with all its shortcomings is still one of the great achievements of civilisation. No Minister could overcome the hesitation of a learned profession in entering what might become just another Government service. Undue emphasis on these misgivings, however, implies that we think of ourselves as an inert mass, to be changed by its environment but incapable of changing it. If we are to use our strength aright we should beware of such fashionable defeatism. The fact that the Minister of Health, a layman, is to be answerable to Parliament for this service need not prevent it from being very largely our own service, representing the best we can do. As in voluntary hospitals and elsewhere, administrative decisions will be taken by lay boards and often by lay officers; but thanks to the unselfish labours of innumerable colleagues, living and dead, the lay administrator and the lay board have a way of paying attention to what doctors say about their own work. At every level the Act enables and encourages the doctor to express his views, and if need be his grievances. The local executive councils, with which practitioners are to make their contracts, will have more medical members than the present insurance committees. Hospitals will have their medical committees, regional boards will have their medical committees, and at the centre there will be the medical members of the Central Health Services Council, of the standing committees, and of the Medical Practices Committee. The management committees, the regional boards, and the boards of governors will all have doctors on them. If, with all this, the voice of medicine cannot make itself heard, or is suppressed by the Minister, it can be switched over to loud-speakers provided by the British Medical Association and other medical organisations, can be translated into print by the medical press, or can be raised in Parliament. Need we really fear an abashed silence ? Can we not even hope to realise our own kind of service in which neither red tape, nor inefficiency, nor ignorance, nor poverty, nor any other creature, stands between our patient and the best we can give him ?

An ideal like that is attainable only by long effort. New buildings, new administrative techniques, new confidence, and new habits of coöperation will be needed before the object of the National Health Service Act is realised. But a good beginning could be made now, in the next few months, in Whitehall. Returning to the spirit of the Medical Planning Commission, in which it played an impressive part, the British Medical Association should reverse last month's unhappy decision—based as it was on incomplete figures. The final returns published on another page show that of 42,123 doctors voting, 19,478 (46%) favoured negotiation, while 22,645 (54%) did not. The majority of 8% would probably have been further narrowed if more Service votes had been returned, and it can hardly be considered the substantial one which Dr. DAIN said would be necessary to justify breaking off negotiations. The council, we are told, was influenced by the large negative vote among general practitioners ; but it might have attached at least equal significance to the fact that the younger doctors (in the groups 0–7 and 8–14 years after qualification) gave a majority for Yes. Nothing short of a new lead from the council or its more cautious members will induce the representative body on Jan. 28 to retrieve an impossible situation. But, in the light of today's letters, the second of the three possible courses is surely the only one for reasonable people.

Lining of the Pulmonary Alveoli

FEW organs have been studied with such enthusiasm as the lung, and the reward in knowledge of its function has been a rich one. Its structure, too, has been repeatedly scrutinised since the times of MORGAGNI and LAENNEC, and painstaking reconstructions of every subdivision of the air-passages would seem to have settled all doubts. Yet opinions still differ on the very existence of a cellular lining to the finest ramifications of the terminal air-spaces.

Is there a cellular barrier between the capillary plexus in the alveolar wall and the air-space, or is there direct contact between inhaled gases and the capillaries ? One might think this easy to decide by the methods of histology, but a long list of supporters for either view can be compiled. The father of histology, VON KÖLLIKER, suggested a compromise in the form of non-nucleated epithelial squames ; but he had to admit that this unusual covering was far from complete. In recent years the argument has alternated between an extension of flattened lining cells from the terminal bronchioles, a pseudo-lining of mononucleated blood or reticulo-endothelial cells, called alveolar cells, and the denial of any lining whatsoever. It is clear that we must turn to other fields of research for a settlement of the difficulty.

The embryologist has entered the contest and has added facts which are of value. But here again uncertainty prevails. The classical school sees in the fœtal lung a gland-like structure reposing in a vascular mesenchymal bed, with an appearance not unlike that of the thyroid gland depleted of its colloid secretion. The lining of these spaces is a cellular derivative of the primary bronchi, formed by budding of tubular structures from parent bronchial cells. The transition from the inert fœtal condition to the state of incessant respiratory movement is accompanied by a *flattening and perhaps loosening* of the lining cells, preceded by an imposing multiplication of the air-spaces. But some investigators deny this hypothesis, claiming that new formation of lining cells does not keep pace with the exaggeration of air-space. S. B. ROSE in Canada and W. G. BARNARD in this country have been foremost in advocating a moulding of the mesenchymal support by the expanding lung whereby a labyrinth of tiny air-cavities lined by naked capillaries takes on the oxygenation of the red corpuscles. The lung thus shares some of the features of the air-spaces in birds and seems to be a device for ensuring the maximum contact with atmospheric oxygen with minimal diffusion space. Such a notion presents difficulties, however, especially when fluid exchange through capillaries is recalled. It is a dogma of physiology that the nourishment of tissues is primarily an ultrafiltration through the capillary membrane, controlled by the balance between the hydrostatic pressure in these minute vessels and the osmotic pressure of the circulating plasma. Unless the lung happens to be unique among tissues, such an ultrafiltrate must leave the alveolar capillaries to circulate throughout the alveolar walls, and tidy minds demand that there be a barrier between it and the air-cavities. A cellular lining to the smallest air-spaces thus seems to be needed. On the other hand, saturation of the air with water vapour might account for any excess of fluid not removed by capillarity. The nearest lymphatics are in the walls of the alveolar ducts and therefore cannot play any direct part in preserving this fluid balance. No solution of the difficulty has yet been offered, though any structural concept of the lung must take this fluid exchange into consideration

SNOW MILLER, one of the greatest investigators of lung structure in his time, held that there was a true epithelial lining to the air-sacs and traced it directly from the bronchiolar epithelium. His figures are convincing until it is realised he depended wholly on pathological material for his preparations. All pathologists are familiar with the case in which bronchiolar lining cells grow along the infundibular walls to the alveoli, so much of this kind of argument falls to the ground. Strange to say, the experimental pathologist has contributed little to the problem. He has shown the rich content of reticulo-endothelial cells within the lungs, and the tendency of these to mimic a lining of ie air-sacs: but he has failed to discriminate between iese cells and epithelium. It looks as if we must wait r an answer until new techniques are invented.

The experimental study of lung healing by Montomery[1] in Edinburgh has raised the issues once gain. He has shown in cats that proliferative activity f the bronchi around a wound of the lung initiates rue healing, and new outgrowths from the parent tems appear at an early stage. A mass of blood-clot nd collapsed alveoli together with the usual type of nflammatory reaction forms in the vicinity of the wound, whereby a collagenous scar results in due course. After some days irregular slits develop amid the collagen, some of which connect with bronchial buds and are lined by a cubical epithelium or by long flattened spindle-shaped cells. Others join up with alveoli. Some spaces also link up with capillaries, so reconstituting the vital vascular plexus. In this way expansion of collapsed alveoli and re-formation of alveoli among the split collagen leads to regeneration of the lung and proceeds until the whole wound is aerated and the scar reduced to a thin band. The unaffected lung tissue thus takes an active part in recovery from injury through the formation of bronchial buds which grow into the provisional scar tissue, aided no doubt by the regular expansion and contraction of the intact spaces—a true vis a tergo. The phenomenon calls to mind the classical idea of lung development, and indeed has great similarity with the mode of growth in glandular organs such as the liver. Montgomery's study, however, leaves untouched the vexed question of persistence of the alveolar lining. Once again a fruitful method of investigation has failed to give a clear answer to the riddle of the lung.

Medicine in Industry

In 1943 the New York Academy of Medicine appointed a committee to review the economic and social changes now taking place, and the part which medicine plays and will play in "whatever new social patterns may ultimately appear." Prof. Bernhard J. Stern was entrusted with the task of reviewing the history, development, and present status of occupational medicine, and the monograph[1] he has produced is an unusually careful and objective study. It goes far to explain why industrial medicine has developed slowly as compared with the public-health services.

Stern points out that the progress of industrial medicine, as indeed of all branches of medicine, has been intimately related to advances in general medical knowledge. The work of the Paris school of clinicians, he says, as well as of Virchow and others, which challenged the older humoral pathology, was a necessary foundation for industrial medicine, and the study of the pathogenic micro-organisms by Koch and Pasteur was essential for its progress. Nevertheless "the preoccupation of medical men with the search for specific micro-organisms associated with communicable diseases distracted attention from research in other fields . . . and narrowed the field of public health and preventive medicine." Sometimes exclusive interest in general hygiene obscured the causes of some occupational diseases. For example, the Royal Commission appointed in 1862 to inquire into the health of men in metalliferous mines ignored the opinion of miners and others that dust was a major cause of illness. The commission considered it to be of secondary importance to fumes of explosives and variations in temperature and climate. It was not until 40 years later that a committee of which J. S. Haldane was a member put the matter in its right perspective, and 12 more years passed before Haldane's work was corroborated by E. L. Collis.

Research in the 20th century into deficiency diseases, into X-ray and other diagnostic techniques, and into organic chemistry, opened new horizons in industrial medicine. Specialisation, which has been conspicuous in industrial medicine as in other fields, has given results otherwise unobtainable; but it has tended to focus on "specific external hazards" rather than to develop an integrated approach to the health of the worker as a whole. Industrial medicine has been separated from the main stream of medicine and public health by dealing exclusively with risks in the factory, mill, and mine, isolated from the worker's health in the community. One of the major problems of contemporary industrial medicine, Stern says, is the recognition of the overlapping of these two provinces now formally and arbitrarily separated. Public health and industrial medicine were closely related in the minds of those English doctors who during the industrial revolution initiated the movements which led to the passing of the Factory Acts. The names of Thackrah, Percival, Kay, Bell, Baillie, Southwood Smith, and later Greenhow are honourable ones in the history of struggle for better conditions both in the home and the factory. It is interesting to note that Chadwick's 1842 report, which led to the establishment of public-health agencies in England, was based on the investigations of the Factory Commission established under the Factory Act of 1833.

A significant cause of delay in the progress of industrial medicine has been the reluctance of many employers to allow unimpeded research into the causes of ill health in their factories, while some of the trade associations have resisted the passing of legislation designed to improve factory conditions. Stern recalls that in the middle of the last century Manchester cotton manufacturers, in order to oppose the factory inspector's requirements for guarding machinery, founded the Factory Law Amendment Association—which Charles Dickens, in *Household Words*, aptly called the Association for the Mangling of Operatives. It has been somewhat easier for the public-health services to develop, for, as the American doctor Benjamin W. McCready wrote in 1837, "motives not only of mercy for the poor but of fear for ourselves, call for a reform; for infectious diseases when once fully developed do not always confine themselves to the localities in which they originate." Public-health measures affect the whole community, and the cost falls on the rates, whereas measures against occupational diseases and accidents affect only the occupational groups concerned. Not only is the stimulus of public opinion lacking in industrial medicine, but there is also resistance from employers who usually have to foot the bills. Stern says that much of the apathy of industrialists towards preventive services may be ascribed to the traditional indifference of management to the conservation of human resources, and to the fact that expenses incurred do not yield immediate returns. In the United States action in the field of industrial health has been undertaken by trade unions with an enlarged conception of their functions in the community.

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[1] Montgomery, G. L. *Brit. J. Surg.* 1944, 31, 292.

[1] Medicine in Industry. By Bernhard J. Stern, PH.D., lecturer in sociology, Columbia University, and visiting professor of sociology, Yale University. London: Oxford University Press. Pp. 209. 8s. 6d.

Though there have been time-lags in the adaptation of social and legal institutions to the needs of modern industrial society, great strides have been made in social legislation since the early days of industrial capitalism, when whatever protection the guilds had previously given to workers was abolished by the practices of laisser-faire economy. Among the major legislative milestones on the long road of progress in industrial medicine have been factory inspection, and workmen's compensation, the regulation of the hours of labour, and the control over health conditions in the factories. But the departments dealing with public health, industrial hygiene, and compensation still need to be brought closer together. The broadly conceived approach of the pioneers in industrial medicine was a wise one. They acted on the principle that the conditions of housing and nutrition and the standards of home living are as much problems of industrial medicine as are hazardous working conditions. This is only another way of saying that health is indivisible.

Annotations

THE FAMILY

"Does not human welfare depend on a recognition that the unit of human existence is not the isolated individual but the family?"

Prof. J. C. Spence asked this question in his convocation lecture[1] at the National Children's Home. His sympathetic assessment of the duties of those who look after children in homes has a special force in view of the findings of the Curtis Committee. "They are the responsibilities of parents," he said, "without the instinctive sanctions of parenthood, the burden of responsibility without the privilege of power. As all sensible parents are at times aware of their own shortcomings with their children, so must you in greater degree feel these faults, for you spend your soul and spirit without the sustenance of certainty." He went on to speak of the seven stages of childhood, to which the parents, and especially the mother, respond instinctively, learning as they go, until the mother of a family of six or seven is an expert, bringing up her children with not only the quickness of instinct but the confidence of experience. In the neonatal stage, and in the second stage which ends when the child is about seven months old, mother and child respond to each other according to an inborn pattern. The mother, "and every woman like her, falls into the same habit of speech and noise-making with which she appropriately approves and disapproves, cheers and chides." Other interests leave her; all her decisions have to do with her child's welfare—"an irrational but deeply satisfying state," as one mother who is also a physiologist described it.

He mentioned an important experiment at the Babies' Hospital, Newcastle, where, when young children with critical illness are admitted, they are accompanied by their mothers who help to nurse them through the illness. If the child needs an operation he is received afterwards straight into his mother's arms. She is given as much responsibility as possible, and shares in the credit of his recovery. A contrasting group of mothers remained at home while their children were in hospital, and a study of the two groups over many years, Professor Spence said, revealed considerable differences. The first group had gained confidence, the second lost it: the weeks of anxiety and separation had left them fearful of every trifling symptom in the child. He sees here a lesson about responsibility, and about the social aids which parents need. He is not quite satisfied that the social aids we have provided for mothers so far are of the best quality: "they are relieved of their children when they should be relieved of their chores." He would rather see in action a philosophy of human welfare which recognises the right of every mother of a family to possess the means of home-making. As it is, Sir William Beveridge has summed up our dilemma: "a family still remains the greatest single cause of poverty."

The third stage of a child's life, from eight months to two years, is a time when he needs much individual attention, the stimulation of play with friendly adults; and Professor Spence doubts the propriety of putting many children of this age into public nurseries, where a communal life is imposed before they are ready for it. At two the child makes his first experiments in independence, and at four is moving towards his first wilful acts of self-reliance. He needs his mother or an older brother or sister at hand to reassure him; and here the older girls in the family should be getting their first experience of maternal responsibility. Between four and seven the child's personality is emerging and is expressed endlessly in play. Between eight and twelve boys and girls diverge. They begin to recognise standards and values and to discover ideal types. The outlines of character and conduct now formed will derive much from their experience of others about them. The years of puberty which follow are the most difficult for the growing child: "it is a fumbling, furtive, and temporarily unattractive stage of life, when the apprenticeship is over, and before the skilled craftsman has emerged."

For normal growth through all these stages the family provides the best environment, especially if it includes, besides the parents, four or five brothers and sisters without wide gaps between them. Two main forces guide the developing children—the instinctive responses of the parents to their needs, and the culture of the family handed down in simple precepts and rules. "Mothers preserve the craft of living and transmit it from one generation to another." He would like to see their instinctive and social knowledge reinforced by teaching in the principles of hygiene and nutrition, and the symptoms of the common preventable diseases.

Professor Spence ended his survey with a short section on the future of the family—the family as it must be among those who are individualists first and parents second. The nineteenth century saw three great revolutions: the notions of equality and liberty which loosened the social structure, the theory of evolution which loosened religious beliefs, and the industrial revolution which dissolved neighbourliness. For homeless children schools, orphanages, and hospitals were founded; but family allowances came late and little. He sees our civilisation declining if we cannot re-create neighbourliness.

A RETICULOCYTOGENIC FACTOR?

ONE of the puzzles of hæmatology has been the achrestic type of anæmia in which there is a megaloblastic marrow like that of pernicious anæmia but the liver contains a sufficiency of anti-anæmic principle. It is so far unknown why the liver principle is not available to the pro-erythroblasts in the bone-marrow: all the known factors necessary for normal erythropoiesis present, and yet the abnormal megaloblastosis sists. Oliva and Frascarelli,[1] of Perugia, suggest that re is an intermediate factor without which the liver tor is not in a form capable of utilisation by the rrow cells. They took plasma from patients who had nigh reticulocyte-count indicative of active erythro-esis, patients with pernicious anæmia at the iculocyte crisis following liver treatment, or patients th microcytic anæmia being treated with iron. When -25 c.cm. of this plasma was injected intravenously o normal subjects it caused a slight but definite e in reticulocytes—up to 4%—reaching a maximum -16 hours after the injection. A similar amount plasma from a normal person produced no such sult. They attribute the effect to a "reticulocyto-nous" factor which is probably present in normal blood amounts too small to be detected, but in patients at eir peak of erythropoiesis is in sufficient concentration produce a detectable reticulocytosis. They suggest at the anti-anæmic liver principle acts through—or combination with—this reticulocytogenic factor, and hen the factor is absent or insufficient the patient's æmia appears refractory, or only poorly responsive, to eatment.

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[1] The Purposes of the Family. Convocation Lecture, 1946. Published by the National Children's Home, Highbury Park, London, N.5. Pp. 68. 2s. 6d.

The combination of an active principle with a circulating activator" is common in physiology, and the presence accessory factors in connexion with the liver principle as also been postulated before.[2] There may be something this suggestion. The next step is to try the effect of ich "reticulocytogenic" plasma on a patient with a fractory megaloblastic anæmia; and it is important hat the patients chosen for test should be truly refrac-ory cases, not merely refractory to a liver extract of he Dakin and West type, whose action is known to be ariable.

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[1] Oliva, G., Frascarelli, R. *Rif. med.* 1946, 60, 437.

[2] See *Lancet*, 1946, ii, 532.

CANCER HOSPITAL RECORDS

A STANDARD method of recording the clinical, patho-ogical, and therapeutic details of cancer cases[1] was ntroduced by the National Radium Commission in January, 1945. The directive booklet, issued by the Ministry of Health,[2] has now been followed by the publication, under the ægis of the Royal Cancer Hospital, of a description[3] of the mechanical methods of recording and analysing the collected data now in use at that centre. As in all variants of the punched-card method, the essential principle is the assignment of numerical values to each item of the clinical history. Thus treatment by surgery, radiotherapy, or chemotherapy is "coded" by noting on a standard form the figure 1, 2, or 3. These values, which are merely classificatory and have no arithmetical significance, are then permanently recorded on a card by punching holes in positions corresponding to these various values on appropriate sections of the card. The sorting out of, say, all cases treated by surgery is then effected mechanically by picking out all cards with a hole punched in the "1" position of the treatment section. Such mechanical methods are of course essential in any large-scale analysis of cancer data, and there are considerable administrative advantages in the adoption of such a system in any wide study of material collected from various centres.

In the day-to-day operation of the system the non-medical facts, such as hospital, age, sex, and occupation, are filled in by a clerk; the clinical details are inserted by the medical registrar on completion of treatment. The information is then coded and punched on a special card by a trained operator. Subsequent history is added to the card as it accrues, and batches of completed cards are sent to a central statistical computing bureau for mechanical sorting and tabulation of the results. Such a central bureau might serve many centres, so the record cards have been made flexible enough in format to allow for local differences in the type of recorded information. At the same time, the basic outline has been standardised and it should prove possible to answer, by the analysis of the accumulated reports, questions, such as survival times after treatment, which need a statistical experience far greater than that of any one hospital. The extra labour involved in completing these standard forms is negligible, and it is more than offset by the speed and accuracy with which a central statistical bureau can furnish annual or other reports to each hospital's own specification.

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[1] See *Lancet*, 1944, ii, 572.

[2] Ministry of Health. Treatment of Cancer. Directions for the use of Record Cards. London. 1945.

[3] The Royal Cancer Hospital Mechanically Sorted Punched Card Index System. By D. W. Smithers, K. M. H. Branson, H. O. Hartley. Obtainable from the Royal Cancer Hospital, London, S.W.3.

PULMONARY SUPPURATION

CLINICAL teachers used to say that lung abscesses could be diagnosed at the doorway by the obnoxious smell; but it is now recognised that they are not inevitably associated with putrefaction. Fœtor is due simply to infection of the necrotic lung tissue and sputum by anaerobes; it depends partly on bronchial drainage, but its similarity to the fœtor oris of dental caries, and the common occurrence of dental sepsis among patients with lung abscess, suggest that the mouth may be the source of these organisms. The classical experiment of Quinn and Meyer,[1] showing that iodised oil introduced into the nose during sleep will find its way by aspiration to the terminal bronchioles at the lung bases, proved that such retrograde infection is possible.

The first phase of acute pulmonary inflammation is an interstitial pneumonitis, but with virulent infection or with lowered resistance this may be followed successively by pneumonia, lung abscess, or septicæmia.[2] Owing to the frequent difficulty of identifying an abscess cavity, patients in whom resolution of pneumonic consolidation is delayed must be regarded as potential candidates for lung abscess, and their case followed by serial radiograms, tomographic if necessary. It seems that bronchogenic abscesses are originally peripheral or subpleural, with a predilection for the subapical and axillary segment of the upper lobe or the apex of the lower lobe. Metastasis by direct bronchial spread can involve almost any neighbouring tertiary bronchus and its unit lobule of lung, though local interstitial spread is also seen. Embolic abscesses from blood-borne infection are a third possibility.

Recent clinical studies of pulmonary suppuration[3 4 5] suggest that pneumonic consolidation may undergo every degree of gradual breakdown and proceed to suppurative pneumonia. Sellors and co-workers[6] draw attention to the syndrome of "spreading suppurative pneumonitis" which is characterised by early consolidation and softening, with later "creeping" extension of the lesion, followed usually by resolution in the areas previously involved and often by permanent lung damage in the form of cavitation and bronchiectasis. Whereas with obstructive bronchogenic abscess the cavitation is an early and outstanding feature, in suppurative pneumonitis the appearances of consolidation overshadow those of cavitation. No causal organism could be demonstrated. The condition occurred in men of middle age; its onset was usually acute, with toxæmia, cough, and copious sputum, and its course protracted, with exacerbations and a high mortality. The clinical features sometimes resembled chronic pulmonary tuberculosis, while in others the diagnosis had to be made from acute lung abscess, neoplasm, or bronchiectasis. One case of "congenital cystic lung" turned out to be the late result of this process. The effects of postural drainage, chemotherapy, and penicillin were uncertain, possibly because of inadequate trial,[7] and the results of surgical drainage were uniformly bad. In selected cases the best results were obtained by excision of the lung.

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[1] Quinn, L. H., Meyer, O. O. *Arch. Otolaryng, Chicago,* 1929, 10, 152.

[2] Maxwell, J., Brock, R. C. *Trans. med. Soc. Lond.* 1938, 61, 222.

[3] Touroff, A. S. W., Neuhof, H. *J. thorac. Surg.* 1941, 10, 618.

[4] Barrett, N. R. *Lancet,* 1944, ii, 647.

[5] Scadding, J. G. *Proc. R. Soc. Med.* 1938, 31, 1259.

[6] Sellors, T. H., Blair, L. G., Houghton, L. E., Thompson, V. C., Pryce, D. M. *Thorax,* 1946, 1, 146.

Whereas up to 50% of lung abscesses may resolve on medical treatment alone, external drainage is necessary as soon as it is clear that improvement is not occurring with simpler measures. Brock [8] has worked out fairly definite rules for the surgical treatment of bronchogenic abscess, based on the surgical anatomy of the bronchial tree.

COLON BACILLUS AND FRIENDS

THE gram-negative non-sporing rods classified under the generic term *Bacterium* comprise a wide range of organisms found in the intestine and other parts of the body, on plants, and in the soil. Two subgroups, the salmonella and shigella, are pathogenic and have other distinguishing features, but in general there seems to be a continuous series of intergrading types of coliform organisms which so far have defied precise definition. Most of the coliforms do not easily initiate pathological processes in adults, and this may be why we have been content with relatively crude biochemical tests to distinguish one from the other. However, cystitis, conjunctivitis, and abscesses are known to be caused by coliform organisms in human beings, while there is evidence that they produce scours and fatal septicæmia in young animals. Recent work on the ætiology of infantile enteritis has renewed interest in these potentially pathogenic coliform organisms, and, as Cruickshank [1] has pointed out, the infant is not only prone to endogenous infections but is ill adapted physiologically and immunologically to deal with them.

If the part played by potentially pathogenic coliforms in disease is to be accurately defined some reliable method of identification is needed. Sjöstedt [2] supports this view by finding among serologically typed strains a close relationship between the capacities to lyse red cells, to produce skin necrosis in rabbits, and to kill mice. These properties, together with the possession of a capsule which interferes with phagocytosis, are said to be common among strains found in pathological material. As the result of work by Kauffmann [3] and his colleagues coliform organisms can now be divided into 25 groups depending on their somatic antigens, and into further types according to their capsular antigens. Using these two types of antigen Kauffmann has devised a scheme similar to that which has proved so useful in identifying members of the salmonella group. Difficulties were encountered in preparing flagellar or H antigens in the same way as for the salmonella group, but this problem has been tackled by Vahlne,[4] who has now demonstrated some twenty H antigens. Vahlne could find no reliable or definite relation between the biochemical and the serological classifications; strains which culturally belonged to the colon and aerogenes groups gave identical serological reactions. On the other hand, he found no qualitative changes in the various antigens within the colon group, and if these findings are confirmed we may have to revise our criteria of identification.

The suggestion that antigenically related groups of coliform organisms cause particular infective conditions was made by Dudgeon in 1921, and Kauffmann has recently concluded that some serologically defined types of *Bact. coli* are more pathogenic than the usual f strains. Vahlne, in a more extensive study, comp strains isolated from fæces with those recovered in of appendicitis, peritonitis, and cystitis. He could show that definite serological groups or types ca particular pathological lesions, but he did find a grea variety of strains in normal than in pathological materi Strains isolated from lesions were more often capsulat and hæmolytic than those in fæces. To get more eviden for the view that coliforms play an important part such infections he examined 94 sera from patients wi appendicitis and 203 sera from normal people. In abo 10% of the sera from patients he could demonstr O agglutinins for some of the coliforms in considerat higher titre than in the controls. These results are n impressive, but Vahlne points out that his sera we collected only six days after appendicectomy. A mo satisfactory demonstration of the rôle of the colifor in human infection might be obtained by studying oth diseases, and there is still much to be learnt about t serology of these organisms. While antigenic analysis the coliforms has a long way to go before it becomes precise instrument like the Kauffmann-White scheme f the salmonellas, the Copenhagen and Lund workers ha already signposted the route.

SAFETY CODE FOR ANÆSTHETIC APPARATUS

GONE are the days when the doctor armed with bottle in one hand and a mask in the other could con himself a fully equipped anæsthetist. Now he has t familiarise himself with a score of anæsthetic agen and with almost as many methods of giving then These methods are often mechanically complicated, an a vital part of his work is to understand and regulat the gadgets that go to their making. This complexit is perhaps unavoidable; but anæsthetists have bee further handicapped by the absence of effectiv standardisation in the apparatus they are called on t use, and the resulting confusion has been the cause fatal accidents.

In an attempt to lessen the confusion a code [1] has bee prepared, at the instigation of the Medical Defen Union and the Association of Anæsthetists, by t British Standards Institution with the full coöperati of doctors and manufacturers. The code sets o long- and short-term policies. The long-term recor mendations call for a complete system of non-inte changeable connexions for gas apparatus which w make wrongful coupling impossible; this, involvi as it will new cylinder valves and couplings, must wa upon improved production, but it is the only tru foolproof safety measure. The short-term recommend tions, which can be effected immediately, include pr posals for distinctive marking of cylinders and pip planned storage, and selection and instruction personnel.

The suggested colour-scheme for cylinder identificati is in the main that already in use, as follows:

Gas	*Colour of cylinder*
CO_2 for inhalation ..	Upper $^3/_4$ sea-green; lower black.
CO_2 for snow-making ..	Sea-green.
Cyclopropane	Aluminium with red shoulder.
Ethylene	Mauve with red shoulder.
Helium	Brown.
Helium and oxygen ..	Brown with white shoulder.
Nitrous oxide	Black.
Oxygen	Black with white shoulder.
Oxygen and CO_2 ..	Black with sea-green shoulder a white neck.

It is not clear why oxygen and nitrous oxide, the mo likely cylinders to be confused, should still be so simila rked. The code does not mention one difficulty ich has led to fatalities in the past—the lack of iformity between the U.S.A. and ourselves. Unless e Americans can be persuaded to change their oxygen linders, for example, from the present green to our ick and white, accidents may still arise from this cause. might be well for those handling the cylinders to dergo, like engine-drivers and air pilots, tests of lour vision, but it should be impressed on all personnel at to repaint or otherwise deface a gas cylinder is a rious crime. The anæsthetist reading the code may use to reflect on his own organisation. Is it as safe he can make it, bearing in mind that it must often worked by tired people in the middle of the night? uch that is traditional could go—for instance, the little hite petticoats in which nurses shroud the cylinders, us concealing their labels. Much time wasted in cylinder-testing" could be saved by a rational scheme cylinder rotation. It should, too, be the rule that henever a gas cylinder is changed its contents must be onfirmed by a second competent person. The code nderlines the need for understanding between manucturers, hospital authorities, and anæsthetists. Let s hope they will pull together to get existing apparatus rought in line with the new proposals as quickly as ossible.

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[7] Stivelman, B. P., Kavee, J. *Ann. int. Med.* 1946, 25, 66.

[8] Brock, R. C. *Guy's Hosp. Rep.* 1942, 91, 111, 131; 1943, 92, 26, 82, 123; 1944, 93, 90; 1946, 95, 40.

[1] Cruickshank, R. *Proc. R. Soc. Med.* 1946, 39, 389.

[2] Sjöstedt, S. *Acta path. microbiol. scand.* 1946, suppl. 63.

[3] Kauffmann, F. *Ibid*, 1944, 21, 20.

[4] Vahlne, G. Serological Typing of the Colon Bacteria, *Ibid*, 1945, suppl. 62.

[1] Code of Practice relating to Medical Gas Cylinders and An thetic Apparatus. British Standards Institution, 28, Victo Street, London, S.W.1. Pp. 15. Post free, 2s.

RHEOCARDIOGRAPHY

WHEN the heart contracts, the resistance to a current assed through the body is altered. This changing esistance can be recorded with the electrocardiograph, nd according to Holzer and his colleagues [1] the records rovide a useful measure of the two phases of ventricular ystole—the isometric and the ejection phases. Experinents were first made on frogs and dogs, and the tracings btained from these animals in circulatory collapse are nterpreted in terms of altered contraction and relaxation f auricle and ventricle. The investigators' monograph lso illustrates the R.K.G.'s of cases of aortitis, hyperhyroidism, heart-block, and tricuspid insufficiency, which ast gives a peculiar curve as yet unexplained. An arch in the curve at the time of the first phase of ventricular systole is claimed to be an early sign of ventricular failure, preceding all others.

Though the value of rheocardiography is difficult to judge from this early work the method seems worth pursuing.

AWARDS FOR UNIVERSITY STUDENTS

IT has long been recognised that boys and girls who have won open scholarships or exhibitions at the universities have sometimes been unable to take up their awards unless they have succeeded in supplementing them by additional awards or other means. They have thus been subjected to the strain of competing, for example, for a State scholarship as well as an open scholarship, and have often been obliged to pursue their course under the handicap of financial difficulties. In the words of the Norwood Committee: "There should be no need for a successful candidate to search round for means of supplementing the college or university award."

Until recently the State has done little to remove these financial barriers. Up to 360 State scholarships have been awarded annually by the Ministry of Education on the results of the examination for the higher school certificate; the maximum value of these scholarships for the normal university year of three terms has been the payment of approved fees and a maintenance grant of only £100. Last May, however, more generous provision was announced by the Ministry.[1] Students who have won scholarships or exhibitions are now to receive further assistance. The supplement will provide for the payment of approved fees and of a maintenance allowance sufficient, "after taking into account the value of the award, an assessed contribution, if any, from the parents or guardians, and the value of any other awards, to bring the student's resources up to the approved standard figure of maintenance." There will no longer be a limit of £100 on the grant for maintenance, and it is expected that the number of awards qualifying for supplement may reach 1200 a year. This is certainly an improvement, but parents who have heard of it will naturally want to know how it affects them and their children. For what range of income will the awards apply? Will any allowance be made for special liabilities, such as those which doctors have to carry?

On Oct. 10 a questioner drew from the parliamentary secretary to the Ministry a little more information. Mr. D. R. Hardman said that no contribution is expected from a parent whose income does not exceed £600 a year. Parents with incomes above this figure will pay a contribution assessed on a graduated scale, which provides that an award will become honorary when the annual income exceeds £1500. "In arriving at the amount of income for this purpose allowances are made in respect of other dependent children and their educational expenses, dependent relatives, mortgage interest, and certain other liabilities." But this is not very helpful. How much, for instance, is allowed for other dependent children? It is difficult to see why it should be necessary for the Ministry to announce these new arrangements by bits and pieces, or for parents to search *Hansard* and departmental circulars. A taxpayer is entitled to have information sufficient to enable him to calculate his obligations to the State. If he needs help for the further education of his children, why should he not be allowed to know whether he is likely to be eligible or not?

SPIRIT OF RESISTANCE

Prof. Ole Chievitz, Danish surgeon and resistance leader, whose death is recorded on another page, was a man whose full stature has yet to be recognised outside his own country. When Denmark was occupied her invaders made it clear that in exchange for civil obedience she would be allowed to go more or less her own way. At that time the defeat of Britain, Germany's last considerable opponent, seemed imminent; it might reasonably have been deemed futile to oppose an enemy in full occupation, without any substantial hope of victory, and in the knowledge that the only certain reward would be death or reprisals against fellow-countrymen and relations. Yet that is exactly what the elderly Chievitz and his friends did. "Tell your friends the British are going to win the war," he would say to his students: and soon he was proving his faith in action.

In Denmark, as in other occupied countries, doctors played a proud part: Chievitz, Fog, Husfeldt—these are names to conjure with, and they are three among many. Aircrews shot down over Denmark will recall with gratitude their secret admission to a Copenhagen hospital; the concealment of their nationality in the open ward, despite Gestapo inspections ("this poor chap has dreadful burns on the face"); the journey to the dockside house; the uneasy moments in the fishing-smack's empty fuel tank during a further Gestapo visitation; and at last the trip to another land and freedom.

We live in somewhat dreary days; for too many of us the self-discipline and the sense of purpose have gone, leaving us relaxed and void. We can, if we will, find fresh heart in the memory of staunch friends, whose confidence in us and in our way of life never wavered. "The British," said Chievitz, "are going to win."

MR. J. J. ROBERTSON, Labour M.P. for Berwick and Haddington since 1945, has been appointed to the General Medical Council as a Crown nominee in succession to Lord Hacking.

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[1] Rheocardiography (R.K.G.). By W. Holzer, K. Polzer, A. Marko Vienna: W. Maudrich. Pp. 43.

[1] Circular no. 104, May 16, 1946.

Special Articles

POSITION OF DOCTORS IN THE NATIONAL HEALTH SERVICE

THE MINISTER'S ASSURANCES

THE following letters have been exchanged by the presidents of the Royal Colleges and Mr. Aneurin Bevan, Minister of Health.

The Presidents' Letter

MY DEAR MINISTER,

The opposition of a substantial part of the medical profession to any renewal of discussions with the Government regarding the National Health Service is causing us concern. We fear that it may lead to an impasse and we wish to do what we can to prevent such an impasse arising.

We recognise that certain of the principles of the new service are incorporated in the Act, but there are other issues of importance which will be determined by regulations and the form of the service will depend to a great extent upon what the regulations contain. We feel that there is an opportunity in framing the regulations to meet several of the objections of the profession. Moreover, the implications of some of the proposals for the new service are not clear to the profession and clarification of these points would be helpful. We hope, therefore, that you will clarify for us any of the points referred to later in this letter on which there may be misunderstanding and that you may be able to give us an assurance that you will endeavour, within the framework of the Act, to meet the views which are held so strongly by many practitioners.

Our first point is a general one. We believe that behind the opposition of members of the profession is the fear that to enter into discussions would compromise their position by implying their approval and acceptance of the main provisions of the Act.

In the general-practitioner part of the service there are three points on which we think that some statement from you would be helpful.

The first is the method of remuneration. This is left to be dealt with by regulations; and is therefore presumably open for discussion; but you have made clear your preference for a basic salary, apparently making it generally applicable because of your difficulties in particular cases. There is general agreement that there are circumstances in which a basic salary or a guaranteed minimum may be necessary, but this is not regarded as justifying a universal basic salary. Cannot the circumstances in which a basic salary is appropriate be left open for discussion ?

Secondly, a large element in the opposition of some practitioners is the fact that if the tribunal recommend the expulsion of a practitioner from the service, his appeal is to be judged by the Minister who has appointed two of the three members of the tribunal. Neither the words nor the spirit of the Act prevent you from agreeing to seek the advice of the General Medical Council on every such appeal.

In the third place, there is a widespread and not unfounded fear that there will be serious interference with the liberty of movement of general practitioners. It would be useful if you would explain how you anticipate that this part of the Act will work in practice, with particular reference to partnerships and groups.

Among specialists there are also certain points giving rise to anxiety. In the background, just as in the case of the general practitioners, there is the general issue of the freedom of the profession and the availability to the people of independent medical advice. The whole profession regard it as essential that independent practice should continue and that independent practitioners should have the necessary facilities for the treatment of their patients. We were therefore glad to receive from the Lord Chancellor and from yourself assurances that independent practitioners would be free to remain in attendance on their patients when admitted to the private wings of hospitals, and also to learn that consultants holding honorary positions on the staffs of hospitals would be at liberty to use all the facilities provided. You know our anxiety to induce specialists to do practically all their work within the precincts of hospitals; it is because of this anxiety that we stress these points. Any information you can give us on the practical operation of the consultant and specialist part of the service will be helpful.

We hope you will forgive us for intervening but we feel that the importance of the cause justifies this step

Yours sincerely,

MORAN
President, Royal College of Physicians.

ALFRED WEBB-JOHNSON
President, Royal College of Surgeons

W. GILLIATT
President, Royal College of Obstetricians and Gynæcologists.

The Minister's Reply

MY DEAR PRESIDENTS,

Thank you for your letter. I agree with you that an impasse between the Government and the medical profession would be a grave misfortune. I believe that some, at least, of the opposition on the part of the profession to discussions is due to a misunderstanding of the proposals and I am glad to answer any questions if by so doing I can make clear what is in doubt.

You say that some members of the profession fear that discussions would compromise their position by implying their approval of the main provisions of the Act. There is no ground for such a fear. Every doctor will have to decide for himself when the proper time comes whether or not he should take part in the new service, and the profession as a whole will be free to determine their views on the service when they know what it is to be The resumption of discussions now would not prejudice these eventual decisions.

As you rightly point out, the ultimate form of the service will largely depend on regulations which have now to be framed. The issue for the medical profession today is not, therefore, whether they will join a service, the final shape of which cannot yet be known, but whether they will accept or forego the opportunity to influence its shaping. I want to have their help and advice in this task and I can certainly assure you that, if discussions take place, I shall endeavour to meet any views of the profession which do not conflict with the principles of the Act.

Let me here make one point. It has been said that I have not consulted the profession and that I have been unwilling to negotiate with them. That is not so While the Bill was in preparation and before Parliament, discussions with the medical profession as with other interests were necessarily conditioned: I could not publish proposals before they were submitted to Parliament and I could not pledge Parliament in advance to their acceptance. Nevertheless I and my officers had full discussions with the negotiating committee and were throughout in close touch with the representatives of the profession. Thus the Government were at all stages fully informed of the views of the profession and the original proposals were modified in many important respects to meet those views. Now the position is different. The Bill is law and within its terms I can negotiate freely.

GENERAL PRACTITIONERS

I turn now to the specific points raised in your letter. You ask three questions about the general-practitioner part of the service:

(i) *The method of remuneration*

Clearly both the method and rates of remuneration are open to discussion since they are matters which are not defined in the Act but have to be determined by regulation. I believe, however, that the Government's proposals have been misinterpreted. The Government have accepted the view of the profession that remuneration should be based substantially on capitation fees and have thus rejected the conception of a full salaried service. I have had it in mind that the remuneration of all general practitioners should include an element of salary, but that the element should be small. As you yourselves recognise, there are circumstances in which a guaranteed minimum is necessary and my own view has been that administratively the most convenient method of achieving this object is to make the basic element universal. But this is essentially a matter which I should like to discuss with the profession.

(ii) *The tribunal*

Here again there is, I think, some misunderstanding. The question to be decided by the tribunal is whether the retention of a doctor in the medical list would be prejudicial to the efficiency of the service, and I regard the setting up of an independent tribunal as an addition to the safeguards which have prevailed under the National Health Insurance for the last thirty-five years. The function of the General Medical Council is to determine whether a doctor has been guilty of unprofessional conduct and that remains unaffected. Moreover, a doctor, like any other citizen, has his rights at common law enforceable by the courts and these also remain unaffected. It is not true, as has been so widely said, that doctors in the new service will be civil servants. On the contrary, their full civic rights are preserved unimpaired. I will gladly discuss with representatives of the profession the procedure to be followed before deciding an appeal to me from a decision of the tribunal to remove a practitioner's name from the list, with a view to providing any additional protection possible within the framework of the Act.

(iii) *The fear of interference with the liberty of movement of general practitioners*

There is no power to direct a doctor to go anywhere or do anything. There is a provision in the Act the sole object of which is to avoid an undue concentration of doctors in any one area. Under this provision a doctor who wishes to practise in the public service in a new area will be required to obtain the approval of a central committee of nine, seven of whom will be medical practitioners appointed after consultation with the medical profession. Normally, however, he will make his arrangements locally through the local executive council, the approval of the central committee being formal. The details of how this will work have still to be discussed and settled, I hope in consultation with the medical profession, but I can say that what I have in mind as the everyday procedure is that in the case of a partnership or group of doctors the partners or members of the group will have the initiative in selecting a doctor to fill an approved vacancy and normally their selection will be confirmed as a matter of course.

Similarly, in the case of a single-handed practice the initiative in selecting the incomer will lie with the local medical committee.

You know, of course, that all doctors who, when the Act comes into operation, are already in practice as principals will have an absolute right to enter the new service in the areas in which they are practising.

SPECIALISTS

You mention finally in your letter the position of specialists and stress the importance to them of ensuring the freedom of the profession and the continuance of independent practice. It is a basic principle of the new service that there should be no interference with the clinical freedom of any doctor—specialist or general practitioner.

It is also a principle of the service that independent specialist practice should be free to continue—specialists being free to remain outside the service or to join it either whole- or part-time, and, if they wish, to be on the staff of a hospital in an honorary capacity. In this way the position of consultants desiring to continue their association with hospitals after the age of retirement and of consultants who do not wish to accept more than a limited responsibility will be met. In the case of a consultant on a hospital staff—and I find it difficult to conceive of a consultant not on a hospital staff—he will be able to treat his private patients in the private beds of his own or other hospitals, subject to availability, and I recognise with you the need for both public and private accommodation, as indeed I have made clear in Parliament on a number of occasions.

The details of all these arrangements will obviously need to be discussed with the profession, but I am confident that round a table we shall be able to make satisfactory arrangements which will encourage specialists to work within the precincts of hospitals —a point to which, like you, I attach the utmost importance.

If you think it desirable I have no objection to the publication of this correspondence.

Yours sincerely,

ANEURIN BEVAN.

THE LONDON REGIONS

A LETTER commenting on the areas proposed for the London regions has been addressed to the Ministry of Health by King Edward's Hospital Fund.

"The proposals," the letter says, "are fully in accord with the views which this Fund has from time to time expressed. It is essential that the hospital services of London and the Home Counties should be taken together, and that the arrangements should be such as to secure to the full the advantages expected to accrue from the extension of the University influence upon the standards of hospital work. At the same time, we appreciate that the area is as a whole too large to be operated as a single region, and we would agree that the division of the area into four regions offers the best practical alternative open to the Minister. In saying this we would not wish to prejudge the question of the advisability of some reconstruction of the boundaries of the regions on the lines now being suggested by the Voluntary Hospitals Committee for London.

"The experience of the Fund shows that it is especially in the populous periphery of the Metropolitan area that the need for further development is most apparent. This development must be completely integrated with the hospital services of the central area, and we are strongly of opinion that the advantages of such a plan as that now proposed will in the long run far outweigh the possible conveniences of any alternative plan such as might be framed to coincide with the present boundaries of the County of London."

The letter ends by quoting a memorandum from the Fund in 1944, commenting on the suggestion that the L.C.C. area should constitute a single authority. The Fund then said that its experience in the Metropolitan Police District proves unmistakably that such an arrangement would only perpetuate one of the primary sources of the maldistribution of hospital facilities in the metropolitan area. "In so far as there is a lack of adequate hospital services in the London area, it is to be found on the periphery of London where new populations have sprung up within recent decades—where it has proved difficult for voluntary provision to keep pace with the growth of population, and where the local authority has equally failed to meet the situation. If ever there was a case for coördinated planning, it is over this wide area that transcends the county boundaries."

AMERICAN DEAF SCHOOLS

Mr. A. W. G. Ewing, PH.D., and Mrs. Ewing, M.SC., of the department for the education of the deaf of Manchester University, have just returned from lecturing and from a tour of deaf schools and deaf children's clinics in the United States and Canada; and on Jan. 3 they gave the Deaf Children's Society an account of their experiences.

There are three types of schools for the deaf in the United States, Dr. Ewing said—public residential schools, begun as voluntary enterprises in the last century and now taken over by the various States; public day schools, founded in this century by cities, or occasionally States; and denominational or private schools. The first of these take more than 12,000 children, the second some 4000, and the third some 1100. They visited 23 schools, and also saw the aural reablement centres which have been set up for deafened Servicemen. In these centres the men receive 4–6 weeks' training in the use of hearing-aids combined with lip-reading. About 5% of those passing through the centre get on well enough to discard their hearing-aids, and the rest learn to use their aids successfully—quite a difficult feat in itself.

Mrs. Ewing, speaking of provision for children under the age of 5, described the great variety in educational policy in different States. In New York State, for example, there is a law that deafness must be reported by the age of 6, and education is provided for all deaf people between the ages of 3 and 21. In Tennessee, on the other hand, there is no education provided for the deaf below the age of 7. Yet, however the educational standards differed, the material conditions were always high. She saw not a single dull uninteresting shabby classroom: lighting, equipment, and furniture were of the best. The teachers were young and gay, wearing pretty frocks, and the clothes and shoes of the children were both good and pretty. There was a grand piano in every classroom. She spoke of the "amenities and dignities" of the environment in which these children are taught as something we must seek to give ours. Yet, in spite of all, she saw no better lip-reading than she sees in English schools, and though speech was often better articulated than among our children, its use was not so free and vital; the children on the whole did not seem to think in words as readily as ours. In Canada there were no schools for deaf children under 5 up to the time of the Ewings' visit; but in Ontario, partly as a result of their lectures, a clinic is now being founded and a worker is being sent to Manchester to train. In the United States, as here, she found two approaches to the teaching of the under-5 child. In most schools, teachers used methods designed for older children, and modified them as well as they could to suit these younger pupils; in a few, efforts are being made to devise special methods for children at this stage of their development. Ordinary nursery-school methods, which aim at teaching the three-year-old independence, will not do, because the deaf are already, in a sense, too independent: they are isolated and must learn to coöperate and enjoy social life. American teacher-parent associations are much more active and friendly than ours. The mothers often help in the school, by playing the piano for rhythmic training, or by minding the children during the teachers' luncheon hour.

Dr. Ewing, taking up the tale, noted that the early schools in America were first modelled on the French Institute for the Deaf, in Paris, where teaching was entirely by signs; and the oral tradition, which has such a firm hold in England, came late. Nowadays, however, some 70% of children are taught wholly or chiefly by speech, and in the Clarke School for the Deaf, and St. Joseph's School at St. Louis, Missouri, teaching i entirely oral. If signing ever gets into a school, whethe it is used for teaching or not, it persists out of scho hours, and he knows of only one residential school i England—at Northampton—where there is no signin among the children at play; but in St. Joseph's an the Clarke School he saw no signing, the children usin speech among themselves. From the Clarke School abou 8 children every year get on well enough to finish thei education in ordinary high-school. In a few America public residential schools there is a combined system of teaching, children getting 1–2 years of oral teachin on admission, between the ages of 4 and 5, and late being taught partly by finger-spelling and signing They observed that where finger-spelling was introduce into teaching in this way speech faded out altogethe among the children; and he mentioned an older boy who had only been deafened at the age of twelve, but who handed them a note asking them to learn one-handed finger-spelling so that they could converse with him. In one particularly well-equipped school where signing was used the children were extremely happy since they never encountered a situation in which they were at a disadvantage; and many were unwilling to leave. They were well trained in occupations, such as printing, beauty-culture, and hairdressing, in which they could make a good living; but what, he asked, would be their social and emotional experience once they left school? They found a similar situation at a college for the deaf, where comely and well-dressed young people were enjoying a fraternity meeting, but there was complete silence except for the sounds of the dance band. They came back more than ever convinced that where oral teaching methods are at all possible no others should be used.

B.M.A. PLEBISCITE

FINAL FIGURES

A FINAL report on the British Medical Association's plebiscite, embodying all replies up to the closing date of Jan. 6, has now been issued. Since the preliminary totals were published on Dec. 16 the number of replies received has risen to 42,123 (civilians 39,013; Services 3110), and the result now reads: Yes 19,478 (46%); No 22,645 (54%). Replies have now come in from 38% of Service doctors; 56% of these voted Yes and 44% No, the same proportion as was recorded in the preliminary results. As the tables show, among serving doctors the strongest support for negotiation was recorded by those qualified for 8 years or more, and by those holding permanent commissions or specialist posts.

4. SOME IMPORTANT PERCENTAGES: CIVILIAN AND SERVICES

—	Total % voting	% voting "yes"	% voting "no"	% not voting	Of those who voted	
					% voting "yes"	% voting "no"
All civilian categories:						
Great Britain ..	81	37	44	19	45½	54½
England and Wales only	83	38	45	17	45½	54½
Groups 1 to 4 (Consultant or specialist, general practitioner principals and assistants, whole-time voluntary hospital):						
Great Britain ..	92	37½	54½	8	41	59
England and Wales only	94	38	55	7	41	59
Groups 2 and 3 only (General practitioner principals and assistants):						
Great Britain ..	88	32	56	12	36	64
England and Wales only	90	32	58	10	35½	64½
All Services	38	21	17	62	56	44

1. CIVILIAN PRACTITIONERS

Group	Description	England and Wales		Scotland		Ireland		Totals		Total replies received
		Yes	No	Yes	No	Yes	No	Yes	No	
1	Consultant or specialist	1907	2140	201	283	23	56	2131	2479	4610
2	General practitioner principal	4744	8854	587	972	148	198	5479	10,024	15,503
3	General practitioner assistant	820	1181	135	190	23	33	978	1404	2382
4	Whole-time voluntary hospital	1827	1343	248	241	41	36	2116	1620	3736
5	Whole-time local-authority general hospital	949	504	94	48	11	13	1054	565	1619
6	Whole time local-authority special hospital	710	307	95	53	22	6	827	366	1193
7	Whole-time public-health service	1125	660	146	90	21	15	1292	765	2057
8	Whole-time Government service	440	221	85	38	11	4	536	263	799
9	Whole-time teacher	242	112	66	35	4	6	312	153	465
10	Whole time research	191	65	23	11	1	3	215	79	294
11	Whole-time non-Government post	213	200	18	23	1	5	232	228	460
12	Medically qualified dental surgeon	65	161	14	36	..	2	79	199	278
13	Retired	1136	1763	140	240	15	23	1291	2026	3317
14	Unclassified	996	909	171	174	32	18	1199	1101	2300
	Totals	15,365	18,420	2023	2434	353	418	17,741	21,272	39,013

2. AGE-GROUP (PERIOD SINCE QUALIFICATION): CIVILIANS ONLY

Description	0–7 years		8–14 years		15–21 years		22 years and over		Period not stated		Total "yes"	Total "no"	Grand total
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No			
Consultant or specialist	92	85	482	342	505	586	1017	1430	35	36	2131	2479	4610
General practitioner principal	305	644	932	1639	1366	2519	2703	5114	83	108	5479	10,024	15,503
General practitioner assistant	536	782	259	362	87	105	84	138	12	17	978	1404	2382
Whole-time voluntary hospital	1522	1304	459	226	54	26	52	38	20	26	2116	1620	3736
Whole-time local-authority general hospital	592	398	260	91	98	34	85	34	19	8	1054	565	1619
Whole-time local authority special hospital	285	159	203	84	147	43	179	74	13	6	827	366	1193
Whole-time public health service	142	64	275	143	321	179	520	369	34	10	1292	765	2057
Whole time Government service	118	54	115	38	89	36	200	129	14	6	536	263	799
Whole-time teacher	82	42	78	34	62	27	82	45	8	5	312	153	465
Whole-time research	103	36	54	12	18	4	35	26	5	1	215	79	294
Whole-time non-Government post	32	31	48	45	60	59	86	91	6	2	232	228	460
Medically qualified dental surgeon	6	26	17	31	17	36	34	104	5	2	79	199	278
Retired	16	23	30	28	50	56	1155	1866	40	53	1291	2026	3317
Unclassified	632	444	251	204	108	111	189	316	19	26	1199	1101	2300
Totals	4553	4092	3463	3279	2982	3821	6421	9774	322	306	17,741	21,272	39,013

3. AGE-GROUP (PERIOD SINCE QUALIFICATION): SERVICES ONLY

Group	Description	0–7 years		8–14 years		15–21 years		22 years and over		Period not stated		Totals		Grand total
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
15	Permanent commission	36	31	126	101	89	69	219	116	4	6	474	323	797
16	Temporary commission specialist	132	47	113	36	35	7	15	9	5	2	300	101	401
17	Temporary commission graded specialist ..	164	115	16	7	3	..	..	1	4	..	187	123	310
18	Temporary commission general-duty officer ..	633	768	26	22	10	10	94	14	13	12	776	826	1602
	Totals	965	961	281	166	137	86	328	140	26	20	1737	1373	3110

Health Centres of Tomorrow

II—THE URBAN CENTRE

THE population of England and Wales before the war was 41,215,000, cared for by 18,870 general practitioners, each of whom had an average of 2184 patients. During the war the civilian population decreased; but owing to differential Service needs the decrease in the number of general practitioners looking after them was proportionally greater, and in December, 1943, there was one to each 2786 civilians. The number of doctors now in general practice cannot be far short of the first-quoted figure, and may indeed exceed it.

Inquiring in 1943 into the pre-war distribution of general practitioners the Central Medical War Committee found that in 1939 the average number of patients per doctor was over 3000 in 16 (9%) of the 176 areas into which the country was divided. Except for East Yorkshire, all these areas were industrial: Ashton, Barnsley, Consett, Gateshead, Stockton, Sunderland, West Bromwich, and Tower Hamlets are examples.

It seems safe to assume that, if they were evenly distributed, our present complement of general practitioners would suffice to provide one doctor for every 2200 people.

THE AMOUNT OF WORK

Information about the incidence of illness is somewhat scanty. Moreover, it is derived mainly from National Health Insurance figures, which can be applied to the general population only tentatively, because the inclusion of women and children, and private patients, in a comprehensive National Health Service will almost certainly raise the average number of medical attendances per person.

Items of service to panel patients probably average about five per year, though nothing authoritative can be said of their distribution between the doctor's surgery and the patient's home. On this basis, 2200 patients would require 11,000 items of service in a year.

Can this be done? It is highly unlikely that doctors will ever get the clear-cut working week of $5^1/_2$ days which other professions enjoy; but they ought to be able to look forward to its equivalent in hours, even if their work is spread over more days. Most practitioners would probably regard an average of 40 items of service per day as not unreasonable, divided, as required, between home visits and attendances at health centre or surgery. The equivalent of $5^1/_2$ working days in a 48-week year would give 264 working days; and if on each of these an average of 40 items of service were rendered the annual total would be 10,560 surgery or home visits. This figure differs by less than 500 from the number of items of service already mentioned as theoretically required on the basis of panel experience.

With whatever qualifications the figures are considered, it does seem possible to say, first, that a start could be made with the new service, and secondly, that 5000 additional practitioners, either as full members of the service or as assistants, would enable it to function smoothly by reducing the number of patients per doctor to something like 2000.

Figures of this nature may enable the profession to discuss with the Minister the limitation of the lists of single-handed doctors to a ceiling of 2500–3000, and to formulate ideas on the remuneration appropriate.

SITUATION

In siting health centres, ease of access by patients will be of prime importance.

At the 1931 census there were 1120 urban areas, of which 113 were towns with more than 50,000 inhabitants. In these urban areas the average density of population was 7·1 persons per acre, or 4544 per square mile. In most large towns, however, it was a good deal higher this: in Greater London, for example, it was more twice as high (18·5 persons per acre), and in the trative county of London it was more than eight as high (58·7). In most urban areas, therefore, a with a radius of one mile will enclose more than 20, people, and if we place a health centre at the centre this circle few of the 20,000 it serves will have to more than a mile to reach it. Many of course would *able to use public transport.*

A population of 20,000 would require the services of six or seven general practitioners and at least two dentists, and this would still leave scope for two or three other doctors to take part in the public service from their own surgeries. A centre of this size would not be cheap either to erect or to maintain; but, besides offering good facilities both to patient and doctor, it would enable assistants to receive a thorough training in general practice. The same population would require a building for its local-authority services (maternity and child welfare and school clinic), and if this were on the same site something would be done to break down the administrative barrier between the curative and preventive health services.

It is hoped that some day the suitably qualified and experienced general practitioner will take charge of the clinics on which the child-health services are based. While it would be generally thought undesirable for the treatment of sick children to pass solely into the hands of a single member of the health-centre group (since the emphasis in English medical training has been on producing all-round doctors rather than "general-practitioner pædiatricians") there would nevertheless be considerable scope for a practitioner having a special interest and training in infant welfare (and possessing a diploma in child health) to work at the infant-welfare centre attached. The fear that by seeing so many mothers and children he would gain unfair advantage in the competition for patients will be overcome if satisfactory arrangements within the group can be arranged.

If opportunities are taken, group practice will do much to counteract the tendency towards a full-time school medical service and removal of the school-child from the family doctor. Much of the minor treatment is at present carried out by the school nurse under medical direction, and this can be done equally well when the medical direction comes from the local practitioner. Moreover, if the health centre is near a school, the local practitioner should become the obvious person to advise on the health problems of the school; and both in this way and by health talks he would have a chance to provide progressive health education. Most children would welcome a regular health talk as a relief from ordinary lessons.

Placing the health centre and the local-authority clinics together would also have other advantages. The health visitor is to have her sphere of work considerably enlarged, and is to come into closer relation with the family doctor. Her natural bases are the public-health centre and the patients' homes, and it will help if one of these is beside the family doctor's base. The midwife has a similar clinic base, and possibly the district nurse could usefully do some of her work from the same centre.

An almoner will probably not be needed at the health centre: with a national insurance system and a National Health Service there seems to be no real opening for her there. There ought however to be a close link with the local office of the Ministry of National Insurance, if only to enable certificates to be collected daily from the centre. Many positive advantages to both patient and doctor might be secured by such a link, and nobody with first-hand knowledge of the work of the Unemployment Assistance Board will be afraid of its being repressive.

STAFF

It is less easy to be specific about the numbers and ategories of non-medical staff required in a health centre; xperience and experiment are necessary. Except for he doctors and dentists, staff will all be whole-time mployees of the local health authorities and will properly xpect their hours of duty (though not necessarily their mes of duty) to be much the same as those of other mployees, which are about 38 per week. Unlike he ordinary office, however, the health centre will have o be open in the evening as well as during the day, o that working patients can attend in their free time. t may have to be open from 8.30 A.M. to 8 P.M. on five days a week, and from 8.30 A.M. to 1 P.M. on the sixth —a total of 62 hours. The doctors would hold two urgeries, of about two hours each, on a full working day, and one surgery on the half day. The dental surgeons would have two-three-hour sessions daily from Monday o Friday.

A telephone system with one or two Post Office lines and a full system of internal communications is an obvious necessity, and will require the services of a fully trained telephonist and a relief clerk, if not two telephonists. In a busy centre there may have to be a night telephonist to deal with emergency calls.

Clerks and typists will be needed most in the morning and in the evening when the public will be making most use of the centre. During the busiest hours, from 8.30 A.M. to 12 NOON, and again from 4.30 to 8 P.M., not less than two must be on duty, to direct patients, sort out and re-file cards, attend to certificates and letters, help in the making of appointments, and assist generally. A third, on duty from 10 A.M. to 6 P.M., could help in this work and deal with callers when there are no doctors in the centre.

These numbers are of course minimal, and allow, in effect, only half a secretary per doctor. They offer no prospect of relieving the doctor of the actual writing of case-notes, prescriptions, and certificates. Nor does it seem that any system would permit this, short of arranging for each doctor to have a confidential secretary-typist who could be present in the consulting-room when patients were being examined. Such an arrangement would be ideal, if cost would allow.

The clerical, caretaking, and cleaning staffs of the centre would probably function most efficiently if under the direction of an experienced clerical officer, to be known by some such title as "centre secretary." He (or more probably she) would be responsible both to the medical officer of health, as representing the local health authority, and to the senior doctor or the medical committee of the centre.

Even this cursory examination of the clerical needs of a health centre shows that any authority responsible for several centres will need a central pool of clerks who can be drafted to any centre in the area to meet holiday or sickness absences among the workers.

In addition many other kinds of worker have to be considered. Caretakers, cleaners, and handyman-stokers will be wanted, in numbers depending on the size of the centre and the hours at which the work must be done. The staff—though probably not the patients—will have to have a canteen. (The doctor on night duty will presumably depend on the good offices of the caretaker for such refreshment as he needs.)

The chiropodist will on the whole be best accommodated in the maternity and child-welfare or "public health" centre, where ultraviolet light treatment may also be given. (Physiotherapy proper will remain the function of the hospital outpatient department.)

The appointment of a pharmacist to dispense prescriptions on the spot, to take charge of drugs and dressings, and possibly to be responsible for dried milk for the maternity and child-welfare centre would be convenient to patients, but is not an absolute necessity. The social worker should be called in when required.

Finally the greatest need, apart from clerical assistance, will be for nurses. The nurse can assist in the examination of female patients, do minor dressings, take charge of the minor operations' room, sterilise instruments and dressings, and assist in a hundred ways. In a centre of the kind here discussed two nurses will be a minimum, and experience may show the need for twice as many. Whether the nurse should be district nurse, health visitor, or school nurse may very well depend on local circumstances, but her rôle in a health centre will certainly be very important.

EFFICIENCY WITHOUT EXTRAVAGANCE

In staffing a health centre we must keep a sense of proportion and must particularly avoid too much specialisation. It is out of the question to arrange for the continuous presence, throughout the day and throughout the year, of each of the many kinds of worker—medical and lay—who might prove useful. To provide a continuous service of pharmacists, for example, it is estimated that every centre would need at least four of them; and if we were to plan the rest of the staff on a corresponding scale we should have an organisation which the community could not possibly afford.

Drawing parallels from the animal world, the modern hospital is a large organism in which many different kinds of cell are well represented. The health centre on the other hand is an organism with comparatively few cells, and it would be extremely vulnerable if each of these was highly specialised. Its salvation will lie in the capacity of the staff to adapt themselves and their working to the changing needs of the hour, and they should all be able to perform when necessary the functions of two or three of their associates. Thus a system of "alternates" might be developed to cover absences off duty, on holiday, or through illness.

General competence and a good spirit will in fact prove more valuable than elaborate organisation. Nevertheless, one of the primary reasons for having a health centre is to economise in medical man-power; and neither the profession nor the public will be satisfied unless it is run at least as efficiently as a good private surgery. The next two articles will give an idea of the centre in action and how its affairs might be managed.

MEDICAL PLANNING COMMISSION AND GROUP PRACTICE

THE *Times* of Jan. 6, in reviewing the issues in dispute between the Government and the British Medical Association, says:

> Early in the war all the principal medical organisations combined to establish a Medical Planning Commission. This authoritative body published an important interim report in the summer of 1942, when the Beveridge report was in preparation and public opinion, for the first time in a generation, was ready for a major reform of the social services. So far as the general practitioner service was concerned, the Commission's report supplied the main inspiration both for the Coalition scheme (outlined in a White Paper of February, 1944) and for Mr. Bevan's Act. The Commission, by a majority, wanted more than a mere extension of the existing National Health Insurance scheme, but rejected a whole-time salaried service. It favoured a middle course. The practitioner should be free to work partly in and partly outside the public service. All the "essentially sound" features of the N.H.I. scheme—such as "free choice of doctor, the minimum of interference by the State, and the central negotiation of terms and conditions of service"—should be retained. But radical steps should be taken to improve the efficiency of the general practitioner, handicapped by "the continuance of traditional individualism" into an age when rapid scientific advance and the growing complexity of medical practice demanded "group or coöperative general practice" by doctors using "a health centre . . . provided by a statutory health authority." Group practice was the means whereby "the value of the practitioner to his patient would gain immeasurably."

Public Health

PREVENTION OF EPIDEMIC NEONATAL DIARRHŒA

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OBSTETRIC SURGEON, CHISWICK AND WEST MIDDLESEX COUNTY HOSPITALS

NEONATAL diarrhœa is a disease of infants in the first three months of life, characterised by the passage of frequent loose stools. The main feature is a progressive loss of weight, due to dehydration. As a rule the stools are yellow or orange, though the first few may be green, and while still frequent they are sometimes formed, being passed from the bowel with accompanying liquid which soaks into the napkin and may be mistaken for urine.

In general, the younger the infant the shorter is the incubation period and the more severe the disease. Premature infants, those enfeebled by disease and deformity, and those with feeding difficulties are especially attacked. It may occur sporadically or in epidemics. Vomiting is a feature of some cases.

Epidemic neonatal diarrhœa is not to be confused with endemic gastro-enteritis, which attacks adults at least as often as children. This latter disease appears to be an air-borne virus infection, and recovery is usual.

THREE EPIDEMICS

The views on prevention set out below have been based on observations of three epidemics during the late war.

The *first epidemic*, at the West Middlesex County Hospital, began in a small ward containing 5 premature infants, 3 of whom contracted the disease and died. In the ensuing ten months 68 babies were attacked in all, and 53 died. The epidemic lasted nine months, becoming on the whole less virulent towards the end.

Various methods were tried to prevent the diarrhœa from spreading, including isolation of all suspect cases and removal from the maternity unit of the babies with the disease. The chief difficulty was early diagnosis. Many infants have an occasional green stool when establishing feeding, whether breast or artificial, and it was only when an infant lost or failed to gain weight while taking adequate feeds that the diagnosis could be made. In spite of these precautions, and others in changing napkins and in feeding, fresh cases of the disease kept occurring at irregular intervals, sometimes several at a time. The disease was not limited to special wards or nurseries.

Treatment consisted of fluid replacement by intravenous saline, cessation of milk-feeding, sulphonamides, large doses of vitamin A, and intravenous plasma. The plasma was given because it was thought that the infection might be influenzal in origin, and the plasma would contain immune bodies. No treatment had much, if any, effect on the course of the disease. Many small babies died within twenty-four hours of the onset.

Towards the end of the epidemic, when a fresh review of the cases was made, it was noticed that no completely breast-fed baby had developed the disease. The diarrhœa, however, was not prevented by any antibodies obtained by breast-feeding, because breast-fed babies with supplementary artificial feeds were equally affected with those completely artificially fed. Further, the source of the infection was not in cow's-milk mixtures, because some affected babies had received none, being bottle-fed on expressed breast milk only. Isolation of the affected babies and the nurses attending them failed to prevent fresh cases occurring, so it seemed that the spread was not due to infection or contagion, but this was not certain since the causal organism was unidentified. Repeated bacteriological investigation of the infants in the epidemic never revealed any pathogenic bacteria.

The only common factor in all cases was the use of pooled feeding-bottles and teats, though only 32% of all babies using bottles became ill.

The *second epidemic* was very small, and began while these investigations were proceeding. It occurred at Chiswick Hospital, which had been newly opened a few months previously. Two babies only were attacked, and these were both moved from the hospital. All bottles were withdrawn, and all babies needing supplementary or artificial feeds were spoon-fed. The same milk mixtures were used and no more cases occurred.

The *third epidemic* started in the West Middlesex County Hospital in November, 1943 (see table). It was not so virulent as the other two. The first babies affected were transferred from the maternity unit, but fresh cases occurred. These later ones were isolated in the maternity block, where each baby was given its own new bottle and teats, and these all recovered. Of the 9 babies transferred to the children's isolation ward 7 died; the bottles here were pooled after each feed.

On Dec. 13 all bottles and teats in the department were withdrawn, and spoon-feeding was substituted. The same milk mixtures were used, and no more cases occurred.

DAILY INCIDENCE OF NEW CASES OF NEONATAL DIARRHŒA

November, 1943

Date ..	11	12–21	22	23	24	25	26	27	28	29	30
New cases	1	0	1	0	7	3	2	5	3	0	2

December, 1943

Date ..	1	2	3	4	5	6	7	8	9	10	11	12	13→
New cases	1	0	1	0	0	1	0	0	1	0	1	2	0

Bottles used for infant feeding gradually acquire an ever-thickening deposit of protein and fat on the inside. It was found, acting on a suggestion of Dr. Gordon Signy, that boiling these bottles failed to sterilise them. The thicker the deposit, the more profuse and rapid was the bacterial growth in culture media introduced into the bottle. New bottles, and those free of film, were made sterile by boiling.

Insufficient bacteriological investigations were carried out at the time of the epidemic for any suggestion to be made as to the causal organism.

DISCUSSION

It seems that the bacterial content of the feeding bottle is gradually built up with use and progressive thickening of the film which forms inside. The affected baby's condition, therefore, may be due to the intake of a very large dose of an organism or organisms from a bottle which it did not use before, owing to the pooling of the bottles after each feed. These organisms, which might be non-pathogenic to older children and adults, will not be killed in the stomach of the infant, as they would be later in life, and they will presumably continue to multiply in the intestinal tract, growing in the warm milk medium. Products of proteolysis, such as histamine, will be absorbed in the tissue fluids and produce the systemic signs of neonatal diarrhœa. If, however, only one baby uses the bottle throughout its stay in hospital, it will become acclimatised to the organism as the dose increases, unless, by careless technique, a large number are introduced from the outside.

This may explain the frequency of diarrhœa in hospitals and institutions, and its rarity in the solitary baby at home, and why, when an affected baby is given water only for a time, it will tend to improve until milk-feeding is reintroduced. It may also explain why different organisms are found in different epidemics, and the success of sulphonamide treatment in some cases and s failure in others. Additional evidence in support of is hypothesis is the absence of inflammation of the gut a necropsy.

In some epidemics completely breast-fed babies are aid to have been attacked, but in some hospitals and aternity homes the night staff are in the habit of giving bottle-feed to fractious babies, unless special instructions re given to the contrary.

No further case of neonatal diarrhœa has occurred in he West Middlesex County Hospital during these last hree years. In this period a high incidence of breast-eeding—over 98%—has been maintained, largely owing o the efforts of Dr. Martha Dynski-Klein, the hospital ædiatrician.

SUMMARY

After the study of an epidemic of neonatal diarrhœa n a hospital, in which the only common factor seemed to e the use of pooled feeding-bottles and teats, two further pidemics were checked by the substitution of spoon-eeding for bottles.

It is suggested that infection may be spread by the eavy and increasing contamination of the film which orms in feeding-bottles in constant use.

The risks of bottle-feeding may be lessened by keeping a separate bottle and teats for each baby, or by sterilising the bottles after they have been thoroughly cleaned of film. The teats cannot be sterilised without destruction.

Bacteriological examination of feeding-bottles during an epidemic may lead to the identification of the causal organism.

I am indebted to the staff of the departments of obstetrics and pathology at the West Middlesex County Hospital, and to London Wholesale Dairies Ltd. for their coöperation.

Infectious Disease in England and Wales

WEEK ENDED DEC. 28

Notifications.—Smallpox, 0; scarlet fever, 943; whooping-cough, 1149; diphtheria, 210; paratyphoid, 6; typhoid, 3; measles (excluding rubella), 7038; pneumonia (primary or influenzal), 760; cerebrospinal fever, 38; poliomyelitis, 1; polioencephalitis, 0; encephalitis lethargica, 0; dysentery, 55; puerperal pyrexia, 90; ophthalmia neonatorum, 41. No case of cholera, plague, or typhus was notified during the week.

Deaths.—In 126 great towns there were no deaths from scarlet fever, 1 (0) from enteric fever, 5 (1) from diphtheria, 5 (0) from measles, 4 (0) from whooping-cough, 104 (15) from diarrhœa and enteritis under two years, and 33 (5) from influenza. The figures in parentheses are those for London itself.

Bury reported the fatal case of an enteric fever. There were 15 deaths from diarrhœa and enteritis at Liverpool, 11 at Manchester, and 8 at Sheffield.

The number of stillbirths notified during the week was 220 (corresponding to a rate of 28 per thousand total births), including 22 in London.

WEEK ENDED DEC. 21

Amended Notifications.—Diphtheria, 243; measles, 7769; pneumonia (primary or influenzal), 699.

NEW YEAR HONOURS

BESIDES those mentioned in our last issue, the New Year honours list included the names of the following doctors:

O.B.E.

Major H. M. SEIN, M.R.C.P., I.M.S.

M.B.E.

Major R. M. MARQUIS, M.B. Edin., R.A.M.C.
ISAAC B. A. ADJAYE, M.R.C.S.
ALEXANDER S. FRATER, M.B.
CECIL V. JUMEAUX, L.M.S.
HUGH WANDS, M.B. Glasg.
Major J. H. COWDREY, N.Z.M.C.

A.F.C.

Squadron-Leader H. M. SCOTT BROWN, M.B. Durh., R.A.F.

In England Now

A Running Commentary by Peripatetic Correspondents

I WAS delighted to read that the morning the coal-mines passed into national ownership was marked by the hoisting at every pit-head in Britain of the National Coal Board's ensign—a rousing banner of royal blue with the device N.C.B. stitched on it in large white capitals. At Penallta, in Glamorgan, a brass band marched through the inky streets at 5.30 A.M. in full blast with *Salute the Happy Morn!* and the miners are now, it seems, to elect a Coal Beauty Queen in honour of the occasion.

When another appointed day breaks on us, I hope its advent will be marked with equal enthusiasm. A flag, of course, will be raised over every hospital, medical school, chemist's shop, mortuary, and doctor's house in the country. This ensign will have a field of scarlet and white diagonal stripes, like the barber's pole, bearing the initials of the National Health Board in white capitals. It will thus be readily distinguished from the yellow and white flag emblazoned with N.G.B. on top of the gas-works, the electric-blue standard marked N.E.B. on the power station, the smoky-grey banner lettered N.R.B. on the railway booking-office, others decorated with N.C.B. and N.S.B. flying from cotton mills and steel foundries, and the small pennants inscribed N.T.B. fluttering from the bonnets of every lorry bound farther than forty miles. I hope by then there will be a gigantic golden flag with N.B.E. on it waving its shadow on Threadneedle Street. And perhaps we shall all be provided with buttonholes bearing the initials of the National Registration Office stamped on a tiny flag of the country of our birth.

The hospital flag has great possibilities as a reminder of the new order of life. It might be raised each morning and lowered each sunset by the medical superintendent, before an audience of the medical and nursing staff and all ambulatory patients, standing at the salute. Perhaps it will occasionally be topped by the personal standard of the visiting regional chairman, which will be broken at the masthead, with bugle calls, on his arrival. Should the Minister himself drop in, a blue silk banner with "Welcome!" on it may be drawn from its locker by the yeoman of signals. Any doctor going so far as to demur at some ministry decision will be shamed into silence by a pained "Remember the flag, old man!" from his colleagues.

Before sunrise on that wonderful day brass bands will march through the all-night dancers in the hospital courtyards. What will they play? *There's a Good Time Coming? Ain't it Grand to be Bloomin' Well Dead? Rule Britannia? St. James's Infirmary Blues?*—Anyway, then we can get down to the election of the Health Beauty Queen.

* * *

Angling in the hidden depths of my bearer Lakhmi's mind one day I brought to light an unexpected quota of diplomacy worthy of Solomon himself.

Once upon a time, he told me, he had under him a very lazy mali who could never get up in time to water the garden before sunrise. Instead he did the job never before nine o'clock and sometimes as late as ten o'clock, by which time, of course, the forenoon sun was beating fiercely on all the flowers, shrubs, and trees. Nor was this all: after watering he pottered about, picking off dead flowers and leaves and performing no other more arduous tasks, until he retired for his noontide meal (the usual handful of chicken-feed), after which he had a long siesta. He would make his next appearance in the garden about four o'clock in the afternoon and give it the evening watering long before sundown, so that he could go home for his supper not later than seven o'clock and thereafter put in many more hours on his beloved charpoy.

Now, watering a garden in the full blaze of sunshine is very bad for the plants. The effect (which is ruin) has something to do with rapid evaporation of the water by the sun's rays. So finally his master could stand it no longer and called in conference Lakhmi, who was in charge of all his other bearers, cooks, plate-washers, bhistis, and so on. Lakhmi asked his master to summon the mali, which was done forthwith. "O mali, at what hour do you have your tiffin?" asked Lakhmi. "At twelve o'clock, noon." "And your supper?" "At seven o'clock." "Well, in future you will have your tiffin at three o'clock in the afternoon and your supper at midnight." Loud lamentations and perfervid protests from the mali. His digestion would be upset, his sleep ruined, his whole life thrown out of gear. "Then why," asked Lakhmi, "do you give the roses their breakfast at ten o'clock and their supper at four? You are upsetting their digestion, ruining their sleep, and throwing their whole life out of gear." "Shabash," exclaimed the master, "in future every time the mali is late with the *morning watering he is to be kept here without food till* 3 P.M., and every time he gives the second watering before sundown he is to be kept here without food till midnight. Enough, I have spoken."

* * *

To wake up one morning with diplopia was to see life literally from a new angle. To walk across the floor with the rugs and furniture tilted and twisted in all directions was to enter a new cubist world, almost a surrealist one. For a married woman to see two husbands anxiously gazing at her was to receive the impression that she had inadvertently committed bigamy. Our young maid gave the most bizarre effect. She stood in the doorway of my bedroom, with the dark passage behind her, and *a pale oval face floated over her head*, its chin resting on her vertex. I stared at her, fascinated, as at a new type of ghost or a medium complete with spirit head, forgetting to answer her query about the baker or what not. When at last I remarked that it was queer to see a head floating over her, she looked startled, as well she might, until I explained.

The remedy, of course, is to close one eye or put on spectacles with one lens blacked out; then the world suddenly becomes normal again. Sometimes one forgets, and, preparing to get out of bed, sees four Glastonbury slippers neatly ranged to receive as many feet. While pleased to see a plethora of slippers, one regrets the multiplicity of feet—too atavistic—then hastily shuts an eye.

My oculist opines that this is an ocular palsy due to the food-poisoning from which I have been suffering, and that I may recover "in time." No doubt he is right. And it was not even a nice ice-cream: it was so nasty that I only ate half of it.

* * *

My military career was not distinguished, but by the time I had reached the stage of demobilisation leave I had acquired a modest row of three campaign ribbons. During this period I took my son to a lecture given in a village hall by my cousin, a professional soldier, known to my boy as Uncle Harry. In full uniform and with three rows of ribbons and a general's cap Uncle Harry is certainly impressive. After a time I noticed my son's gaze wandering from Uncle Harry's chest to mine. Mine was the broader but relatively colourless. I knew what was coming. "Daddy, have you got a V.C.?" After a moment I decided that I hadn't and tried to pass it off gracefully. There was a short pause and then another inquiry. "Daddy, have you got a D.S.O.?" I was again forced to admit that by a curious oversight this had not come my way. He then said, "Look at Uncle Harry." I began to explain, rather feebly, that whereas Uncle Harry was a professional soldier I had merely been a doctor in the army, *in fact taking a little time off from* my ordinary work, but I could feel my prestige falling. At this moment an old lady in the crowd rose to inquire of the speaker, who was discussing the British troops in Austria, the present condition of the Albigensians. Seeing Uncle in difficulties I rose and asked leave to explain that the Albigensians were a sect who lived in the south of France in the 12th century and were suppressed with great violence. The speaker gracefully acknowledged my explanation and the old lady sat down. Since then my reputation has been restored, and I have even been asked my opinion on model railways.

* * *

"I've had ma wee grandson at the Eye Infirmary. He's only two and he's got a cataract. Just imagine, a wee thing like that wi' a cataract! Our own doctor said he *thought* it was a cataract but we had better see the specialist, and he says it *is* a cataract. I could hardly believe it, but I've looked it up in ma 'Home Doctor' book and the specialist is right enough."

Letters to the Editor

LAY OR MEDICAL ADMINISTRATION?

SIR,—Your correspondent's challenging article on pital administration (Jan. 4, p. 36) calls for friendly constructive criticism. To take matters of detail it should be recognised that many men and women *after* achieving a professional qualification, that t talents lie in administration. Those who have a medical degree ought not to be debarred on that account from an administrative career. The medical curriculum is a good foundation for postgraduate studies in administrative medicine, because it is both scientific humanistic in its approach to life. It will become better still when the proposals of the Goodenough Committee *are fully implemented.*

Controversy about the relative efficiency of lay and medical administrators is sterile. Both are necessary, and each is an expert in his own sphere. Most people will agree that the title of "medical superintendent" is no longer appropriate for a modern hospital or group of hospitals. The parallel system which has proved its worth in many voluntary hospitals has won a well-deserved victory over the hierarchical scheme characteristic of the municipal services. In the regional organisation of the future the administrative division of each group will be just as important as the surgical, the medical, or the nursing division; and the medical *administrator will work side by side with his lay colleague.* The function of each will be to interpret the technical aspects of hospital administration to the lay committee, and there will be a progressive enlargement of the field in both lay and medical administration.

Your correspondent's comment on the doctor's rôle, however, raises matters of general principle on which the profession must make up its mind. To suggest that the status of the medical profession is, and ought to be, bound up with its function of giving advice savours of the cloister rather than the world of men. When we depart from this, we are no doubt involved in policy; but in point of fact a great many medical men and women are engaged *in formulating and directing* policy without becoming entangled, and there will be little hope for medicine unless they continue to do so. The awful threat that "policy means, in the last resort, politics" should disturb no-one but Mr. Faint-heart. Politics—the science and art of government, whether of a nation, a hospital, or a health service—is a fitting study for the wise in any profession. Great names of the past crowd to the mind—one need mention only Stokes, Acland Osler, and Dawson; and many medical men and women of today are joining with their fellows in the other sciences to broaden, strengthen, and humanise both national and local administration. "It is of great importance to a country," said Sydney Smith nearly 150 years ago, "that there should be as many understandings as possible actively employed in it."

London. J. M. MACKINTOSH.

THE B.M.A.'s DECISION

SIR,—To Dr. Cox I answer Yes! I am a democrat, and a practising one. I want every person in the land to be able to have all necessary treatment when sick, without carping care as to whether they can afford it; and I want us, the doctors, to serve under terms of service that will enable us to give our best skill to every one of our patients, and still have time for thought, discussion and study, as well as time off for rest and refreshment of body and mind.

This should have been ready for the men and women in the Services when they came back. Posts with an income, in part assured, should have been there for all those young doctors to step into. They were not. Let the past be forgotten, and let us get on with the future. This is to settle down and discuss how these two things needed can best be secured. The time for negotiating is passed; the word infers some degree of compromise and disagreement. It is discussion that we want, with men and women sitting round tables thrashing out difficulties, of which there are many. Three months have been lost, and no-one knows where he is with regard to where he will be on April 1, 1948. Unless this is done ıce, the arrangements made, and the terms of service be bad: and once-made will be very difficult to ge.

have long maintained that these terms of service ıld be discussed before the rates of pay, by separate es or committees. For the rates of pay, which may l negotiations, I know no better group of men than B.M.A.. and therefore I think they should have this which would make them ineligible for the others. t is why I think that, in the end, it may be well that y have repudiated the duty entrusted to them. No! o not know any organised body that can represent whole profession, any more than the B.M.A. does: it does not even represent its own members in these tters, some of whom joined in order to attend the ıical meetings, many because they were persuaded do so on qualification, and most because they want the *itish Medical Journal* without trouble. But I do not nt to run down the B.M.A. which has much good rk before it in its proper sphere.

I am a disciple of Wilfred Trotter, and he said that t is no longer possible to conceal the wholly unique portance of medicine for the very existence of social e." It is deplorable that just as the time has come for to take up our proper position in regard to this, we ould represent ourselves to the world at large as a actionary selfish body of men and women, threatening wreck the King's Government, refusing to work an ct that has become the law of the land, and so, instead setting an example for high-minded altruism, putting fore those of less good education than ourselves a d example of how to serve the State. But Wilfred rotter also wrote about the herd instinct and as a result this part of men's ancestry it is possible for a small umber of persons working on the quiet behind closed oors to build up an organisation whereby they can npose their views upon the many, stifle all independence f thought, and then at the appropriate moment stampede he herd in the direction that they wish. This is the sort f thing that we want to avoid in the next stages of our ocial evolution. It is what has been happening with he B.M.A. and the medical profession since 1912: and t will be well if the repudiation of its self-assumed unctions by the B.M.A. results in our throwing off this nfluence.

We can sum up by saying that the National Health Service is now the law of the land; and it is up to us, ne and all, to make it a good one. No-one can do it or us.

London, S.E.1. T. B. LAYTON.

SIR,—It is necessary to correct Mr. Layton's suggestion (Dec. 28) that the leaders of the B.M.A. have "herded" the will of the profession and influenced the plebiscite vote. The official B.M.A. communications received by me have always been restrained and non-directive, as have been the editorial articles appearing in the *British Medical Journal* on the subject of the recent Act. The correspondence published in the journal accurately reflects the opinions freely expressed at well-attended divisional meetings of practitioners.

The *Times* has applied the word "emotional" to B.M.A. policy. If the adjective is accurate it must be applied to the general body of practitioners, and I would point out that situations which conflict heavily with any individual's conviction of right and wrong will usually produce emotional response.

Stamford, Lincs. E. C. TILL.

EFFECTIVE AGENT AGAINST SCORPIONS

SIR,—For some years workers have been looking for an easily synthesised chemical to replace the expensive and scanty pyrethrum and derris, which up till now have been the most effective agents against the scorpion. We have investigated the suitability of 'A.L. 63' (D.D.T. 10%) and a new insecticide 'Gammexane' (the gamma isomer of benzene hexachloride), both of which are manufactured by Imperial Chemical Industries Ltd. The effect of A.L. 63 on scorpions was found to be very weak.

Gammexane, on the other hand, has proved extremely effective. It is a free-flowing powder with excellent dusting properties, harmless to man and the higher animals under normal conditions of use; experiments on rats, rabbits, and guineapigs have established the lethal dose at 20 g. per kg. body-weight, or about 3 lb. for an average man. The dust can be safely used indoors. Scorpions exposed to 1–4 g. of powder containing only 1% gammexane in talc are paralysed within 30–60 minutes. Greater concentrations kill the scorpions more rapidly, but the interval before death is, of course, unimportant so long as the scorpion is paralysed. Gammexane is, we submit, the chemical of choice in combating scorpions.

Faculty of Agriculture,
Fouad I University, Cairo.

H. S. SOLIMAN
A. H. MOHAMED.

VARICOSE VEINS

SIR,—In the journals of this country I can find no records regarding the prevalence of varicose veins; there have been but few references to the influence of hormones as "varicosity factors" in its ætiology; and little has been said about the relative absence of specialist treatment for the varicose patient in many parts of the country.

Recently I drew attention to the fact that during the war years diseases of veins caused the highest surgical admission-rate to our E.M.S. hospitals, 10% of all admissions being due to this cause[1]; and most of these patients remained in hospital for more than three weeks.[2] These figures are so remarkable that I approached Dr. Cecil Roberts, who has sent me the results of the examination of 10,000 candidates for the Post Office service between 1937 and 1939:

Age	Male candidates			Female candidates		
	No. examined	With varicose veins		No. examined	With varicose veins	
		No.	Percentage		No.	Percentage
Under 25 ..	1839	5	0·27	4785	55	1·14
25–34 ..	2143	37	1·72	117	9	7·68
35–44 ..	1166	37	3·18	66	11	16·6
45 and over	56	3	5·35	32	9	28·12
Total ..	5195	82	1·57	5000	84	1·68

Here there is self-selection, since both men and women knowing that they suffer from varices would probably not offer themselves for this employment. We may take it therefore that the incidence among the general public is very much higher. These figures show that more than a quarter of the women of 45 and over suffer from varicose veins,—a very big increase over that in women between 35 and 44. There is no doubt that the menopause brings to light many cases.

Further information is required about the influence of hormones on varices. The fact that varices tend to swell at puberty, during menstruation, in early pregnancy, and at the menopause is accepted. During the premenstrual phase every woman is in a state of pseudopregnancy, and one may regard the menstrual flow as a miscarriage of the unfertilised ovum. The enlargement of varices in the premenstrual phase and in the early days of pregnancy may therefore be accounted for by the same hormonal influence. The action of progesterone on the plain muscle of the uterus is recognised, and its action on veins is probably similar.

Varicose veins may become severe in the early days of a pregnancy, before mechanical pressure or pelvic congestion has occurred. By contrast, it should be noted how little effect a large fibroid or an ovarian cyst may have on a varix, in spite of the pelvic pressure. Recently, I saw a young girl in the prepuberty stage with severe varices; six months later periods commenced and the varices retrogressed in a sensational manner.

Dr. Marizita, of New York, has been treating the varices of pregnancy with alpha-œstradiol dipropionate

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1. *Brit. med. J.* 1946, ii, 680.
2. On the State of the Public Health during Six Years of War. H.M. Stationery Office. 1946.

('Di-ovocylin '),[3] and claims remarkable improvements in most of his cases.

We need more careful statistical surveys of this prevalent condition. Without further figures we cannot analyse the many factors which together cause the vein to follow its wayward path to varicosity.

London, W.1. R. ROWDEN FOOTE.

DETECTION OF EARLY PULMONARY TUBERCULOSIS

SIR,—To one who has watched, during the past twenty years, the progress of efforts to detect pulmonary tuberculosis at an early stage it seems regrettable that, with the introduction of miniature-film mass radiography, the merits of serial screening have almost sunk into oblivion. I do not know of any published comparative studies on the efficiency of the two methods; but the average figure (0·3 %) of active cases needing immediate treatment obtained by screening (fluoroscopy), quoted by Clark et al.[1] and presented in earlier statistics, is not much below that obtained by miniature-film radiography (0·4 %).[1] If optimal adaptation of the eye is secured by a preparatory period of at least 15 min. (a prerequisite which must be rigorously adhered to), and if the working capacity of the retina is not overtaxed (flagging may be expected after 100 min.), inflammatory and caseous lesions as well as retrogressive (fibrous or calcareous) changes are easily discernible on both the miniature film and the screen. For the detection of isolated thin-walled cavities, screening, with its possibilities for turning and tilting the patient, may in some cases provide the better chance, and the same is true for small foci on a level with the clavicle, but on the whole the *miniature film must be considered more* efficient.

An experienced tuberculosis worker who spends two or three hours a week in serial screening can deal in a year with about 2500 persons—not a large proportion of a district community but still, in view of the limitations of mass radiography, a valuable contribution to the programme of discovering new cases.

Most patients who come to the sanatorium as a result of mass radiography, in my experience, have hard lesions of dubious activity or fresh inflammatory consolidations. We have been told[2] that mass radiography reveals pulmonary tuberculosis in its earliest recognisable form and at a stage seldom discovered in ordinary routine work. The clearly defined or more diffuse shadow of the "early infiltration" may well be regarded as the starting-point of the progressive phase, and the importance of its demonstration in the precavernous phase can hardly be overrated. But according to prevailing opinion it represents a secondary development, superimposed on the pre-existing foci of the nodular seeding, which is, as a rule, the initial lesion of the postprimary epoch and remains symptomless till the localising inflammatory exacerbation ("early infiltration") appears. Even the full-size film is not always conclusive about the fresh granulomatous spread; only when the nodules have reached a certain density will they produce the distinct tenuous "mottling." On screening, a slight ill-defined opacity may raise suspicion, in which case liberal use should be made of the full-size film. I have seen, within five years, among sanatorium admissions due to mass radiography, only 2 cases of this "earliest recognisable" form of postprimary tuberculosis—i.e., the seeding not yet aggravated by inflammatory or destructive changes. Figures showing to what extent it can be recognised on miniature films would be welcome. It is reported that development of progressive lung disease has been observed immediately after the patient had passed a mass-radiography test with negative result; probably a delicate non-inflammatory spread had escaped detection on the miniature film.

If the case-finding methods comprised under the term "routine dispensary work" are fully used; if persons exposed to massive infection are followed up longer than a mere few years after exposure and especially during the critical period between the ages of 15 and 25, and if hidden sources of infection are searched fo every way, including serial tuberculin-testing, the initial stages of postprimary lung tuberculosis detected not less often by the district tuberculosis than by the mass-radiography unit. Of course, if work contents itself with examining applicants who developed symptoms, the early stages will not discovered.

These remarks are not designed to raise oppositio the further development of mass radiography, the value of which for finding new cases is not di Serial screening should be regarded as a useful and no means obsolete substitute so long as there are sufficient miniature-film units available. To the ques whether mass radiography is superior to the rou dispensary methods in tracing the early stages of tuberculosis the last word has not yet been sp Needless to say, the question is a theoretical one; two approaches to the task must be combined.

Westmorland Sanatorium, Meathop,
Grange-over-Sands. E. FRAENKE

SINUS ARRHYTHMIA IN THE YOUNG

SIR,—Recently I have made a point of looking for si arrhythmia at all routine examinations of children, the result that in an unselected series of children young people (including 647 boys between 12 and years of age) I have found signs of what I take to be sinus arrhythmia, on deep breathing, in *every* case. Is this condition, usually described as one of frequent occurrence present in *all* children? A physician with whom I discuss this finding expressed no surprise, but I doubt if it general knowledge.

What I find *constantly present* is a rhythmical variation in heart action correlated with respiratory phase and affecting: (1) the heart-rate (maximal at the end of inspiration, and minimal at the end of expiration); and (2) the loudness of the first sound and sharpness of the second sound (both minimal at the end of inspiration, and maximal at the end of expiration). The few mur murs encountered varied correspondingly in audibility.

All of these changes were most readily evident in nervous children; in placid older boys they were largely *confined to the end-points of respiratory* excursion.

Middlesbrough. JOHN CAHILL.

A MORAL PROBLEM

SIR,—Mr. Kenneth Mellanby has added two more "moral problems" to the one originally discussed in your annotation, and it is important to realise that these problems, though related, are distinct.

On the original issue of whether useful results obtained by criminal experiments should be published or destroyed his conclusions seem essentially correct. Those taking the opposite view appear to subscribe to an over-simplified moral theory—namely, that an action must be either 100 % good or 100 % bad. Actually, any action produces many results, some good and others bad, in varying degrees. Undoubtedly the harm done by such experiments outweighs any possible good that might accrue, and they should not be performed. But they have in fact already been performed, and it is impossible to undo them. If their results are capable of being put to useful purposes, and we destroy *them*, we *are* that they have produced nothing but evil. If we publish and use them, then at least some good will have followed. No-one would suggest that information on traumatic brain lesions should be suppressed because the persons developing them have usually been the victims of attempted murder or war wounds, or would imagine that publication of such information is scientific justifica tion for murder or war.

We do not yet know what useful results, if any, the Nazi scientists have produced. But let us suppose that they have found the perfect typhus vaccine, or a really effective cure for pulmonary tuberculosis. Do Mr Layton, Dr. Nelson-Jones, or the writer of your annota tion seriously suggest that such results should be des troyed? And if so, will they explain how "our duty to our neighbour" is fulfilled by allowing him to die of diseases it is in our power to prevent? Even if the actual results are only of minor importance, the moral problem is exactly the same.

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[3] *Med. Rec.* July, 1946.

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[1] Clark, K. C., Hart, P. d'A., Kerley, P., Thompson, B. C. *Spec. Rep. Ser. med. Res. Coun., Lond.* no. 251, 1945.

[2] Davies, T. W., Davies, M. *Brit. J. Tuberc.* 1945, 39, 23.

A new point raised by Mr. Mellanby is whether erious research-workers " who have performed harmful periments on human beings without their consent guilty of a crime. He appears to doubt whether they guilty, and in an interview given before his departure Germany is represented as deprecating Russian action trying and condemning certain eminent German entists for this offence. But the answer to this is simple. he actions performed are admittedly criminal in any stem of national or international law, and scientists e as subject to the law as other persons: they can aim no personal immunity on the grounds that their imes are committed for disinterested motives.

Mr. Mellanby's reference to the use of condemned urderers as volunteer experimental subjects, though teresting, is scarcely relevant. This practice is or was gal in certain States of the U.S.A. (Goldberger's classical xperiments on pellagra are an example): and many ight be prepared to argue that it should be made legal ere on the same conditions—namely, that the condemned an be allowed entire freedom of choice in the matter, nd the death penalty remitted if they survive. There ppears to be no evidence that any such choice was llowed to the subjects of the Nazi experiments.

DENIS HERBERT
Hon. Secretary, Medical Sciences Committee, A.Sc.W.

ACUTE INFECTIOUS LYMPHOCYTOSIS

SIR,—In connexion with Dr. Steigman's paper (Dec. 28) we should like to report the following case.

The patient, a girl of 3 years, was admitted, under the care of Dr. H. H. Chodak-Gregory, on Nov. 22, solely on account of failure to gain weight during the previous twelve months. The home conditions were not good, but the child had been given iron for anæmia and vitamin C for some months as an outpatient of a London hospital.

Clinically there were few signs—one or two enlarged cervical glands and a rather bulky liver, but no splenomegaly. Routine blood examination revealed a white-cell count of 79,200 per c.mm., with 62·5% small, and 17% large, lymphocytes. The character of the blood-cells did not suggest either leukæmia (there were only 1% lymphoblasts) or infectious mononucleosis. There was no evidence of whooping-cough and no fever.

The white-cell count has gradually fallen to 16,450 per c.mm., and the proportions of polymorphonuclear leucocytes and lymphocytes are now approximately normal.

We think that this must be a case of acute infectious lymphocytosis.

Three Counties Emergency Hospital,
Arlesey, Beds.

E. V. FOYLE
R. J. REYNOLDS.

TREATMENT OF TUBERCULOSIS

SIR,—Dr. Houghton and Dr. Corrigan (Dec. 14) have shown that in certain patients amphetamine relieves apprehension—a useful contribution. It now appears that other forms of treatment which they agree are of great benefit have also extreme disadvantages: according to Dr. Brailsford (Dec. 28) these are so great as to make it advisable to treat the patients at home. That apprehensive patients are to be found among those with tuberculosis is clear, but it is going too far to suggest that a modern sanatorium is a place of universal anxiety and alarm. If it be so, it is a strange reflection on the power of the physician to suggest confidence and to raise and maintain morale. More than chemistry is needed then.

Many types of temperament and reaction are found among tuberculous patients. Only today one patient in this hospital said that he had spent such a good Christmas that he hoped he would be able to have thoracoplasty done and prolong his stay to enjoy another. This statement was no more a joke than the apprehensions of others; but it does not warrant a theory of general indifference to mutilation. I find that the majority of patients here accept the need for active interference without emotional upset and weigh sensibly the considerations which so seriously affect their future.

This is not to deny that the physical effects of tuberculosis, with its serious mortality, may be depressing, and that the social and economic distress may be severe. It is surprising that cheerfulness keeps breaking in and that wards of tuberculous patients who are in hospital for long periods contain so many who face their difficulties with understanding and balanced optimism.

Vere Pearson and Morland first helped us to understand the psychology of the tuberculous, and the former's recently published autobiography answers effectively Dr. Brailsford's question as to the place and value of sanatorium treatment. Does Dr. Brailsford think that the anxieties and stresses of the patient are absent at home? They are often ætiological factors in the illness. For many patients a spell of sanatorium treatment puts into better perspective their distorted view of their own mental and physical state. "Long rest with mental serenity" is often easier to obtain than in the home. "Think of the housewife trying to rest where she can hear every footstep . . . of the business man equally fretted by business or family disquiets" (Pearson).

Let us judge our patients according to their individual needs: some may be better at home, but many will profit by a period in a suitable sanatorium. Let us also take a reasonable view of the extent of apprehension and alarm in sanatorium patients.

Clare Hall County Hospital,
South Mimms, Barnet.

F. A. H. SIMMONDS.

POSTOPERATIVE CHESTS

SIR,—The importance of the "freedom of the bed" is emphasised in your leading article of Dec. 21. Surely this argues in favour of local or spinal as opposed to ether inhalation anæsthesia? With a local or spinal anæsthetic freedom is from the first complete, except for reflex inhibition from the operation area, and immobility of the legs with spinal anæsthesia. The patient coming round from ether narcosis, on the other hand, undergoes a varying period of complete decubitus, with associated reduction of pulmonary ventilation.

Worksop.

M. HAYDON-BAILLIE.

IMPENDING DEATH UNDER ANÆSTHESIA

SIR,—I was very interested in Mr. Hamilton Bailey's article last week, for I had a similar case some five years ago.

This was a woman of 60 for whom I did a partial gastrectomy for gastric ulcer, using spinal anæsthesia (light 'Duracaine'). I had got about halfway through the operation when she stopped breathing and shortly afterwards the heart ceased beating. Rhythmical pressure on the chest failing to produce any response, massage of the heart through the diaphragm was begun, and adrenaline was injected into the heart. We did not time the duration of stoppage of the heart from the beginning, but there was no return of cardiac contractions for 5 minutes from the moment when timing was started, and I should guess this as fully 2 minutes after the heart-beats had been noticed as absent. Weak and irregular beats then began and gradually returned to strong contractions: the operation was eventually finished without further incident. The patient was mentally confused for some forty-eight hours, but eventually made a complete recovery from every point of view.

This was an interesting though alarming experience, but the real interest lay in the method I used to restart the respiratory movements. As there was no response to the usual methods and my hand was in the region of the œsophageal opening in the diaphragm I dragged on this muscle with my forefinger placed in the opening, and immediately it was obvious that the lungs were being well inflated at each stroke. Alternately drawing down the diaphragm and relaxing it kept up artificial respiration most effectively, and with so little expenditure of muscular effort on my part that it could have been kept going for hours with ease had it been necessary; in about 10 minutes spontaneous respirations were established.

On two occasions since (without cardiac stoppage) I have found the same manœuvre act most efficiently, and in my opinion it is much the most effective way of restarting breathing in any case in which the abdomen is open. I have not seen or heard of this method being used before, though it is an obvious thing to do, and it is certainly most efficient.

Leeds.

E. R. FLINT.

Obituary

OLE CHIEVITZ

M.D. COPENHAGEN

Prof. Ole Chievitz, senior surgeon of the Finsen Institute, Copenhagen, who died on Dec. 27 after a short illness, was known not only as a brilliant doctor but as a leader in his country's resistance to German domination.

Born in 1883, the son of J. H. Chievitz, the anatomist, he came of a family closely linked with the best cultural traditions of Denmark. He qualified at Copenhagen in 1909, and was for many years Rovsing's first assistant. He was appointed to the Finsen Institute in 1921, and in the years that followed became surgeon at the Radium Institute, lecturer in surgery at the University of Copenhagen, and, when war threatened, adviser in surgery to the Civil Air Defence. In the 1918 and again in the 1939 Russo-Finnish wars he commanded Danish red-cross ambulances in Finland. He was chairman of the Danish Surgical Society from 1934 to 1936, and was awarded honorary degrees by the universities of Copenhagen and Oslo.

The invasion of Denmark in April, 1940, was followed by a period of utter despair. It seemed hopeless to resist the ruthless invaders who were overrunning one country after another. But Chievitz soon made his decision: "I have chosen. I am going my way, whether many or few are coming." The downhearted and bewildered were decisively influenced by this positive lead from a man who was loved and respected. His contempt for the Nazis and his faith in their enemies was expressed without fear or restraint; in the days of the London blitz he would end his lectures in surgery with: "Tell your friends that the British are going to win the war—that's what Chievitz says."

Soon he was actively engaged in illegal work. In 1942 he was arrested as a member of the staff of the important clandestine newspaper *Frit Danmark*; he was gaoled for four months, then sentenced to eight months' imprisonment. The Germans, still arrogant, released him as a harmless idealist. This "harmless idealist" happened to be organiser of the Allied intelligence service in his country and a leader of the Special Forces—parachutists sent from Britain.

Chievitz's imprisonment caused thousands to join the resistance. After release he resumed his ordinary hospital work and joined the Council of Liberation. The council, which was the underground government, had twelve members, of whom three were professors of the medical faculty at Copenhagen—Chievitz and Husfeldt, both surgeons, and Fog, the neurologist. In July, 1944, Chievitz himself had to go underground. He suffered all the hardships and privations of a hunted man, and was involved in close gunfights with the Gestapo. By his nom-de-guerre, "Jens," he was known to many British airmen who were rescued and returned to Britain by his organisations. With untiring energy he continued to collect and transmit invaluable intelligence to the Allies until, on May 5, 1945, Denmark was liberated; his task completed, he resigned his commissions.

As a surgeon Chievitz had a comprehensive knowledge and experience, and an enthusiastic but critical turn of mind. Though writing little, he influenced developments in the surgical treatment of cancer, tuberculosis, and endocrine disorders. He was loved by his patients, students, and assistants: to have been Chievitz's assistant was in itself a high qualification.

His understanding of his fellow-men was broad and forgiving. His wit was legendary; though usually kindly, it could be a lash. To those who came for help or advice he gave without stint; the despairing he consoled. The daily problems in hospital, the minor tactical questions in the fight—these would cause him doubt and anxiety. But in moments of decision he struck like lightning. Heedless of danger, and claiming nothing for himself, he carried out his task. This ever-burning heart was the true greatness of Chievitz, who took his stand where there seemed to be no hope.

K. H. K.

Appointments

BARNES, JOSEPHINE, D.M. Oxfd, F.R.C.S., M.R.C.P., M.R.C.O.G.: gynæcological surgeon, Elizabeth Garrett Anderson H. London.

BREWER, ANGUS, M.R.C.S.: clinical pathologist, Hampstead Ge and North-East London Hospital.

CRAWFORD, F. J. H., B.SC., M.D. Lpool, D.P.H.: M.O.H. and M.O., Radnorshire.

HENDERSON, WALTER, M.B. Edin., F.R.C.P.E.: pædiatrician, Y County Hospital, York City General Hospital, and Y Maternity Hospital.

LIPSCOMB, J. F., M.B. Sydney, F.R.C.S.: otolaryngologist, Ke county council.

MULVEIN, MARGARET, M.B. Glasg.: asst. school M.O., North Ri education committee.

NICOL, C. G. M., M.B. Lond., D.P.H.: M.O.H. and school M. Barnsley.

SHERNE, JACOB, M.B. Leeds, F.R.C.S., D.O.M.S.: ophthalmic surge Leeds Public Dispensary and Hospital.

WALLACE, H. J., M.D. Camb., M.R.C.P.: dermatologist, Ro Surrey County Hospital.

Albert Dock Hospital, London:

FREEMAN, HARRY, F.R.C.S.: senior asst. surgeon.

KELLY, P. M., B.CHIR. Camb., F.R.C.S.: second asst. surgeon.

National Temperance Hospital, London:

FREEMAN, HARRY, F.R.C.S.: asst. surgeon.

HOLLINS, A. S., O.B.E., M.B. Camb., M.R.C.P.: asst. physician.

County Borough of Croydon:

BEVAN-JONES, JOHN, M.D. Lond., M.R.C.P., D.P.H.: physician and pædiatrician.

CLIFT, A. F., F.R.C.S., M.R.C.O.G.: senior M.O. for obstetrics and gynæcology.

Kingston County Hospital, Surrey:

BOGGON, R. H., M.S. Lond., F.R.C.S.: consulting surgeon

BROWN, A., M.B. Aberd., D.A.: anæsthetist.

CALVERLEY, MARIE H., M.B. Leeds, M.R.C.O.G.: obstetric registrar

CUNNINGHAM, A. A., B.SC., M.D. Dubl., M.R.C.P., D.P.H.: medical superintendent and physician.

DOWE, J. B., M.B. Sydney, D.L.O.: asst. ear, nose, and throat surgeon.

FRANKLIN, R. H., M.B. Lond., F.R.C.S.: consulting surgeon.

HIRD, G. F., M.R.C.S.: casualty registrar.

HOLLINGS, G. B., M.D. Lond., M.R.C.P.: asst. physician.

LEASK, L. R., M.B. Lond., F.R.C.S.: asst. surgeon.

McKENZIE, W. S., M.B. Camb., F.R.C.S.: consulting ear, nose, and throat surgeon.

MIMPRISS, T. W., M.S. Lond., F.R.C.S.: consulting genito-urinary surgeon.

MURPHY, W. R., L.R.C.P.I., D.A.: anæsthetic registrar.

STENHOUSE, A. B., M.R.C.S., M.R.C.O.G.: asst. obstetrician.

Manchester Royal Infirmary:

HANSEN, R. E. A. S., M.B. Camb.: medical chief asst. to medical neurological unit.

YOUNG, N. A. J., M.B. Manc., F.R.C.S.E.: asst. aural surgeon

Manchester University Centre for Study of Chronic Rheumatism, Devonshire Hospital, Buxton:

BARBER, H. S., M.D. Dubl., F.R.C.P.I.: part-time clinical director.

SUTCLIFFE, G. R. M., M.B. Durh.: senior M.O. as asst. to director.

Salisbury General Infirmary, Wilts:

BURT-WHITE, HAROLD, M.D. Lond., F.R.C.S., M.R.C.O.G.: gynæcologist.

DUFF, ALEXANDER, M.D. Glasg., F.R.C.S.E.: surgeon.

GORDON, J. G., M.B. Camb.: obstetrician.

GUBBIN, J. H., M.B. Lond.: physician.

HALL, A. S., M.D. Lpool: dermatologist.

LONGRIDGE, R. G. M., M.R.C.P.: physician.

MARTIN-JONES, J. D., M.D. Camb., D.O.M.S.: ophthalmic surgeon.

SIMPSON, A. D. H., M.R.C.S., D.A.: anæsthetist.

TAYLOR-YOUNG, H. S., F.R.C.S.: surgeon.

WAKEMAN, A. C. R., B.SC., PH.D. Birm., M.R.C.S., D.M.R.E.: radiologist.

Colonial Service:

ARCHIBALD, H. M., M.B.E., M.B. Glasg.: M.O., Nigeria.

BARBOUR, DIANA E., M.B. Lond.: lady M.O., Malaya.

BOLBOURNE, M. J., M.B.: M.O., Gold Coast.

CARSON, H. M., M.B.: M.O., Gold Coast.

FAIRBAIRN, HAROLD, M.D. Glasg., D.T.M. & H.: M.O. i/c of trypanosomiasis research station, Tinde, Tanganyika.

FURNESS, J. E., M.B. Lond.: M.O., Nigeria.

GRIFFITHS, H. W. C., M.B.: M.O., Northern Rhodesia.

HOLROYD, L. H., M.B. Glasg.: M.O., Northern Rhodesia.

ISAAC, R. H., M.R.C.S.: M.O., Malaya.

JOSEPH, W. T., B.M.: M.O., Leeward Islands.

McPHERSON, H. J., M.B. Edin.: M.O., Malaya.

MANNING, J. D., M.R.C.S.: pathologist, Nigeria.

MURPHY, J. C. V., M.B. Lpool: M.O., Gold Coast.

O'DRISCOLL, G. C. V., M.B. Dubl.: M.O., Nigeria.

RUDYARD, FREDERICK, M.B. Sheff.: M.O. grade II, British Solomon Islands.

SASEGBON, A. O., M.B. Dubl.: M.O., Nigeria.

SMART, G. B., M.B. Calcutta, F.R.F.P.S., D.P.H., D.T.M. & H.: M.O., Hong-Kong.

SMITH, E. B., M.B.: M.O., Nyasaland.

STEPHENS, P. R., B.SC., M.B. Birm.: M.O., Northern Rhodesia.

VANCROSSON, W. F., L.R.C.P.E.: M.O., grade C, Trinidad.

Examining Factory Surgeons:

BROWN, W. R., L.R.C.P.E.: Greenock.

CLIMENTI, K. J.: Windermere.

URQUHART, D. A., M.B. Edin.: Shrewsbury.

Notes and News

A FRENCH VIEW OF HEALTH CENTRES

Britain is not the only country where medical reform is the air. Dr. Marc Nédélec[1] has a plan for France which ludes the promotion of group practice and of health centres. r urban areas he recommends one centre, staffed by eight ctors. for every 10,000–15,000 population. He would divide working day into three parts: from 7 A.M. to 12.30 P.M.; m 12.30 to 6 P.M.; and from 6 to 11 P.M. On three days a ek (Mondays, Wednesdays, and Fridays) three of the ctors, X, Y, and Z, would see patients at the centre, one each of these times; on these days they would make only gent visits, reserving their routine calls for the other three rking days. Three more doctors, A, B, and C, would see tients on Tuesdays, Thursdays, and Saturdays, and visit on e intervening days. The two remaining members of the am would be juniors who would do night duty, retaining arge of patients seen at emergency calls; in the daytime ey would assist the other six. The centre's ancillary staff ould comprise two secretaries and a resident secretary-tendant for night duty.

For rural areas Dr. Nédélec proposes units of two doctors. the country the work would be divided into morning nsultations, afternoon visits, and night duty. On the basis at the visits would take longer than the consultations, e suggests that the doctor responsible for the consultations ould also be on call at night; but the two doctors would ternate in their duties. For auxiliary services he recommends midwife, with a small maternity home open to all who wish enter it, a secretary-attendant, one or two chauffeurs, and rural social worker.

Dr. Nédélec emphasises the need for the freest possible hoice of doctors and admits that his scheme may need evision in the light of this requirement. He anticipates, with he adoption of a comprehensive plan, a rapprochement etween those in preventive and those in clinical medicine. Relations between these two groups seem to have been no more genial in France than in Britain.

University of Cambridge

The following degrees were conferred on Dec. 14:

M.D.—R. I. S. Bayliss (by proxy).

M.B., B.Chir.—C. W. A. Pullan, A. S. Wigfield (by proxy); H. S. Eyre.

M.B.—A. F. Alsop (by proxy).

University of Liverpool

The following were successful in recent examinations:

M.Ch.Orth.—J. A. P. Cameron, J. P. Heron, C. Hollenberg, D. M. Jones, W. Lamont, R. Roaf, G. D. Rowley, E. W. Stout, A. K. Talwalkar, F. R. Tucker.

D.P.H.—L. Findlay (with distinction), J. Norris.

Certificate in Public Health.—E. M. Calvey, G. S. Clouston, Margaret L. Magee, W. H. Patridge, Constance M. Rampling.

D.T.M. & H.—*W. H. H. Andrews, F. H. Budden, E. M. Craggs, D. Gall, F. E. D. Griffiths, Margaret E. Holness, W. T. Joseph, S. G. Loh, A. McKelvie, J. M. S. Manson, P. R. Mohan, S. Newman, P. Pattison, J. N. Robertson, H. B. L. Russell, S. D. Sawyer, D. Scott, Alice Speight, Margot M. Stern, †R. H. Strudwick.

* Recommended for the Warrington Yorke medal.
† Recommended for the Milne medal.

Order of St. John of Jerusalem

The King has sanctioned the following promotions in, and appointments to, this order:

As Knights.—Surgeon Vice-Admiral Henry St. Clair Colson, C.B.E., M.B., Air Marshal Sir Andrew Grant, K.B.E., C.B., M.B., K.H.S.

As Commanders.—Robert Barr MacGregor, C.M.G., M.B., Major-General Philip Henry Mitchiner, C.B., C.B.E., M.D., F.R.C.S., Frederick William Morton Palmer, M.D., Colonel Allan Robert Stanley Vickers, M.B., Frances Christina Burrell McKay, M.B.

As Associate Commander.—Major Shiavax Ardeshir Paymaster, L.M.S., I.M.S.

As Officers.—Lieut.-Colonel Colin Macphail Forbes, M.B. (since deceased), Robert Nelson, M.B., John Cecil Rankin Buchanan, M.D., Brigadier Cuthbert Scales, M.C., M.B., Major John Henry Plumridge, R.A.M.C., Brigadier Douglas Gordon Cheyne, C.B.E., M.C., M.D., Richard Davies Jones, M.R.C.S., Ralph James Walker, M.B., Joseph John Mangion, M.D., Colonel Richard Irvine Poston, M.D., late R.A.M.C., Michael Colin Lavin, M.B., Henry Burton Pare, M.B., Colonel Cornelis Godfrey Lodewyk van Dyk, M.B., Lieut.-Colonel Jordan Constantine John, O.B.E., M.B., I.M.S., Colonel George Grafton Lees Stening, M.B.

As Associate Officers.—Simon Joseph Hoffman, M.R.C.S., Dr. Prabhar Kumar Chatterjee.

Royal College of Surgeons of England

A course of lectures on ophthalmology will be delivered between Jan. 20 and 27 by Mr. George Black, Dr. Dorothy Campbell, Dr. O. M. Duthie, Mr. John Foster, Dr. I. M. Michaelson, Mr. O. Gayer Morgan, Mr. Michael Oldfield, and Dr. G. I. Scott. The lectures will be given at 3.45 and 5 P.M., except on Jan. 23, when they will be given at 3.45 and 6.15 P.M.

Royal Faculty of Physicians and Surgeons of Glasgow

A lecture on Surgery of the Thymus Gland will be delivered by Mr. Geoffrey Keynes in the hall of the faculty, 242, St. Vincent Street, Glasgow, on Wednesday, Jan. 15, at 4 P.M.

Harveian Society of London

The society's annual general meeting will be held at 26, Portland Place, W.1, on Wednesday, Jan. 15, at 8.15 P.M. Brigadier H. L. Glyn Hughes will deliver a presidential address on Normandy to the Baltic from a Medical Angle.

Royal Medical Foundation of Epsom College

Applications are invited for a Challice annuity (present value £32 per annum), which is to be awarded to a medical practitioner who, on account of age, has been compelled to retire from professional work. Forms of application can be obtained from the secretary's office, Epsom College, Surrey.

Fellowships at Crichton Royal

Fellowships in psychiatry at the Crichton Royal Hospital, Dumfries, for 1947, have been awarded to Dr. Denis Martin, Dr. Eric Harrison, and Dr. Charles Lacey.

Association of Clinical Pathologists

The 37th scientific meeting of the association will be held at the National Hospital, Queen Square, London, W.C.1, on Friday and Saturday, Jan. 24 and 25.

International Society of Surgery

The society's 12th congress will be held in London between Sept. 14 and 20, under the presidency of Dr. Léopold Mayer (Brussels). The chairman of the English committee is Prof. G. Grey Turner, and the congress secretary is Mr. H. W. S. Wright, 9, Weymouth Street, London, W.1.

National Association of Maternity and Child Welfare Centres

The association is to hold a conference on parentcraft and homecraft at Friends House, Euston Road, London, N.W.1, on Thursday, Jan. 30. The chairman at the morning session, starting at 10.30, will be Miss Myra Curtis; in the afternoon Sir Wilson Jameson will be chairman. Inquiries should be addressed to Miss M. R. Lovelock, 5, Tavistock Place, W.C.1.

St. George's Hospital, London

Dr. S. D. Elek has been appointed teacher in bacteriology at the medical school.

King Edward's Hospital Fund for London

The Fund has received a further instalment of £75,000 from the Nuffield Trust for the Special Areas. Altogether £575,000 has now been received, the first £250,000 of which was, at Lord Nuffield's request, allocated to Guy's Hospital.

Fellowship at a London Hospital

Messrs. Boots Ltd., the chemists, have endowed for seven years a research fellowship of £1000 per annum at St. Mary's Hospital. Dr. R. E. B. Hudson has been elected the first fellow.

Specimens of War Injuries

The National Collection of Pathological Specimens of War Injuries, organised by the Medical Research Council, has been transferred to the Examination Hall, 8, Queen Square, London, W.C.1. (Tel.: Terminus 3270.)

Surgeon's Gift to Benevolent Association

Mr. Joseph Cunning, F.R.C.S., and Mrs. Cunning, M.B., have presented their estate, Broome Park, Betchworth, Surrey, to the Electrical Industries Benevolent Association as a memorial to their son, James Erskine Cunning, who was killed in a raid over Essen in 1941. The property will be used as a home for old people.

"British Journal of Cancer"

As mentioned in a leading article on Jan. 4, a new *British Journal of Cancer* will be the official organ of the British Empire Cancer Campaign. It will appear quarterly from next March. The annual subscription is 2 guineas, and the publishers are Messrs. H. K. Lewis and Co. Ltd., 136, Gower Street, London, W.C.1.

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1. Essai sur la Réforme de la Médecine. Paris: René Julliard. Pp. 230. Fr. 48.

Tour of Czechoslovakia

The Czechoslovak authorities are extending a hospitable welcome to a party of British doctors who will make a tour of the chief spas of that country, on the lines of a similar and very successful one that was carried out between the two wars. On this occasion the party will leave London on March 20, returning on April 8. Only a limited number of doctors can be taken. Further details may be obtained from Mr. Henry Baerlein, Bath Club, 41, Brook Street, London, W.1.

"Medical Bookman"

We have received a copy of the first number of this new periodical, which is to be published monthly by Messrs. Harvey and Blythe, 6, Hanover Square, London, W.1 (price 6*d.*). The publication hopes "to bring the reader into easy and interesting contact with the medical publications of the whole world."

Retirement of Colonel Harrison

Colonel L. W. Harrison, C.B., D.S.O., F.R.C.P.E., whose retirement from the staff of the Ministry of Health is announced, has been associated with the control of venereal diseases in England and Wales for nearly half a century. He did pioneer work in devising aids to diagnosis, and played a leading part in establishing the efficacy of "606." Early in the first world war he commanded a venereal-disease military hospital in France, and later he was adviser to the War Office. In 1919 he was appointed adviser to the Ministry of Health, and from then until 1936 he was director of the V.D. department at St. Thomas's Hospital. Last year he was presented by the American Social Hygiene Association with the William Freeman Snow medal—an annual award for "distinguished service to humanity."

Deaths in the United States

During 1945 there were 1,401,719 deaths in the United States; this was fewer than in either of the two preceding years. Heart disease accounted for 30·3%, cancer for 12·7%, and vascular lesions of the brain for 9·2%. Accidental deaths numbered 95,918, motor-vehicle accidents accounting for 28,076 (compared with 24,282 in 1944). Deaths from infectious diseases were fewer than in 1944, with record low figures for pneumonia and influenza. Tuberculosis caused 52,916 deaths—fewer than in any previous year.

Return to Practice

The Central Medical War Committee announces that the following have resumed civilian practice:

Dr. T. G. REAH, 4, Spring Grove, Harrogate.
Dr. N. LLOYD RUSBY, 135, Harley Street, W.1.

Births, Marriages, and Deaths

BIRTHS

BARNES.—On Dec. 30, at Andover, the wife of Dr. J. M. Barnes—a daughter.

ELLIOT-SMITH.—On Dec. 26, at Oxford, the wife of Mr. Arthur Elliot-Smith, F.R.C.S.—a son.

ELMES.—On Dec. 25, at Lagos, Nigeria, the wife of Dr. B. G. T. Elmes, Colonial Medical Service—a son.

FINNEGAN.—On Jan. 2, at Purley, the wife of Dr. D. P. Finnegan—a son.

FLEMING.—On Dec. 26, at Bath, the wife of Dr. R. J. K. Fleming—a daughter.

HERFORD.—On Dec. 26, at Bristol, the wife of Dr. M. E. M. Herford—a daughter.

HESTER.—On Jan. 2, at St. Albans, the wife of Mr. K. H. C. Hester, F.R.C.S.—a daughter.

NAIRN.—On Jan. 5, at Liverpool, the wife of Dr. R. C. Nairn—a daughter.

PEILL.—On Dec. 23, at Whitchurch, Salop, the wife of Wing-Commander Ralph Peill, R.A.F.—a daughter.

POWELL.—On Dec. 26, at Lagos, Nigeria, the wife of Dr. H. J. Powell—a daughter.

WOOD.—On Dec. 27, in London, the wife of Dr. Paul Wood—a son.

MARRIAGES

BUCKLER—HAMILTON.—On Jan. 4, at Weybridge, Frederick Ridsdale Buckler, M.R.C.S., to Iris May Hamilton.

ECKSTEIN—SAWARD.—On Dec. 28, in London, Friedrich Max Peter Eckstein, M.B., to Beatrice Saward.

DEATHS

GIBSON.—On Dec. 28, at Haslemere, Surrey, Edwin Arthur Gibson, M.D. Glasg., aged 76.

SCOTT.—On Dec. 31, at Stagsden, Arthur Bodley Scott, M.R.C.S., aged 61.

TRAILL.—On Jan. 1, at Bagshot, Cecil Grahame Traill, M.B. Edin., aged 86.

WILKINSON.—On Dec. 28, at Newton Abbot, George Tandy Wilkinson, L.R.C.P.E., L.R.C.S.I., aged 87.

Arrangements in Scotland for Yellow-fever

The Department of Health for Scotland have arranged centres in Edinburgh, Glasgow, and Aberdeen where t intending to visit yellow-fever areas may obtain free inoc tion. Additional centres are to be established at Dundee Inverness.

Reorganisation of Dover Hospitals

By an arrangement which came into effect on Jan. the Royal Victoria Hospital, Dover, is dealing with sur conditions, while the county hospital is accepting med cases. The agreement, which is thought to be the first of kind, includes the pooling of resources, so that med nursing, and medical-auxiliary staffs will be interchangeab

Rutin Tablets

Rutin, a flavonal glucoside isolated from the flowers leaves of buckwheat, has given *promising results* in treatment of capillary fragility associated with hypertens (see *Lancet*, 1946, ii, 16). Messrs. Allen and Hanburys L have now placed on the market tablets containing 20 mg. rutin, issued in bottles of 100 tablets. They note that rutin less effective if vitamin-C deficiency is present, so care shoul be taken to see that the patient has an adequate intake of that vitamin.

Diary of the Week

JAN. 12 TO 18

Monday, 13th

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1
8 P.M. Pathological meeting.

Tuesday, 14th

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5 P.M. *Experimental Medicine and Therapeutics.* Dr. J. C Waterlow: Nutritional Liver Disease in West Indian Babies. Dr. H. Heller, Dr. S. E. Dicker: *Renal and Hepatic Lesions in Relation to Dietary Deficiencies.*
5.30 P.M. *Psychiatry.* Dr. James Tanner: Morphological Level of the Personality.

EDINBURGH POSTGRADUATE BOARD FOR MEDICINE
5 P.M. (Royal Infirmary) Prof. F. A. E. Crew, F.R.S.: Death in the Blue Book.

Wednesday, 15th

ROYAL SANITARY INSTITUTE, 90, Buckingham Palace Road, S.W.1
2.30 P.M. Prof. R. H. Parry: Health Centres.

BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck Street, W.1
5 P.M. Prof. W. V. Mayneord: Applications of Atomic Phys in Medicine. (Third of six lectures.)

HARVEIAN SOCIETY OF LONDON
8.15 P.M. (26, Portland Place, W.1.) Brigadier H. L. Glyn Hughes Normandy to the Baltic from a Medical Angle. (Pres-dential address.)

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW, 24 St. Vincent Street
4 P.M. Mr. Geoffrey Keynes: Surgery of the Thymus Gland

Thursday, 16th

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields W.C.2
5 P.M. Mr. R. H. Franklin: Congenital Atresia of the Œsophagus (Hunterian lecture.)

ROYAL SOCIETY OF MEDICINE
5 P.M. *Dermatology.* Cases will be shown at 4 P.M.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, 26, Portland Place, W.1
8 P.M. Mr. R. C. Muirhead Thomson, D.SC.: Recent Knowledge about Malaria Vectors in West Africa and their Control

BRITISH INSTITUTE OF RADIOLOGY
8 P.M. Mr. T. Holmes Sellors, Dr. D. Evan Bedford, Dr. J. Duncan White: Cardiac Radiology.

SOCIALIST MEDICAL ASSOCIATION
7.30 P.M. (296, Vauxhall Bridge Road, S.W.1.) Dr. J. N. Morris Social Aspects of Juvenile Rheumatism.

Friday, 17th

ROYAL SOCIETY OF MEDICINE
8 P.M. *Obstetrics and Gynæcology.* Mr. J. D. S. Flew, Prof. H. N Lloyd, Dr. Peter Denham, Mr. G. F. Gibberd: Management of the Normal Third-stage Labour and of the rhage Therein.
8 P.M. *Radiology.* Dr. Stanley Nowell: Tomography. Dr. A Elkeles: Disseminated Ossified Nodules in the Lung associated with Mitral Stenosis.

FACULTY OF RADIOLOGISTS
2.30 P.M. (Royal College of Surgeons.) *Diagnosis section.* Mr. J. J Mason Brown: Arterial Injuries (with reference to Arteriography in the Diagnosis).

LONDON CHEST HOSPITAL, Victoria Park, E.2
5 P.M. Dr. K. F. W. Hinson: Pathology of Solitary Tuberculo Foci in Lung.

Saturday, 18th

LONDON COUNCIL OF SOCIAL SERVICE
10.30 A.M. (Bonnington Hotel, Southampton Row, W.C.1) Conference: Special Forms of Catering for the Aged Invalids, and Infirm.

THE OUTLOOK FOR PHYSIOLOGY*

C. LOVATT EVANS

D.Sc. Lond., LL.D. (Hon.) Birm., F.R.C.P., F.R.S.

JODRELL PROFESSOR OF PHYSIOLOGY AT UNIVERSITY COLLEGE, LONDON

DURING the last half-century the exact sciences have shown an amazing growth; there is every reason to suppose that their active growth will continue, though perhaps the advances cannot be expected to maintain during the next fifty years the dramatic and revolutionary quality which has marked the progress of these sciences during the first half-century. A feature of the second half of the century that is widely expected to be without any precedent in the history of mankind, however, is the application of the results of research in the pure sciences to the needs of man, and the ultimate fulfilment of the promise of a world of leisure and plenty. Parenthetically, no biologist can be blind, though it is a convention to pretend to be, to the obstacles in the way of a realisation of these hopes—the prerequisite changes in the structure of society and even in the nature of man himself—for history shows that the pains of war, like those of labour, are soon forgotten under the compelling force of primal instinct.

The biological sciences have also progressed in an astonishing manner and at ever-increasing speed. Their progress has in no small measure been a consequence of the advances in the exact sciences, on which they largely depend for techniques and for conceptions in which to express their results. The striking features in the developments of the last fifty years have been, on the one hand, the bewildering increase in detail and complexity in every subject, and, on the other hand, the growing recognition of the unity of all knowledge. The frontiers between the exact sciences, and between them and philosophy, have become shadowy, and the same holds good for the biological sciences. Science is one and indivisible, and physiology, as one branch of it, has been involved in the general trend.

The biological sciences possess, to a greater degree than the more fundamental sciences, qualities of growth, differentiation, and plasticity. This is not surprising in view of the properties of the living material which it is their purpose to study, and which preclude them from making arbitrary simplification of their problems. The exact sciences grow in detail, and therefore in bulk, as they get older; but, despite some vagueness at their boundaries and some degree of subdivision internally, each of the main subjects exhibits a uniform discipline and a centripetal coherence. Thus, despite its growth, chemistry remains one science. The biological sciences show rather a centrifugal tendency, a proneness to divide by fission to form new subjects, or at least to give new names to old branches.

PROGRESS OF PHYSIOLOGY IN THE LAST FIFTY YEARS

Let us glance at physiology of fifty years ago and try to contrast it with its present state. During the 17th and 18th centuries this country had made to the medical sciences contributions quite out of proportion to the size of its population, and many of these discoveries fell within the province now called physiology. In the 19th century we fell far behind the Continent in these studies, and only began to regain ground during its last three decades. At the turn of the present century things were improving rapidly; there were in this country some distinguished physiologists, then ageing, who had been instrumental in the recent revival and were greatly to influence the future development of physiology. Foremost among them were Sir John Burdon Sanderson, of Oxford, and Sir Michael Foster, of Cambridge, both of them former pupils of Sharpey at University College, London, and both original members of the Physiological Society, founded in 1876. Foster, a prime mover in this, had also been largely instrumental in starting the *Journal of Physiology* in 1878, and the International Congress of Physiology in 1889; this was due to hold its fifth meeting at Turin in 1901. Of middle age and still actively at work, there were, for example, Schafer, recently appointed at Edinburgh, Gaskell, J. S. Haldane, Gotch, Halliburton, Yeo, Langley, and Brodie. At earlier years of their careers were the intense generation comprising Dale, J. Barcroft, Bayliss, Pembrey, Leonard Hill, Sherrington, Starling, Hopkins, Thomas Lewis, then very young, and many others.

A glance at the papers published in Great Britain at the turn of the century shows interesting features of comparison with one for the years 1938–39. In 1900 the bulk of the papers contributed came from Cambridge, Oxford, and University College, London; by 1938–39 the contributions from these sources had fallen from about 70% to about 40% of the whole, but those from special research institutes now took about 12% and communications from abroad rose from 15% to 30%. Other features revealed by this rough analysis are the great increase in the total number of publications, and the rise in the number of contributions from the provincial schools. The scale of absolute all-round increase in publication can be seen from the numbers of papers published from the physiological laboratories of University College and issued at intervals in the form of "Collected Papers"; for example, vol. xii, 1900–02, contained 30 papers, whereas vol. xxxiv, 1937–39, listed 97. The increase in output is still more striking in the case of the provincial schools.

The reasons for the uneven distribution of activity in 1900 are various. Though for the preceding fifty years physiology had been pursued actively in several Continental countries, especially Germany and France, it was, in 1900, only about a quarter of a century since the first separate chair of physiology had been founded in England. This was in 1874, at University College, London, the first occupant being Burdon Sanderson. Michael Foster occupied the first chair in Cambridge in 1883; the Waynflete chair at Oxford was also created in 1883, and its first occupant was Burdon Sanderson. These three places, University College, London, and the universities of Oxford and Cambridge, thus took the lead in founding modern British physiology. In Scotland physiology was well established. The provincial schools in England, however, lagged very far behind as regards space, equipment, and personnel, and it was a solitary and uphill task for any of the few whole-time physiologists to attempt to engage in research work in physiology in any provincial university or medical school in those days. Nevertheless Sherrington did classical work at Liverpool.

One factor which accelerated the development of physiology was the antivivisection activities which led to the Royal Commission of 1875 on experimentation on living animals. The influence was for good, inasmuch as it drew physiologists together and so led to the foundation of the Physiological Society in 1876, and because the Act of Parliament (39 & 40 Vict. Cap. 77) to which it gave rise has since served to regulate and protect experimentation and to make not only the perpetration of cruelty but also the systematic persecution of investigators less easy.

The position is vastly encouraging now compared with what it was in the opening years of the century; every provincial school has laboratories, some of them large and finely equipped, in all of which work is actively in progress; there are well-equipped institutes for pure research, and several commercial undertakings have also set up efficient laboratories for routine and applied research work.

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* Abridged from the second Bertram Louis Abrahams lecture delivered at the Royal College of Physicians of London on July 16, 1946.

Another contrast between the publications in physiology in 1900 and now is an increase in the average number of authors to a paper. The change, which is world-wide, is due to the increasing complexity of all investigation, with the result that most types of modern investigation are beyond the powers of a single worker. In a measure also it is an expression of the fashion for "schools" of research, in which a leader expresses his talents through the medium of his pupils, and often for their benefit. The practice, in this country, of placing authors' names in alphabetical order certainly prevents a display of permutations and combinations of names in multiple publications, but it has the drawback that for purposes of bibliographical reference all but the first author, when there are more than two, are relegated to the anonymity of "et al."

The type of work done has shown a great change too in the half-century now nearing its close. By 1900 the tide of experimental work on muscle and nerve had for the time being spent itself, and most of the work in hand involved acute experiments on mammals, or else was of a biochemical nature; there was but little done on the human subject. It was a phase, somewhat belated as compared with the Continent, of exploration of the fundamental phenomena of mammalian physiology. In this phase British physiology soon took a place second to none in the world and held it for several decades. Flexner (1912) wrote: "the medical sciences are cultivated in Germany for their own sake. . . . With the single exception of British physiology, the medical sciences in Great Britain and France, on the other hand, have remained in an instrumental relation to medicine and surgery. . . . The history of British physiology proves conclusively that what is best for a subject is best for all the varied purposes which directly or indirectly it serves."

At the opening of the century the most highly developed branches of British physiology concerned muscle-nerve physiology, circulation, and histology. The pathfinding studies of Sherrington on the nervous system, Haldane on respiration, Barcroft on the blood, Bayliss on general physiology, and Starling on experimental physiology were in their early beginning; a host of other major subjects, including later, and within the last 30 years, the whole topics of the vitamins, the endocrines, and reproduction, were to follow.

BIOCHEMISTRY

The growth of biochemistry was also deferred, largely because an insufficient number of first-class chemists took interest in the unpromising messes, incapable of crystallisation or distillation, with which the physiological chemist then had to deal. So physiologists at the opening of the century did the best they could with them. Biochemistry and physiology are, in my opinion, so closely linked as to be incapable, without damage to both, of complete separation from one another. But the essentially chemical background of modern biochemistry has led to its being set up in separate departments in many of our schools. This separation has proved all to the good in the advancement of biochemical research; but, in so far as it might lead to the loss of interest in important branches of their subject by physiologists, regrettable gaps in the teaching of it may become possible. We can only try to hold the subjects together from both sides as best we can.

The importance of applications of chemistry to physiology is shown by a consideration of its contributions to the advances in the whole outlook of physiology in the present century. At its outset the nature of carb hydrates and proteins was being worked out; int mediary metabolism was scarcely touched; the wor "hormone" and "vitamin" were not yet coined tissue oxidations were almost a sealed book; practic nothing was known of the functions of the "ductl glands," the physiology of reproduction, or the for tion of urine; micro-methods of analysis had yet been introduced; from the chemical aspect, phenomena of muscular contraction, now an intric and still largely unsolved puzzle, were a clean sla the known enzymes were few and of simple action; whole subject of physical chemistry, which was to f such extensive applications in biological inquiry, was its earliest beginnings, and even organic chemistry h barely reached a stage of technique at which it co begin to be a reliable help in the attack on biologi problems.

BIOPHYSICS

It now seems that, just as physiology budded off fr anatomy and then itself threw off, as an offshoot, t subject of biochemistry, so now it is preparing to devel another new branch called biophysics. Moreover, t fear has been expressed that, what with the handi over to specialists, each "maintaining with no lit heat his various opinions," of such branches as histolog biochemistry, general physiology, clinical science, nut tion, experimental pathology, pharmacology, endocrin logy, and so forth, any further branching will impe the parent trunk. My view is that this fear represen a parochial view and that the ultimate parent trunk knowledge. Perhaps some hard pruning of old woo might encourage still more vigorous new growth, especiall if combined with judicious "disbudding." Thoug biophysics is now an active growing-point, it is to early to say whether it will earn for itself a separat place as a subject for undergraduate study. When has produced such fruit as biochemistry has done, shall know that it has earned such a place. In th meantime it should be nourished and shielded from th east wind; the results of its research work will valuable in any case.

Sometimes the biochemical and biophysical approach to a problem lead apparently to different conclusio Take, for instance, the important question of neu muscular or interneuronal transmission. The chemic line of inquiry leads to the opinion that transmission excitability depends on the liberation of acetylcholin which is in due course destroyed by choline esteras Biophysical study, on the other hand, leads to the co clusion that the phenomenon is mainly electrical, a that, in neuromuscular transmission, for instance, t potential changes constituting the nervous impulse le to the establishment of end-plate potentials which, their magnitude, timing, and location, are adequa to stimulate the adjoining muscular tissue. It is n improbable, however, that the divergence betwe these two points of view is less in reality than in appea ance, and I fully believe it will ultimately be show that physical and chemical changes are the comm accompaniments of a fundamental physico-chemic change, the nature of which is yet to be revealed.

In 1870 Bert wrote: "Physiology must defend its from two dangers: absorption by zoology and absorpti by medicine, the second the most to be feared." No if physiology is in danger of absorption, it is by physi and chemistry. This is no doubt its ultimate destin but that lies very far ahead.

TEACHING OF PHYSIOLOGY

So far as the instruction of medical students is co cerned, I feel no qualm whatever that physiology w long maintain the place it has won as a focal point preclinical education. Class teaching of physiolog specially the practical work, has undergone a revolution n our five decades. At the start of the century, histology occupied a place of first importance; experimental work consisted almost entirely of frog nerve-muscle physiology; physiological chemistry of urine-testing and spotting of dietary components. So far as I know, no mammalian experiments were ever demonstrated, still less performed, by the student. Human physiology was represented, if at all, by exercises with simple clinical nstruments, such as the sphygmograph, ophthalmoscope, or laryngoscope. In lectures, histology, elementary embryology, muscle and nerve, and circulation occupied nearly all the time. The divorce from clinical interests was almost complete.

How different is the picture now. Half a century ago the phenomena studied were either evident to the unaided senses, or could be made so by the use of the most simple and unequivocal devices; now they are often beyond the range of the unaided senses and require complex tools and specialist knowledge for their study. If the insignia of the physiologist were then the microscope, smoked drum, inductorium, and a bottle of ammonium sulphate, today they might be the electron microscope, cathode-ray tube, photo-electric cell, manometric apparatus, and Geiger counter. If his small units were then the millimetre, milligram, and second, and his results communicable in simple words or numbers, today his units are often a thousandth of those, and his results expressed in logarithmic scales and nomograms, or in conventional statistical form.

In lectures much attention is still given to blood, circulation, and respiration, and relatively little to nerve-muscle; the nervous system, diet and digestion, metabolism, the endocrines, and reproduction take increasingly important places; applications to clinical subjects, daily life, industry, &c., are emphasised, and clinical demonstrations are arranged. Histology and embryology are taught by specialists, and often in connexion with anatomy. Adequate courses in organic chemistry and biochemistry are held; talkie films are on the way as a regular feature of instruction; and mammalian and human experiments performed by the students occupy a conspicuous place. Emphasis is laid on the nature of scientific evidence, including that derived from statistical inquiry, and on the significance of the controlled experiment.

What can one expect for the future? The rapid expansion of biochemistry and the gathering speed of development of biophysics lead us to ask what will be the relation of these to physiology, and the position of physiology itself, if they develop along lines which take them far from common ground with physiology. This, I think, is almost certain to happen eventually, and in the interests of progress we should not deplore such an unfolding. What might be deplorable would be the possible effects of such developments on physiology as the study of function, particularly in relation to medical education. It is not so much the partitioning of physiology into biochemistry and biophysics that is to be feared, as the dwindling of the outlook on integrated function which might ensue from such a partitioning.

It may be that in the very distant future some broad generalisations will emerge, as a result of which all physiological phenomena will be capable of expression in a few mathematical formulæ and chemical equations; but such a final crystallisation could only emerge from a mother-liquor supersaturated with exceedingly abundant and intricate detail. In the protracted meantime it seems to be essential that the study of normal function be held together in the form of a subject which, whatever its name, will be a lineal descendant of the physiology of today. The right solution in these circumstances will be the introduction of a centripetal tendency to counteract the centrifugal one. If biochemistry, and ultimately biophysics, move away beyond the ambit of physiological interest, it will be necessary to bring back such portions of those subjects as may by that time be essential to, and within the comprehension of, the physiologists, or which have ancillary value to him as tools. This will conveniently take the form of establishing, within physiological departments, sections which will deal with biochemistry and biophysics in relation to the study of function as understood by physiologists. This has already been done in some places; but I think that a close collaboration between departments of physiology, biochemistry, and biophysics (when research units in that subject arise) is at present practicable and is the better solution. An essential condition, however, is propinquity.

As regards teaching, I see, in the future, adequate laboratories for practical instruction in all our medical schools, some as yet uncreated; selected classes of future research-workers receiving a broad training based on a sound foundation of exact science; a regular supply of healthy animals for experimental work; specially planned laboratories for instruction and research in human physiology; new techniques of biophysics to enable a student in a few hours to grasp and confirm the conclusions of a lifetime of earlier researches, just as easily as today he can in a few experiments confirm the findings which it took the immortal Harvey years of patient toil to reach. I see, in the very near future, the teacher aided by talkie films, in colour, prepared by experts; frequent interchanges of lecturers between schools in this and other countries; symposia and seminar teaching largely substituted for lectures; and young investigators and selected students given facilities to study abroad.

Another aspect of physiological teaching which will, I believe, become more important in the future is the dissemination of physiological knowledge among the general public. The need for it has been brought home to us by the war, especially in relation to diet. Whoever has heard the cheery common-sense talks by the "Radio Doctor" must have realised the value of such knowledge and its potential appeal to a wide circle. Writers from Huxley (1854) to Krogh (1939) have emphasised the desirability of instruction of the public in the knowledge of their own bodies. In Denmark such instruction is general in schools, and I should like to see it become general here.

RESEARCH

In the research field, we may expect important advances in the applications of physical chemistry to the study of the dynamic equilibria in cells and tissue fluids. Biochemical and biophysical analysis of the mechanisms of tissue activity should also add greatly to our knowledge; much has already been done by way of unravelling the phenomena concerned in muscular contraction and in the transmission of excitatory states; but, complex as the findings now appear to be, it cannot be supposed that anything more than a scratching of the surface has been achieved, or that investigation of other processes, such as secretion, would not yield an equally rich harvest.

We can expect a good deal of experimental work on man, and this of three types. First, a continuation of work already begun on a considerable front, which, briefly, amounts to the re-examination, using human subjects, of the salient facts of classical physiology worked out on other species, mostly under anæsthetics; results already reached have, to a surprising extent, vindicated the findings of classical physiology. Some of this work can be carried out on normal subjects without much inconvenience; for example, the circulation in skin and muscle can be studied, and many aspects of the physiology of circulation, respiration, digestion, and urine formation investigated. For some of the work we are indebted to the restless ingenuity of surgeons, who have severed most of the nerves, fistulated the hollow viscera, cannulated the tubes, and removed in part or whole, intentionally or otherwise, most of the organs of the body. For example, it has been shown in man that, after section of both vagi, reflex gastric secretion ceases—a classical finding of Pavlov on dogs. No-one can have listened to Penfield's recent Ferrier lecture without appreciating the fruitfulness of "combined" surgical operations on man.

Secondly, these techniques and this confirmed knowledge can be applied to the experimental study of disease, and this I take to be one of the objectives of clinical science. For example, *it has been shown that in the* anæmias the blood volume is reduced and the cardiac output increased.

Thirdly, there is the important study of the ecological factors concerned with response of man to altered conditions in the external environment—such conditions as climate, temperature, humidity, clothing, diet, pressure and composition of the air, acceleration, mechanical commotion, radiations, and so on. Many problems in this category became urgent during the war, but there is a vast territory still waiting for exploration.

In these and other ways yet to be disclosed physiologists of the future, as in the past, like true *physiologoi* will faithfully follow our great master's exhortation "*to search and study out the secrets of Nature by way* of Experiment."

All this sounds very optimistic and confident; but there is another side to the picture, and it should be mentioned, though it involves problems that confront not only physiology but also all science and many other aspects of modern life. They are summarised in the words information, coöperation, man-power, and cost.

The position regarding information is that there were before the war *36,000 periodicals devoted to scientific* subjects on the "World List" and some 25,000 not listed; of the 750,000 papers appearing in the 15,000 best-known journals "only about one-third are referred to in any one of the 300 leading journals providing abstracts or indexed" (Hutton 1946). These figures speak for themselves.

PLANNING

As regards scientific man-power, the situation has been made clear by the Barlow report to the Lord President of the Council. Briefly, this country will by 1955 probably have a minimal deficit of 26,000 scientists, unless the rate of production by the universities can be speeded up in some unforseeable way. This problem and those of cost and coöperation hang very much together.

The question arises whether the best way of dealing with a situation which verges on the chaotic might not be by some *form* of deliberate planning. It is an era of planning—not the first in our history. It is at the moment merely very self-conscious and impatient. But remember the advice given by Shakespeare:

> "... Much more, in this great work,
> Which is, almost, to pluck a kingdom down
> And set another up, should we survey
> The plot of situation and the model,
> Consent upon a sure foundation,
> Question surveyors, know our own estate,
> How able such a work to undergo,
> To weigh against his opposite; or else
> We fortify in paper and in figures,
> Using the names of men instead of men,
> Like one that draws the model of a house
> Beyond his power to build it; who, half through,
> Gives o'er and leaves *his part-created cost*
> A naked subject to the weeping clouds
> And waste for churlish winter's tyranny."
> —*Henry IV*, part 2, Act I, Scene 3.

The resounding success of planned researches connexion with the war effort has given rise to a that planning of scientific research in general be followed by a similar acceleration in the develop of scientific knowledge. I believe such a view to incompatible with the spirit of science; none the the danger may be imminent—it has been given a "Augustus," wrote Gibbon (1776), "was sensible mankind is governed by names: nor was he deceived in his expectation that the senate and people would submit to slavery, provided they were respectfully assured that they still enjoyed their ancient freedom." The Na Health Service Act has very little to say about medical research; but the sentence *to the effect that the* Minister will be empowered to conduct research may be more pregnant than it looks.

In war we utilise, in every sense, capital reserves accumulated in peace, and the general theoretical background of science provides the intellectual capital for war-time applications of science. These exploitations, though yielding good dividends, were of the nature of development and did not constitute research at all in the sense of creation of fresh intellectual capital. The speed and precision with which these dividends were obtained was sometimes as surprising as their magnitude, and the types of war problems into which even physiology entered were many and varied. Though science was excluded from mention in the British victory parade of June 8, 1946, it is common knowledge that applications of science became matters of major importance in almost every aspect of war activity. But the success, even in these purely applied fields, was the result of a vast effort; often *it* was reached through *the good will and* initiative of individuals and teams, and rather *in spite of* than because of the administrative machinery. Ultimately all research is either a highly individual matter or one for small and closely knit teams of workers.

How then can the State fulfil its duty without having encouragement take the form of a directive? Any scientific man would answer that we need *la*boratories, equipment, and time; these it is the duty of the State to provide; give us these tools and we will, and we alone can, finish the job. We do need broad planning to give us these things. Since only we know what we want, we need strong and direct representation on such planning committees and not too much filtration through "*proper channels.*" We *do not* need *anyone* in an official position to tell us on what problems we may, or must, and, more especially, on what we may not, or must not, work. Committees of experts, however, can be very helpful to individual workers or teams by facilitating contacts, as well as by providing ways and *means.* But all research in university institutions should be entirely free from bureaucratic control in any shape or form.

One of the best ways of encouraging research work would be by the provision of research funds on a more liberal scale to all universities. *Each* scientific *department* should have a fund of its *own*, proportionate to its size and activity, for provision of facilities for its workers according to their needs.

Bush (1945), director *of the* Office of Scientific Research and Development, advances the conclusions of the committees which deliberated on a programme for post-war scientific research. "New frontiers of the mind are before us," President Roosevelt had written, "and, if they are pioneered with the same vision, boldness, and drive with which we have waged *this* war, we can create a fuller and more fruitful employment and a fuller and more fruitful life." Here was a tempting invitation to planners. The report has much praise for our Medical Research Council and University Grants Committee, which it regards as pioneers *in the State support* of research, and says: "Between World War I and World War II, the United States overtook the other nations medical research, and forged ahead to a position of orld leadership. If this leadership is to be main-ined, some form of Government financial aid to the edical schools will be necessary." The report makes commendations for an administration not unlike our forts at State support, but even more far-reaching. he committee also expressly states—and I could not gree more—"that this aid, if misdirected, may do rious harm," and "The agency should not attempt o dominate or regiment medical research, but should unction by creating greater opportunities and more eedom for investigation, and by aiding in coöperative fforts. It should not attempt to influence the selection f personnel, the conditions of tenure, the salary level, r other internal affairs of the institutions to which it ives aid. . . . The establishment of lifetime research rofessorships or of protracted research fellowships at he expense of Federal funds is considered unwise." Exceptional individuals should be supported from general esearch funds or through a grant in aid. The agency lso "should avoid even the semblance of scientific uthority. . . . Its integrative and catalytic efforts re to be carried out by recommendation and invitation ather than by direction."

In an editorial in the *New York Times*, under the title of "The Lesson of the Bomb," it was claimed that to eave scientists quite free in their work was a policy of laisser-faire. In a masterly rejoinder Dr. Warren Weaver made the position of pure science quite clear: "Even if some way were found to force scientists to work within such a system, every evidence of scientific history and scientific fact emphasises that the procedure would fail. . . . The humdrum following up of ideas and methods already at hand—this can be charted out and scheduled by men of moderate ability. But one can no more produce fundamental and truly original work by means of some grand over-all planning scheme for science than one can produce great sonnets by hiring poets by the hour. . . . The important gaps in science are the ones we do not see and cannot foresee."

MAN-POWER

Regarding man-power, the procuring of trained workers in physiology is a matter of fundamental importance in this country. The supply of physiologists is far below the demand. First, for the reason, common to the whole scientific community, that the war, as regards the production of potential scientific workers no less than as regards the creation of fresh intellectual capital, has not merely not advanced science, but also has greatly hindered it by the creation of a ten-year gap in the production of potential workers. Secondly, because the ranks of physiological research-workers are decimated by the rival claims of teaching and of cognate subjects of investigation, such as industrial applications, clinical research, pathology, &c. There is at present less provision for the production of workers than there is for the direct furtherance of research by grants in aid. The problem naturally divides into two parts: the selection of individuals, and their subsequent preliminary training.

The very best type of worker commonly selects himself, or is fairly easily picked out by his teachers. All he needs is guidance, and what sort of guidance should he be given? First of all, he must understand that physiological research work nearly always involves the use of methods of work and thought characteristic of other sciences, particularly physics and chemistry. He should therefore have such a knowledge of one or both of these subjects as to enable him at least to speak to chemists or physicists in their own language, and he should get it early. Here we meet with the real dilemma of medical education: that we are likely in the interests of the few to overload the curriculum for the many. The only solution is two kinds of medical education: one mainly fundamental for the benefit of such future research-workers, and one more directly vocational, but by no means sketchy, for the bulk who will be concerned with the urgent problems of treatment of the sick. For the more vocational group the course should be much as at present, but of a definitely more vocational character in the premedical and preclinical years. Then, if any of them wish, after all, to specialise in, say, physiology, an extra year could be spent at this subject before passing on to the clinical years. Though this last is the line we at present encourage the promising medical students to follow, it must be admitted that all too often their basal knowledge of chemistry and physics is not adequate for the needs of such a course.

The alternative, since a really complete course of training would be so long, is for physiologists and biochemists to be trained on the science side only and to stop short of any clinical training. Though it cannot be gainsaid that research-workers so trained have contributed greatly to our science, I should deem it a misfortune for physiology and for medical education in general if most of those engaged in the teaching of medical students had not themselves obtained a qualification in medicine.

ENVOI

Physiology, a science in its own right, and a main pillar in the edifice of scientific medicine, has undergone great changes in the past few decades; it has become vast and complex. It has been largely responsible for the birth of modern biochemistry and is now taking its share in developing biophysics. It has returned to a closer connexion with medicine and the phenomena of daily life, and there is a need for education of the public in elementary physiology. British physiology has a past of which we can be proud, and a future to which we can look with confidence. Its present state, in common with that of other sciences, is one of flux and perplexity; with proper material support its own fecundity will ensure that it will go on beyond these difficulties and from strength to strength. Its development cannot be planned or directed. The functional outlook which it represents, by whatever titles it may be called, will long continue to be an integrative influence in medical education and an inspiration to research.

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". . . On 30 June, 1946, when it was already beginning to decrease, the professional personnel of UNRRA numbered 1363, of which 229 were locally recruited in the countries where they worked. The international staff was recruited from 35 different countries. The countries supplying the largest number for international service were the United States (263), the United Kingdom (206), Belgium (104), France (101), the Netherlands (82), Denmark (53), Eire (39), Canada (39), and Poland (34). The Chief Medical Officers, too, were from many different countries. Among the professional personnel, 568 were physicians, 584 nurses, 60 sanitary engineers, and 40 dentists. . . . The largest individual country mission was that to China, where UNRRA had 90 physicians and 95 others of the health professions. Headquarters professional staff was small: 14 in Washington and 15 in London. All but 4 nurses were in the field.

"International teamwork in health dates back many years. Unlike most other cultural work it has not been hurt but strengthened by the cataclysms of the two world wars. It has now come of age and disasters of war are no longer needed for incentive."—*UNRRA Epidemiological Information Bulletin*, Washington, Dec. 15, 1946, p. 971.

THE SUPRASPINATUS SYNDROME

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Codman[1] pointed out that lesions of the supraspinatus tendon and subacromial bursa were the commonest cause of pain in the shoulder.

These lesions and the typical syndrome they produce still pass unrecognised far too often. This paper is based on 89 cases collected in just over three years. In 31 of them the subacromial bursa and supraspinatus tendon were exposed during acromionectomy.

The *mechanism* by which the syndrome is produced is simple. In the middle range of abduction of the humerus the supraspinatus tendon, with its covering bursa, impinges against the overlying acromion (fig. 1). When a lesion of tendon or bursa exists, this pressure causes pain, and reflex muscle spasm accompanies any movement that tends to bring the lesion into contact with the acromion.

The *pathology* of the various lesions of tendon and bursa is not so clear-cut, and probably several conditions may produce the typical syndrome. The primary lesion may be of the tendon or of the bursa; but, as these two are so intimately connected, often both may be involved.

The *cause* of most lesions appears to be trauma—usually a single contusion but occasionally repeated minor injuries. The typical history is of force applied to the abducted arm. Such an injury may produce a small tear of the supraspinatus tendon, due presumably to a sudden strain on this structure, or a tendinitis, caused by contusion of the tendon against the overlying acromion. This latter injury seems to be associated almost invariably with a subacromial bursitis, also traumatic in origin.

In some instances the lesion appears to be a typical bursitis, with a macroscopical appearance exactly like that observed in prepatellar bursitis.

Finally, calcification of the supraspinatus tendon may be degenerative, though an initial injury or repeated minor traumata may be a factor in this degeneration.

PATHOLOGICAL FINDINGS

In the 31 patients in whom the subacromial bursa was opened and the supraspinatus tendon inspected during acromionectomy the macroscopical findings were as follows:

(1) In 15 cases there appeared to be a tendinitis associated with a bursitis. In the normal shoulder the subacromial bursa is thin-walled and almost transparent, and the underlying tendon is smooth, white, and shining. In this group of cases the bursal wall appeared inflamed and œdematous and the tendon red and thickened. The bursal changes were greatest near the tendon and varied in different circumstances. In 2 cases, explored soon after injury, the œdema of the bursal floor over the tendon was so severe that the synovial lining formed red œdematous folds almost $^1/_2$ in. long. In 3 cases explored some months after injury a localised roughened reddish patch about $^3/_4$ in. in diameter was observed in the same area. Various degrees of change between these two extremes were seen in the remaining 10 cases.

(2) In 6 cases calcified deposits in the supraspinatus tendon were seen on radiological examination. When explored, the bursa in these was a little thickened and more opaque than usual. The tendon also appeared a little thickened, reddish, and less smooth than normal. No effort was made to scrape or otherwise remove the deposit.

(3) In 5 cases tears of the tendon were found. In 3 of these the tendon was partly detached at its insertion. The extent of the detachment was about $^1/_2$ in., and in no instance had there been any significant retraction of the tendon. In the remaining 2 cases small rents in the tendon were through which the articular surface of the humerus could seen.

(4) In 5 cases the primary lesion appeared to be a There was generalised thickening of the bursal wall, was red and densely adherent to the acromion. In 2 the bursa contained multiple small loose bodies similar those sometimes seen in a chronically inflamed bursa. In the remaining 3 cases the bursa contained a free fluid, and the synovial lining was plicated, œdematous and inflamed. It was not easy to differentiate this group tendinitis associated with bursitis, the main point being the changes appeared to be generalised and not localised the region of the tendon.

SYMPTOMS AND SIGNS

The cardinal signs of supraspinatus syndrome are a painful arc of movement somewhere between 60° and 120° on abducting the arm, a reversal of the normal scapulohumeral rhythm (see below), and tenderness on deep pressure over the supraspinatus tendon. Unfortunately this syndrome is not always so characteristic. The findings in the series under review can be summarised as follows:

History of Injury.—Most patients gave a history of the sort of accident already described. Except in those in whom the tendon was torn, symptoms did not arise immediately but appeared 12–24 hours after injury. Presumably at the time of injury the tendon and bursa are compressed against the acromion, but the typical syndrome does not appear before œdema has developed. At the time of injury there is often little or no pain, and the function of the shoulder is normal. For this reason patients do not always attribute their symptoms to their accident.

Pain.—Three types of pain are usual:

(1) Aching of the shoulder, usually referred to the insertion of the deltoid, but often of a much wider distribution. Pain may be referred to the whole of the outer side of the arm and dorsum of the forearm, or even to the neck. This widely referred aching pain is very real and, if this fact is not recognised, the surgeon may be misled or may unjustly suspect the patient of exaggerating his symptoms. Another almost constant feature is that the aching is most severe sitting down and in bed at night, and is less troublesome while the patient is up and walking about. I believe the reason for this to be that, when the arm is unsupported, the humerus drops away from the acromion and pressure round the tendon and bursa is relieved.

(2) Painful arc of movement. The mechanism of this has been discussed above. This finding is one of the most distinctive features of the syndrome. The painful arc is somewhere between 60° and 120° of abduction and forward flexion; the exact site and area vary a little, as does the severity of the pain. In the less severe cases there may only be a slight "hitch" at about 90° of abduction, and in many instances patients have developed a trick movement, usually full external rotation of the arm, to ease the arm past the painful point. In the most severe cases the patient cannot move the arm past the painful arc, even when lying down and assisting movement with the opposite hand. Once the arm is past the painful arc, however, movement is free, and the arm can be moved about above the head without pain. Patients do not always observe that pain is associated with certain movements—*i.e.*, with abduction and forward flexion through a certain arc—and that other movements are free, and simply complain of pain in the shoulder when the arm is moved.

(3) A sharp stabbing pain on any start or sudden movement of the arm. This is referred to the region of the subac bursa and is probably due either to a sudden contraction of supraspinatus or to a sudden jarring of the lesion the acromion. This unexpected sharp pain is one of the m annoying and troublesome features of the syndrome.

Reverse Scapulohumeral Rhythm.—Some degree reversal of the normal scapulohumeral movement constant. This is due to reflex muscle spasm on movement which tends to bring the lesion into co with the acromion. Instead of the normal humeral movement throughout the first 90° of abduction, scapular movement takes place as soon as the painful arc is approached, and the whole shoulder is typically raised.

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[1] Codman, E. A. The Shoulder, Boston, 1934.

Local Tenderness.—It is often possible to localise a deep tenderness quite sharply to the area of the subacromial bursa. By passive movement of the arm it is also possible to rub this painful area against the acromion, producing a typical pain, and this manœuvre often produces the sensation of something slipping past the acromion, a sensation which can be detected by both patient and surgeon.

True Limitation of Movement.—This greatly complicates the clinical picture and makes diagnosis difficult. The cause of a true limitation of movement is probably disuse; the patient finds that abduction is painful, and perhaps pain is so severe as to render this movement impossible, and so for weeks or even months all abduction is voluntarily avoided. As a result periarticular adhesions form, and abduction is genuinely limited, even though the original tendinitis or bursitis may have resolved.

DIFFERENTIAL DIAGNOSIS

Several conditions are often confused with the supraspinatus syndrome:

Complete Rupture or Avulsion of Supraspinatus Tendon.—As a general rule this lesion occurs in rather older men, usually as a result of a more severe injury. The condition is characterised by loss of the power to abduct the arm, together with pain on all movements. Although a painful arc is found on abduction when the lesion is brought into contact with the acromion, the chief feature is loss of power and inability to initiate or sustain abduction. It is of the utmost importance to recognise this injury at once, because immediate surgical repair of the tendon is indicated.

"*Frozen Shoulder.*"—This is probably due to a periarthritis and adhesions. There is a generalised stiffness of the joint, with pain on attempting to force passive movement.

Tuberculosis of Shoulder-joint.—This does not present the typical features of the supraspinatus syndrome; its typical features are aching, pain at the extremes of movement, muscle spasm, muscle wasting, radiographic changes (ill marked in the early stages), and a raised sedimentation-rate.

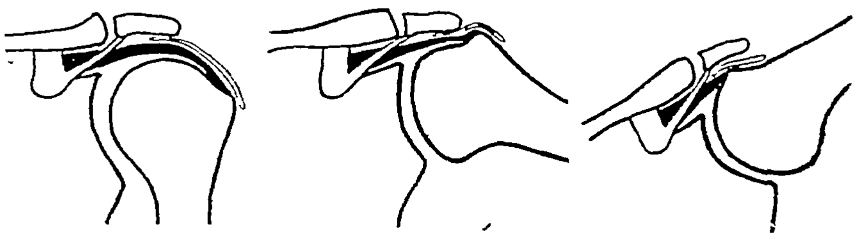

Fig. 1—In the middle range of abduction the supraspinatus tendon, covered by the subacromial bursa, impinges against the overlying acromion process.

Fibrositis.—Because of the referred pain, many typical syndromes are dismissed with the vague diagnosis of fibrositis of the arm or shoulder.

Neurosis.—It is surprising how many of these patients are dismissed as "neurotic." In many instances the wide distribution of the pain, and the fact that the patient can move the arm freely at the extremes of movement and yet complains of pain on movement, lead to the assumption that the most is being made of some trivial disability. The pain associated with the true supraspinatus syndrome tends in any circumstances to "get the patient down," and this attitude is accentuated if, on seeking medical advice, they are dismissed with little sympathy, or assured that their trouble is only mental.

PROGNOSIS

So far as prognosis was concerned, in the present series two points became clear: (1) Except when calcified deposits were present, about two-thirds of the patients with the typical syndrome recovered in 1–3 months, irrespective of treatment. The difficulty was that I could discover no means, other than by observation for some months, of telling which patients were not going to recover spontaneously. (2) Those patients in whom calcified deposits in the tendon could be demonstrated radiologically tend to recover very slowly, if at all.

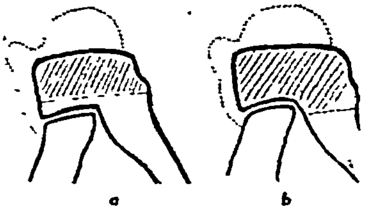

Fig. 2—The acromion can be removed in such a way as to preserve the acromioclavicular joint (a). This is not always satisfactory, and it is better to remove the acromion process completely (b).

TREATMENT

Many different methods of treating the supraspinatus syndrome have been described; and, as is to be expected in a condition in which two-thirds of the patients recover spontaneously, good results have been reported with each. In the present series many of these measures were of doubtful value. Broadly speaking, treatment can be divided into conservative and operative. The following measures were used in the conservative treatment:

Rest.—If seen in the early stages it seems logical to rest the limb, so that the lesion may have a chance to resolve without constantly being irritated and made worse by repeated impingement against the acromion. The arm may be immobilised in a sling, or in abduction either on a frame or in plaster. Immobilisation in abduction might be expected to relax the supraspinatus tendon to some extent, but in my experience this position had no particular advantages, and its use was reserved for those patients in whom a small tear of the tendon was suspected.

If a shoulder was immobilised either in a sling or a splint for too long a true limitation of movement developed, due presumably to adhesions. For this reason immobilisation was never continued for longer than three weeks, and after the first week the patient was instructed to exercise the shoulder through a full range of movement twice a day. Most patients, when lying supine, could ease the arm past the painful arc without much difficulty, and once past this point the arm could be fully abducted and exercised in this position without pain.

Active Exercises.—After a period of rest in recent injuries, or in older lesions which had not recovered completely, patients often seemed to benefit a great deal from active exercises performed under supervision. These were particularly effective in cases in which the lesion appeared to have resolved but the shoulder had become stiff through disuse.

Injection with Local Anæsthetic.—If the painful area is sufficiently widely infiltrated with local anæsthetic, the painful arc of movement can be temporarily abolished. It has been claimed that many patients are permanently benefited by one or two infiltrations, but in our experience this was not so. In no instance was a patient much relieved, and in 12 of the 31 patients in which acromionectomy was necessary repeated injections with local anæsthetic had been tried without success.

Radiant Heat and Short-wave Diathermy.—Most patients with painful shoulder are treated with radiant heat or short-wave diathermy or with both these measures at some time or other. I could not find any evidence that any patient gained anything more than temporary relief from these measures, and in many instances no effect whatever was produced.

Manipulation of Shoulder.—A gentle manipulation of the shoulder under general anæsthesia may be of some value when the lesion has subsided but the joint has become stiff through disuse. In the acute stages, however, a manipulation is dangerous and harmful.

ACROMIONECTOMY

About a third of all patients were unaffected or only partially relieved by any form of conservative treatment. In these circumstances I excised the acromion. This procedure, first suggested by Watson-Jones,[2] removes pressure on the tendon and bursa and permits a full range of painless movement. Relieved of repeated irritation the lesion of the tendon or bursa tends to heal or resolve.

The amount of acromion removed is of the utmost importance. In the first 9 patients operated on, the acromion was divided immediately lateral to the acromioclavicular joint (fig. 2*a*) so that this articulation was preserved intact. Though on examination on the table this appeared to give adequate clearance to the upper end of the humerus on abduction of the arm, in practice it was found that in some instances symptoms were only partially relieved. In 3 of these patients a second and more complete excision was performed, with complete success, and in 2 others permission for a second operation was sought and refused. In the remaining 22 patients the acromion was excised as far medially as and including the acromioclavicular articulation, with completely satisfactory results (fig. 2*b*).

Of the 31 patients operated on, 29 were completely cured, though in 3 sufficient bone was not removed at the first operation, and a more complete excision was later necessary. In 1 there was only partial relief and a tendency to pain on certain movements, probably because sufficient acromion had not been excised; but permission for a second operation could not be obtained. In 1 there was no benefit from operation, probably because sufficient bone had not been removed; but again permission for a second operation was refused.

So far as subsequent function of the shoulder was concerned, excision of the acromion caused no disability. From the cosmetic point of view there was no obvious alteration in contour, but the scar was visible.

Indications for Acromionectomy.—Two conditions were regarded as indications for operation: (1) A supraspinatus syndrome causing material disability and associated with radiologically demonstrable calcified deposit in the tendon. In my experience the response to conservative treatment in such cases was so poor as to warrant immediate operation. (2) A supraspinatus syndrome causing material disability which does not respond to two or three months of conservative treatment.

Contra-indication.—There is one important contra-indication to operation—true limitation of shoulder movement. In those cases in which disuse has led to a true limitation of movement of the shoulder-joint operation should not be undertaken before a full range of passive movement has been restored. Active exercises, if necessary a gentle manipulation followed by exercises, should be persisted with until all adhesions have been broken down. In patients with gross muscle spasm to pain the true range of movement should be t by infiltrating the lesion with local anæsthetic before examination.

Operative Technique.—The patient lies on the sound side, and the surgeon sits at the upper end of the table, facing the superior aspect of the shoulder. The arm controlled by an assistant, being rotated and abducted as necessary.

An anteroposterior incision of the sabre-cut type is made over the acromioclavicular joint and acromion. A flap of skin and subcutaneous tissue is turned outwards, so that the upper surface of the acromion is exposed. The periosteum is incised, and a flap is turned inwards, so that the line in which the acromion is to be divided is exposed. The superior acromioclavicular ligament is also detached and turned inwards. With a thin-bladed osteotome, held very obliquely, the acromion is divided from before backwards. The divided acromion is lifted with a blunt spike and grasped with sequestrum forceps while its deltoid attachments are divided from behind forwards with a scalpel. The last structures to be divided are the remaining acromioclavicular ligaments and the coracoacromial ligament.

In some instances the subacromial bursa is very adherent and may be opened as the acromion is dissected free. If not, the bursa is opened as soon as the bone is removed, and the arm is abducted and rotated so that the tendon and interior of the bursa can be inspected. When the extent of the lesion has been determined, the bursa is closed with fine catgut, and the deltoid is sutured to the cut surface of the acromion, using the flap of periosteum already turned back. The skin is sutured, and a pressure bandage is applied.

Postoperative Treatment.—The arm is immobilised in a sling for a few days, and about a week after operation active exercises are started. Abduction against gravity is usually impossible for about ten days, and then returns quickly. Movements are full between three and four weeks after operation, and a short period of treatment at an organised rehabilitation centre is often of value at this stage.

SUMMARY

In the middle range of abduction of the humerus the supraspinatus tendon and its bursa are pressed against the acromion. If there is a lesion of either tendon or bursa this pressure causes pain and reflex muscular spasm. The cause of such a lesion is usually trauma.

The cardinal signs of supraspinatus syndrome are: (1) a painful arc (between 60° and 120°) on abduction of the humerus; (2) reversal of the normal scapulohumeral rhythm; and (3) tenderness on deep pressure over the supraspinatus tendon.

Pain may lead to disuse, adhesions, and limitation of movement.

Two-thirds of the patients recovered spontaneously.

The remaining third were cured by acromionectomy.

Where there is true limitation of movement, acromionectomy should not be done before all adhesions have been broken down by exercises.

"... what medical practitioners have for years been asking for in vain is a continuity of medical records without which there can be no continuity of treatment. Should they want to piece a case together which presents some diagnostic difficulty, there ought to be a full dossier automatically following each individual whether he be a hopeless chronic invalid or a perfectly sound person, or only appeared to be so. The resulting simplification would benefit doctor and patient alike."—Dr. GEORGE DE SWIET, *Fortnightly Review*, January, 1947, p. 51.

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[2] Watson-Jones, R. Fractures and Joint Injuries, Edinburgh, 1943, p. 418.

MUSCLE-RELAXING ACTION OF MYANESIN

F. M. BERGER W. BRADLEY

From the Research Department of
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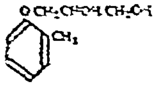
DURING an extensive investigation of the chemical and pharmacological properties of glycerol ethers the observation was made that α : β-dihydroxy-γ-(2-methylphenoxy)-propane, subsequently named 'Myanesin,' caused muscular relaxation and paralysis. A few other α-substituted glycerol ethers were found to possess similar pharmacological properties, but myanesin was the most potent and safest of all the compounds examined. This communication describes briefly the properties and mode of action of myanesin* and draws attention to the applications it may have in clinical medicine.

CHEMICAL AND PHYSICAL PROPERTIES

Myanesin belongs to the class of α-glycerol ethers. It is α : β-dihydroxy-γ-(2-methylphenoxy)-propane :



Myanesin is a colourless odourless crystalline solid with a melting-point of 70–71° C. Its solubility in water at 22° C is 1·09 g./100 ml. of water, but stable supersaturated solutions can easily be obtained by cooling solutions prepared at higher temperatures. Myanesin is very soluble in alcohol and propylene glycol. It is a neutral solid, and the pH of its solution is practically the same as that of the pure solvent. Urea and its derivatives, particularly ethyl urea, greatly increase the water-solubility of myanesin. Solutions of myanesin are stable and unaffected by light, air, cold, and dilute acids and alkalis; they can be sterilised by heat or filtration and are compatible and freely miscible with solutions of sodium chloride, glucose, and derivatives of barbituric and thiobarbituric acids.

PHARMACOLOGICAL PROPERTIES

Effect on Muscles.—Rabbits injected intravenously with 10–12 mg. per kg. of body-weight showed muscular relaxation. Doses of 30–50 mg. per kg. produced flaccid paralysis without loss of consciousness. The rabbits regained muscular power 5–10 min. after injection and remained well. Larger doses caused paralysis of longer duration. Doses of 350 mg. per kg. were tolerated when injected over a period of 30 min. Myanesin has a low toxicity and a distinct margin of safety. The mean lethal and mean paralysing doses in mice after intraperitoneal administration were 610 ± 10 mg. per kg. and 178 ± 8 mg. per kg. respectively. Excitement, tremors, or convulsions did not develop at any time after administration of myanesin.

Myanesin was quickly detoxified and broken down in the body. It did not exert a cumulative action and did not cause habituation. It also had a weak curare-like action when administered in large and nearly lethal doses. In dilutions of 1 : 10,000 it did not affect the isolated guineapig's ileum or rabbit's duodenum.

Effect on Blood-pressure and Respiration.—Intravenous injections of 30 mg. to rabbits or cats did not influence blood-pressure or respiration. Larger doses caused a fall of blood-pressure and a decrease in rate and an increase in depth of the respiratory movements. Toxic doses caused death by respiratory paralysis.

Anticonvulsant Action.—Myanesin, in doses insufficient to cause paralysis, had a strong antagonistic action against strychnine convulsions and was in this respect much superior to hexobarbitone. In convulsions produced by leptazol, hexobarbitone was very effective and myanesin relatively ineffective (see table). These observations suggest that the pharmacological actions of myanesin are due to its depressant action on the spinal cord.

Potentiating Effect on Barbiturate Anæsthesia.—Simultaneous injection of an ineffective dose of myanesin and an ineffective dose of soluble hexobarbitone caused deep narcosis without excitement in the prenarcotic stage and with complete muscular relaxation during narcosis. The depth and duration of anæsthesia could also be increased by administration of small doses of myanesin. Myanesin also effectively suppressed prenarcotic excitement and muscular fibrillations or spasms during anæsthesia. A full report of the pharmacological properties has been published in the *British Journal of Pharmacology and Chemotherapy* for December, 1946, p. 265.

DISCUSSION

Muscular relaxation during light anæsthesia can be obtained by the cautious use of curare. This method is not, however, without danger, because the amount of curare necessary to produce muscular relaxation is very close to that producing paralysis of the diaphragm. Myanesin, on the other hand, produces relaxation without embarrassment of respiration. Even with doses that produce muscular paralysis no respiratory embarrassment results.

Myanesin does not appear to act on the brain, because it does not affect consciousness and never causes prenarcotic excitation. It cannot, therefore, be classed among the anæsthetics. Myanesin is not a curare substitute, because its mode of action is quite different from that of curare.

ANTAGONISM OF MYANESIN AND SOLUBLE HEXOBARBITONE TO STRYCHNINE AND LEPTAZOL CONVULSIONS IN MICE

(Drugs injected subcutaneously in 2½% gum-acacia solution)

Strychnine (mg./kg.)	Leptazol (mg./kg.)	Myanesin (mg./kg.)	Hexobarbitone (mg./kg.)	No. of mice	Convulsed (%)	Died (%)
1·33	..	..	..	109	68·9	49·6
1·33	..	100	..	140	19·3	2·5
1·33	..	..	100	100	97·0	29·0
..	120	..	..	60	95·6	53·3
..	120	200	..	40	92·5	42·5
..	120	..	50	20	0	0

The experimental results indicate that the administration of myanesin together with barbiturates in amounts only sufficient to produce unconsciousness causes profound muscular relaxation without the disadvantages inherent in the use of deep general anæsthesia, spinal anæsthesia, or curare. Myanesin may also be worthy of clinical trials in the treatment of spastic paralysis and dystonic states and for the prevention of traumatic complications in convulsive shock therapy.

SUMMARY

Myanesin, α : β-dihydroxy-γ-(2-methylphenoxy)-propane, given in suitable doses, produces muscular relaxation and paralysis without causing respiratory arrest or influencing the blood-pressure. It has a low toxicity and is quickly destroyed in the body.

Myanesin efficiently antagonises strychnine convulsions, counteracts excitement due to barbiturates, and potentiates barbiturate anæsthesia. Its action is apparently due to depression of reflexes in the spinal cord.

Myanesin seems likely to prove useful for producing relaxation during light anæsthesia and may have other valuable uses in medicine.

We thank the directors of The British Drug Houses Ltd. for their interest in our work and permission to publish the results, and Messrs. R. A. Hall and F. G. Sayer and the Misses B. J. O'Brien, D. M. Culver, and H. McInnes for technical assistance.

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* Myanesin was submitted for clinical trial under the name 'B.D.H. 312.'

A NEW SYNTHETIC CURARISING AGENT IN ANÆSTHESIA

F. Barnett Mallinson
M.R.C.S., D.A.

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Some time ago I was asked by the research department of The British Drug Houses Ltd. to undertake the clinical trials of a synthetic drug, 'B.D.H. 312,' said to have an action resembling that of curare and which might be of value in anæsthesia. This drug had been administered experimentally to animals but not to man.

I have been so impressed with the potentialities of B.D.H. 312, or 'Myanesin' as it is now called, that I feel that a description of experience and results in the first 112 cases should be published now without awaiting the outcome of the prolonged clinical investigation which is in progress. In this way as wide a comparison with the now accepted preparations of curaré may be made available as expeditiously as possible by experienced workers in the field of anæsthesia. This paper is intended therefore only as a preliminary report.

CHEMISTRY AND PHARMACOLOGY

Myanesin is a synthetic substance having the formula $\alpha:\beta$-dihydroxy-γ-(2-methylphenoxy) propane. It is put up as a solution, in ampoules containing 1 g. in 10 c.cm. The solution may be boiled. It possesses antibacterial properties. Solutions of 'Pentothal sodium' and myanesin may be mixed without the formation of a precipitate.

The pharmacology of myanesin has been thoroughly investigated in animals (Berger and Bradley 1946, 1947). There is no evidence of toxic effects on any organ of the body in doses well in excess of those therapeutically effective. Further, no effect has been noted on tonus and contraction of intestinal muscle.

Although in animals narcosis is produced in addition to paralysis, the injection of about 13 mg. per kg. of body-weight in a conscious patient produced no demonstrable narcotic effect; the addition of a small dose of pentothal produced narcosis accompanied by good abdominal relaxation (case 1). In another patient 27 mg. per kg. produced some weakness of limb muscles and full abdominal relaxation without narcosis (case 2). Neither patient had any difficulty in conversing and making comments on subjective symptoms. Neither experienced any such distress as has been reported with curare.

The absence of narcosis in human beings may be explained by the relatively small doses given, 200–300 mg./kg. being necessary for the production of narcosis in animals (Berger and Bradley 1947). This is an impressive indication of the wide margin of safety experienced with myanesin. Its action is so enhanced by pentothal that full abdominal relaxation is easily obtained in man with doses of 10–15 mg. per kg.

METHOD OF USE

Premedication.—As with most anæsthetic agents, premedication is desirable but not essential (case 11). 'Omnopon' and scopolamine are very satisfactory.

Administration.—After anæsthesia has been established an injection of 5–10 c.cm. of myanesin is made intravenously a few seconds before the peritoneum is opened. Full relaxation follows in a few seconds. Doses of 5–10 c.cm. may be repeated as often as required during long operations. In an exceptional case as much as 50 c.cm. has been used during a long operation without the slightest postoperative effect. Doses which are adequate even for high abdominal surgery rarely if ever produce intercostal paralysis. Sometimes slight
tory depression develops but lasts only a minute

Anæsthesia.—(1) *Pentothal-N_2O-O_2:* relaxation this technique is easily obtained with the lightest depth of anæsthesia; for example, plane I with N_2O-O_2 has been found adequate for gastrectomies (ca 3 and 6). The average lower laparotomy can often carried through on 0·5 g. pentothal (case 4), though a sthenic patient may require up to 0·9 g. *Relaxation* ca be maintained with anæsthesia so light that the patie is making slight movements (case 5). Deeper (plane anæsthesia with a given dose of myanesin causes lon rather than more profound relaxation (see table).

(2) *Pentothal-cyclopropane:* plane I again is su Relaxation is often secured with slightly smaller dose myanesin and often lasts much longer (case 7, and table).

(3) *Pentothal-N_2O-O_2-ether:* a few patients have received a small induction dose of pentothal (0·2–0·4 g.) and plane has been maintained with N_2O-O_2 plus minimal ether (average 10 drachms per hr.). The results are the same with other anæsthetics; the exceedingly small amount of ether used should be noted.

(4) *N_2O-O_2-ether:* one case has received "straight gas-oxygen-ether" with similar results according to expectation (see table).

AVERAGE DURATION OF ABDOMINAL RELAXATION IN PLANE I ANÆSTHESIA

Anæsthetic	Av. 1st dose		Av. duration of relaxation	Depth of anæsthesia
	Pentothal (g.)	Myanesin (c.cm.)		
Pentothal-N_2O-O_2 ..	0·49	7·5	17 min.	Light plane I
Pentothal-N_2O-O_2 ..	0·7	9·0	23 min.	Normal plane I
Pentothal-N_2O-O_2-ether *	0·4	10·0	24 min.	
N_2O-O_2-ether †	...	18·0	1 hr.	
Pentothal-C_3H_6 ..	0·5	7·0	1 hr. 45 min.	
Pentothal-N_2O-O_2 ..	1·0	9·0	53 min.	Plane II

* Av. amount of ether 10 drachms per hr.
† Single case; ether 1 oz. per hr.

ILLUSTRATIVE CASES

Case 1.—Sthenic man, aged 32. Hæmorrhoidectomy "A" risk.

11.50 A.M.: myanesin 10 c.cm. given during 3 min. No demonstrable effect: no paralysis, no narcosis.
11.54 A.M.: pentothal 0·15 g.; consciousness lost; still move on operative stimulus.
11.56 A.M.: pentothal 0·3 g.; sphincter completely relaxed; good abdominal relaxation; plane I anæsthesia.
11.58 A.M.: groaning, but still relaxed.
12.02 P.M.: operation stopped; beginning to open eyes; still abdominal relaxation.
12.20 P.M.: fully conscious.

Case 2.—Woman, aged 38. Saphenous ligation. "A" risk.

11.50 A.M.: myanesin 20 c.cm. "Felt tired," could still lift leg but "muscles felt weak"; no distress; no dysarthria; complete abdominal relaxation.
11.53 A.M.: pentothal 0·2 g.; apnœa 1 min.; slight depression respiration following restart (without intercostal paralysis) 2 min.
11.56 A.M.: operation started.
11.59 A.M.: gas-oxygen started; abdominal relaxation + + +.
12.55 P.M.: operation stopped; no further pentothal has been administered; anæsthesia plane I.
12.57 P.M.: patient awake and talking.

Case 3.—Man, aged 32. Gastrectomy for ulcer. Chronic bronchitis. "B" risk.

11.30 A.M.: pentothal 0·45 g. + N_2O-O_2; plane I.
11.37 A.M.: myanesin 10 c.cm.; relaxation + +, no respiratory depression.
12.08 P.M.: very light, moving fingers; pentothal 0·15 g.
12.12 P.M.: relaxation good, but additional requested for manipulation of stomach high under costal margins; myanesin 3 c.cm.; relaxation + + +.
12.40 P.M.: relaxation less; anæsthesia verging on 2nd stage. myanesin 3 c.cm. + pentothal 0·15 g.; respiratory depression 2–3 min.; no intercostal paralysis.
1 P.M.: operation stopped. Time 1½ hr.

CASE 4.—Woman, aged 23. Large ovarian endometrioma. Blood-pressure (B.P.) 112/76 mm. Hg.

2.30 P.M. : pentothal 0·5 g. +N_2O-O_2 ; plane I.
2.35 P.M. : no abdominal relaxation ; B.P. 106/70.
2.40 P.M. : myanesin 10 c.cm. ; relaxation + + ; B.P. 106/70.
2.45 P.M. : cyst delivered ; Trendelenburg position ; B.P. 112/75.
3.05 P.M. : de-trendelenburged ; B.P. 108/76.
3.10 P.M. : peritoneum sutured ; relaxation still ; patient moving arm slightly ; B.P. 106/76.
3.15 P.M. : operation stopped ; B.P. 112/78.

CASE 5.—Man, aged 20. Very heavy sthenic athlete. Acute ppendix. "A" risk.

11.30 A.M. : pentothal 0·5 g. +N_2O-O_2 ; plane I.
11.32 A.M. : struggling and coming round ; myanesin 10 c.cm. and penthothal 0·25 g. mixed.
11.33 A.M. : quiet and well relaxed.
11.40 A.M. : moved on incision ; pentothal 0·1 g. ; well relaxed.
11.45 A.M. : slight movements ; well relaxed ; pentothal 0·1 g. + myanesin 5 c.cm.
11.55 A.M. : myanesin 4 c.cm. to assist closure of peritoneum.
12.05 P.M. : slight movements.
12.08 P.M. : moving and wriggling.
12.10 P.M. : operation stopped.

CASE 6.—Woman, aged 54. High gastrectomy for ulcer. B" risk.

12.10 P.M. : pentothal 0·5 g.
12.30 P.M. : pentothal 0·25 g. +N_2O-O_2 ; plane I–II.
12.35 P.M. : myanesin 4 c.cm. ; relaxation + + ; no intercostal paralysis.
12.50 P.M. : pentothal 0·15 g. ; anæsthesia very light.
12.55 P.M. : myanesin 4 c.cm. for high manipulation of stomach ; relaxation + +.
1.40 P.M. : pentothal 0·1 g. +myanesin 5 c.cm. ; apnœa 2 min. ; no subsequent intercostal paralysis ; relaxation + + +.
1.55 P.M. : operation stopped. Time $1^3/_4$ hr.

CASE 7.—Woman, aged 29. Lower laparotomy. Tuberculous peritonitis. Bilateral salpingectomy and ovarian cystectomy. Pulmonary tuberculosis. "B" risk.

2.30 P.M. : pentothal 0 5 g. +cyclopropane-O_2 ; plane I.
3.30 P.M. : peritoneum opened ; myanesin 8 c.cm. ; relaxation + + +.
4.30 P.M. : peritoneum closed ; relaxation still adequate, but less.
5 P.M. : operation stopped.

CASE 8.—Woman, aged 24. Hysterotomy (3 months pregnant) and sterilisation. Aortic incompetence. Mitral stenosis and incompetence. Pale, cyanosed, orthopnœic hypostatic congestion. "D+" risk.

2.25 P.M. : pentothal 0·5 g. slowly ; 100% oxygen ; plane I.
2.30 P.M. : myanesin 10 c.cm. ; relaxation O.K.
2.50 P.M. : operation stopped ; patient almost-conscious. Has since made uninterrupted recovery.

CASE 9.—Man, aged 86. Suprapubic cystotomy. Kidney function poor+. Hypostatic congestion. "C" risk.

9.50 A.M. : pentothal 0·3 g. slowly. Preliminary cystoscopy.
10.04 A.M. : myanesin 6 c.cm. +pentothal 0·2 g. for abdominal opening ; very light plane I.
10.13 A.M. : operation stopped. Practically conscious.

CASE 10.—Boy, aged 6. Premedication : 'Seconal' gr. $1^1/_2$. Right inguinal hernia. "A" risk.

12.15 P.M. : pentothal 0 5 g. +N_2O-O_2.
12.20 P.M. : insufficiently relaxed; myanesin 5 c.cm. ; relaxation +.
12.30 P.M. : insufficiently relaxed; myanesin 5 c.cm. ; relaxation + +.
12.50 P.M. : operation stopped.

CASE 11.—Woman, aged 43. No premedication. Placenta prævia. Twin pregnancy, not in labour. Classical cæsarean section.

11.20 P.M. : pentothal 0 2 g. +myanesin 5 c.cm. mixed.
11.22 P.M. : N_2O-O_2.
12 NOON : operation stopped ; relaxation adequate.
Gas anæsthesia much smoother and more easily induced. Plane I hroughout. Very light. Vomited food plus at end operation ; fully conscious in 2 min. No effect on uterus. Babies : no anxiety.

CASE 12.—Woman, aged 47. Radical mastectomy. Moderately severe diabetes, on insulin. *No special preparation carried out.* Chronic bronchitis. Poor myocardium. "C" risk.

10.20 A.M. : pentothal 0·5 g.
10.30 A.M. : myanesin 10 c.cm. Relaxed pectorals + +.
11.25 A.M. : operation stopped. Moderate shock.
No postoperative disturbance of diabetes whatever; diet and insulin normal.

RESULTS

All kinds of risk up to D+ and including emergencies have been accepted (case 8) for administration of the drug. Patients with poor kidney function have not been excluded, and such cases have included a number of Harris and Millin type prostatectomies. Ages have ranged from 3 to 86 years, and operation times from 15 min. to over $3^1/_2$ hours.

Blood-pressure.—No significant alterations have been noted that could be attributed to myanesin.

Intestines.—No definite evidence has been obtained of any clinical effect on intestinal muscle. During one of the gastrectomies it was thought that there might be some slight diminution of tone though peristalsis was active.

Vocal Cords.—The effects on the vocal cords have been somewhat variable. Intubation as a rule was not so easy as has been described by Gray and Halton (1946) with curare (on the other hand such heroic measures as these authors described were not employed). I must confess I was a little disappointed with curare also in this respect. Bigger doses of myanesin may give better relaxation of the vocal cords, and work is proceeding on these lines. My experience has been that unexpectedly big doses of both pentothal and the curarising agent are needed with both drugs. The severe laryngeal spasm which is common when intubating under pentothal alone is never seen when myanesin is used. With doses of about 0·75 g. of pentothal and 15 c.cm. of myanesin the cords can usually be seen moderately abducted for a few seconds, but in most cases they close when the stimulus of laryngoscope or tube is applied. When the tube is passed, however, as a rule on a cough, the patient usually settles down again quickly, though coughing on the tube has been a persistent nuisance in one or two cases in which no analgesic jelly was used to lubricate it. Laryngeal spasm occurring under pentothal-gas-oxygen from any cause can be rapidly controlled with an injection of myanesin.

Cæsarean Section.—The smoothing effect of combining a few c.cm. of the drug with an otherwise inadequate dose of pentothal has been exceedingly useful in such operations as cæsarean section, where it is held to be important to keep the amounts of pentothal to a minimum and yet premedication is contra-indicated, the metabolic rate is high, and pharyngeal and laryngeal reflexes are apt to be unusually sensitive owing to the presence of food in the stomach (case 11). No increased tendency to hæmorrhage or other undesirable effects on the uterus have been observed, and no effects on the babies born by cæsarean section.

Postoperative Condition.—After major operations the patients given myanesin have been strikingly brighter and more comfortable than those receiving spinal or deep general anæsthesia or curare to produce relaxation. Observations in one diabetic receiving insulin suggest that myanesin causes no upset of carbohydrate metabolism or postoperative acidosis (case 12). The incidence of vomiting has been low ; only 12% of the patients have vomited at all, and only 4% more than twice. No patient has given rise to anxiety on the table through the use of myanesin, and none has died within at least five days of the operation.

CONCLUSIONS

As I have emphasised with curare (Mallinson 1945), a true assessment of this or any curarising agent must await the long-term results of tens of thousands of cases. Myanesin must still be considered an experimental drug for use by the expert anæsthetist so that further reliable data and experience may be gained.

I do feel very strongly, however, that the technique of curarisation of muscle to obtain abdominal relaxation, which was so bravely introduced by Griffith and Johnson (1942) with curare, has with myanesin reached a point at which it bids fair to become the greatest advance in anæsthesia since the introduction of pentothal.

SUMMARY

Myanesin, a new synthetic drug, appears to have well-marked advantages over curare.

It has a wider margin of safety than curare. Doses of 5–20 c.cm. (about 7–28 mg. per kg.) produce no undesirable effects; this is not unexpected since 200–300 mg. per kg. is tolerated by animals.

Abdominal relaxation is obtainable even in the conscious patient; and without any distress.

The drug does not cause intercostal paralysis in doses producing full relaxation of the abdominal muscles.

In most cases it is much more effective with barbiturate anæsthesia than is curare and apparently enhances the action of the barbiturates.

So easily is abdominal relaxation obtained under pentothal-N_2O-O_2 when myanesin is used that the use of the more toxic agent cyclopropane is not necessary.

It is effective under the lightest possible anæsthesia; this is of great importance in reducing the amount of general anæsthesia needed.

No bronchospasm or salivation occurs even when no atropine or hyoscine has been given and even in the conscious patient (Cullen 1944).

I wish to thank those surgeons who have coöperated with me in this research, particularly Mr. Kenneth Heritage, whose patience and pertinent criticism have been invaluable. Also Mr. C. K. Vartan and Mr. E. Hesketh Roberts. I am indebted to The British Drug Houses Ltd. for the supply of B.D.H. 312 (myanesin) used in this research.

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TREATMENT OF
RENAL FAILURE IN WEIL'S DISEASE BY SPINAL ANÆSTHESIA

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CONSIDERABLE interest has been taken recently in the renal lesions associated with crush syndrome, incompatible blood-transfusion, yellow fever, Weil's disease, and other conditions. Maegraith et al. (1945) demonstrated the similarity of their renal pathology and suggested that the term "renal anoxia" should be used to describe the renal failure which develops in all of them. Lauson et al. (1944) have shown that the effective renal blood-flow in the circulatory collapse accompanying various injuries is reduced more than can be explained by the fall of blood-pressure or the circulatory rate.

Our knowledge of the renal circulation has been greatly increased by the work of Trueta et al. (1946), who have shown experimentally that, in animals, on appropriate nerve stimulation, the blood may be diverted, wholly or in part, from the cortex and short-circuited through medullary blood-channels. They suggest that the oliguria in Weil's disease and in allied conditions is due to a similar mechanism. Wylie (1946a and b) has shown, by the injection of trypan-blue into guineapigs infected with *Leptospira icterohæmorrhagiæ*, that a diminution of cortical blood-flow is present from the first day of infection, and that it becomes progressively more severe until death ensues. Such a diminution could readily explain the rise of blood-urea so early in the disease. These observations point towards vascular spasm as a cause of the diminution of glomerular blood-flow.

The view that the reduction in glomerular blood-flow is brought about by spasm is supported by the success of paralysis of the sympathetic nerves in the treatment of these conditions. Peters (1942) reports with splanchnic block in a case of anuria following transfusion, in a man aged 32, who had been anuric 7 days. He cites Rubritius, Havlicek, and R as having relieved reflex anuria by this means. further cases of its successful use, in post-a anurias, are recorded by O'Sullivan and Spitzer (1

The use of high spinal anæsthesia in anuria due Weil's disease seems therefore to be amply justified and Robertson (1946) has treated three cases high spinal anæsthesia up to the level of D7. The was in a woman of 20, who had been anuric for 60 Diuresis occurred, and she made a complete but s recovery. The second case was in a man of 35, who admitted moribund with a blood-urea level of over 500 m per 100 c.cm., having been anuric for several days. Though diuresis took place, his condition continued deteriorate, and he died in uræmic coma. The la case was in a man of 58, who had been anuric for hours. He started to secrete small quantities of urine but his urinary output never rose above 30 oz. a day and he died $2^1/_2$ days later.

There appear to be three possible causes for the failure of high spinal anæsthesia in the last two cases. The first is that the sympathetic nerve-supply to the kidneys was not successfully interrupted; the fact that urinary secretion started again immediately after the attempted sympathetic block in both cases suggests that the object was at least partly achieved. The second is that the blood-pressure after high spinal anæsthesia (90 mm. Hg systolic) was not high enough to allow of full urinary secretion. Finally it was thought that the oliguria and anuria had persisted too long before the induction of high spinal anæsthesia.

If, as the experimental evidence suggests, the cortex is ischæmic because of selective spasm of the renal vessels, the earlier this spasm is broken, by paralysis of the sympathetic nerves, the less renal damage will take place. It is known that the prognosis in Weil's disease becomes progressively worse with age, and this may be due to a decreased tolerance to ischæmia of the renal tissues of the older patients. Therefore it is suggested that, to cut down the mortality in severe cases of Weil's disease, sympathetic paralysis should be employed in the oliguric stage of the disease, if correction of the dehydration and hypotension has not increased the urinary secretion.

In the case described here, the blood-pressure was well raised and maintained by intravenous infusion of plasma and the intramuscular injection of 'Methedrine' (*d*-N-methylamphetamine hydrochloride) 30 mg. Dehydration was relieved by encouraging the patient to take fluids liberally by mouth, and by continuing the intravenous infusion with alternating litres of 4 3 sodium sulphate and 5% glucose-saline.

CASE-RECORD

A strong and healthy man, aged 61, who had been employed in the watercress beds at the head of the river Test fr 21 years, was taken suddenly ill with nausea, vomiting, weakness, but did not complain of pains in his limbs or back.

He was feverish that evening, and remained so for the next four days. On the 5th day he noted that he wa jaundiced, and sent for the doctor, who found his [illegible] rate to be normal, pulse-rate 90 per min., and liver enlarged and tender. The patient remained apyrexial for the next tw days, with increasing jaundice, and was admitted to hospital on the evening of the 7th day.

On admission his temperature was 97° F, pulse irregular and feeble, rate 80 per min., blood-pressure 85/65 mm. Hg. Next day he was brightly jaundiced, with arteriolar flush of forehead and face; one small petechial hæmorrhage on inside of lip, and many others on his back. Tongue b dry, and furred; conjunctivæ suffused; pulse-rate 80 min. fibrillating; blood-pressure 100/70 mm. Hg. enlarged and tender; spleen not palpable. Catheterisation produced 8 oz. of urine. No neck rigidity or muscle tenderness. Cranial nerves and fundi normal; reflexes present and equal, plantars flexor.

Blood: Hb 100%, white cells 15,800 per c.mm. (polymorphs 91%, lymphocytes 8%, large hyaline 1%). Blood-urea 321 mg. per 100 c.cm. Icteric index 97. Blood injected intraperitoneally into a guineapig enabled *L. icterohæmorrhagiæ* to be isolated, but serum was negative in all dilutions on agglutination.

Urine: acid, trace of albumin, scattered leucocytes, some red cells, occasional hyaline and epithelial casts; bile pigment present.

Cerebrospinal fluid: cells 132 per c.mm. (polymorphs 75%); protein 35 mg. per 100 c.cm.; chlorides 640 mg. per 100 c.cm.

Treatment with penicillin 30,000 units intramuscularly 3-hourly was started. After 1 pint of plasma given intravenously and the intramuscular injection of methedrine 30 mg., blood-pressure rose to 130/90 mm. Hg and remained round that level. The patient was drinking well, and the plasma was followed by 4·3% sodium sulphate by slow drip. Later 0·5 mg. of 'Digoxin' was given by mouth.

At 6 P.M. there had been no increase of urinary output, so high spinal anæsthesia (16 c.cm. of light 'Nupercaine,' *the patient sitting up for 55 sec.*) was administered, producing skin anæsthesia up to the level of D7.

By next morning he had received 105 oz. of fluid and had passed 52 oz. of urine, containing 1·75 g. urea per 100 c.cm. He had stopped hiccoughing, and felt less drowsy. His pulse was regular at 88 per min., blood-pressure 110/80 mm. Hg. More cutaneous hæmorrhages had appeared, so he was given 10 mg. of vitamin K intramuscularly. Later in the day the blood-urea was 328 mg. per 100 c.cm., and urinary urea 1·95 g. per 100 c.cm. There was a trace of agglutination to *L. icterohæmorrhagiæ* in dilutions up to 1/300. Penicillin and vitamin K were continued, and the intravenous infusion was also continued with 5% glucose saline.

On the 10th day further cutaneous hæmorrhages appeared and he had a slight epistaxis, but his urinary output continued to rise, and he felt much better. Blood-urea 232 mg. per 100 c.cm. Agglutination titre unchanged. Blood-pressure 130/80 mm. Hg. Treatment was continued as on the previous day. Next day the penicillin, vitamin K, and intravenous infusion were discontinued, as his general condition and fluid intake were so good.

He made an uninterrupted recovery from then on, with no secondary rise of temperature. On the 18th day his agglutination reaction *to L. icterohæmorrhagiæ* was positive in dilutions up to 1/300, with a trace at 1/1000.

DISCUSSION

It is fully appreciated that, in Weil's disease of this severe type, spontaneous recovery may take place without the active measures used in this case—thus Walch-Sorgdrager (1939) records spontaneous recovery with blood-urea levels up to 360 mg. per 100 c.cm.—but the close time relation between the induction of high spinal anæsthesia and the start of urinary secretion suggests that this treatment played some part in his recovery. High spinal anæsthesia was chosen, rather than splanchnic block, for technical reasons. It was considered that this was the surest method of interrupting the sympathetic impulses to the kidney, though the danger of collapse was fully realised. The blood-pressure was raised not only to diminish the chances of such collapse but also to keep it well above the renal-filtration level throughout the whole procedure.

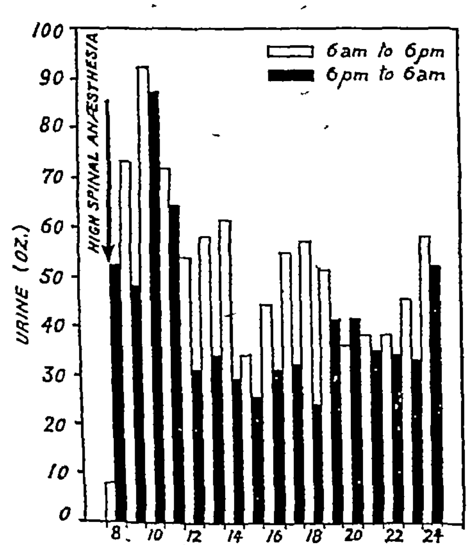

Fig. 1—Diuresis following high spinal anæsthesia on the evening of the 8th day of illness.

Hitherto sympathetic paralysis has only been used in the treatment of well-established anurias when all other measures have failed. In view of the increasing evidence that renal vascular spasm is a cause of this type of anuria, the procedure should be given a trial before irreparable damage has taken place. It would be interesting to know if either splanchnic block or high spinal anæsthesia has been employed in the oliguric stages of blackwater fever or yellow fever before complete anuria has set in.

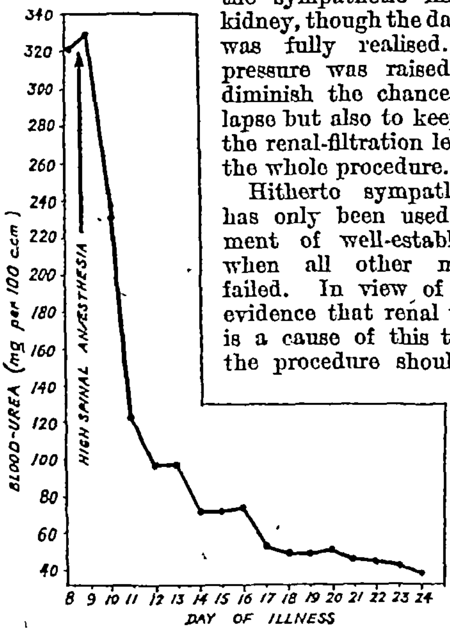

Fig. 2—Rapid fall of blood-urea after diuresis had become well established.

SUMMARY

A man of 61, suffering from Weil's disease for 8 days, was drowsy, deeply jaundiced, and dehydrated, with blood-pressure 100/70 mm. Hg and blood-urea 321 mg. per 100 c.cm. He was still secreting small quantities of urine, the exact amounts and urea content of which were not recorded. Since recovery from such a state is extremely rare, particularly at the age of 61, it was decided to adopt active measures to increase his urinary output and remedy his hypotension before irreparable renal damage had taken place. When his blood-pressure had been raised to 130/90 mm. Hg, high spinal anæsthesia was induced up to the level of D7. The results were most dramatic, and diuresis began, with a good urea content of the urine (1·75 g. per 100 c.cm.). After a day's lag the blood-urea level fell at a remarkable speed. Fluid intake was well maintained by mouth and by intravenous infusion, and the diuresis continued despite the fact that the effect of the spinal anæsthesia wore off. Recovery was complete.

I wish to thank Dr. C. B. S. Fuller for allowing me to publish this case; Dr. C. H. Wrigley, pathologist to the Royal Hampshire County Hospital, and Dr. J. C. Broom, of Wellcome Research Laboratories, for their assistance with the pathological investigations; and my colleagues for their helpful criticism.

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BACTERIOPHAGE CLASSIFICATION OF SHIGELLA SONNEI

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A NEW way of classifying bacterial strains was demonstrated by Craigie and Yen (1938), who, using bacteriophages, differentiated between several distinct types of *Bacterium typhosum* which could not be distinguished by ordinary serological or biochemical methods. The types were constant. Subsequently other bacteria also were classified by means of bacteriophages: *Bact. paratyphosum B* by Felix and Callow (1943), *Staphylococcus aureus* by Fisk (1942) and Wilson and Atkinson (1945), and soil bacteria by Conn et al. (1945).

I have tried to type *Shigella sonnei* by means of phages and present the results here. I isolated 25 Sonne phages, 7 of which came from partly lysed Sonne colonies of human origin, 2 from filtrates of fæces from dysenteric subjects, 12 from filtrates of animal fæces (pig, hen, horse, cat), and 4 from filtrates of sewage and dung water.* The phages were "purified" by transplantation of isolated plaques after serial dilution; 3–5 passages were made, and the last of them was passed through a Chamberland filter. In relevant cases, either the strain itself or one epidemiologically related to it was used in the passages.

METHOD

The classification of the types was in accordance with the method of Craigie and Yen (1938). I tried to carry out the tests under as constant conditions as possible. The agar concentration was kept throughout at 1·25%, and a sufficient stock of the medium was prepared so that a considerable number of tests could be made under uniform conditions. The critical test dilution (C.T.D.) was regularly controlled against selected strains of different sensitivity. Moreover, the phage dilutions were subjected from time to time to a bacterial sterility test. Only calibrated platinum loops were used. The agar plates, before use, were dried in the incubator for 10–15 min. at 37° C, and after inoculation with the broth cultures for another 15–30 min. at the same temperature. The broth drops were thus thoroughly dried (incomplete drying may give a misleading reaction). The phages were then added without delay. If the interval between the inoculation of the culture and the addition of phages is too long, the reactions may be indistinct. This happens if the interval considerably exceeds an hour at 37° C or 3 hours at room temperature. The plates were examined in a simple microscope after incubation for $4^1/_2$–6 hours.

RESULTS

I first investigated whether the S and R forms of the Sonne bacteria differed with regard to lysosensitivity. In preparing the phages a difference was already noticeable. The 13 phages first isolated yielded preparations with a high titre for the corresponding R strain, but only 8 for the S form also; the other 5 phages did not lyse S forms of the corresponding or other strains at all, or else reached merely low titres with a pronounced secondary growth. No phages which acted exclusively or mainly on the S forms were observed. Thus, S+R and R phages could be distinguished. In spite of repeated attempts on different S strains, the R phages could not be transformed to S+R phages. Generally speaking, the Sonne phages were found to be scarcely amenable to adaptation. The S+R phages with weak S component, on the other hand, could have this component moderately increased by propagation on the S strain.

With a C.T.D. of the 21 phage preparations, the S and R forms of 112 strains from 42 places were tested. In tests with an S+R phage a qualitative difference b the S and R forms of the same strain, whether it sensitive or resistant, was never observed, regardless whether the phage was propagated on the S or R or not. The R phages, on the other hand, lysed R strains. Control tests yielded identical results, provided that the C.T.D. was carefully adjusted. In testing against R phages it was essential that the strains should be in a pure R form. Even a slight content of the S form might mask the lysosensitivity. Testing the cultures with an absorbed Sonne S serum and plating definitely showed whether the strains were in pure R form or not.

As it appears from the above that R strains are best suited for attempts to classify Sonne bacteria, and as, moreover, R forms but not S forms can regularly be obtained from a Sonne strain, only R strains were tested in the subsequent investigations.

When additional phages had been isolated, the tests of a selected part of the above-mentioned R strains were continued. Moreover, additional strains were studied with all the phages. The number of Sonne strains was 108 from 71 places, the number of phages 25. On the basis of the relation of the strains to these phages, 14 types of Sonne could be distinguished. It was found that this classification could be made on the results obtained with 7 of the 25 phages (see table). Of the others, 6 behaved like some other phage, whereas the remainder, though showing deviations from all other phages, did not make any further classification possible, at least on the basis of the existing material.

The classification is based on a very distinct difference between the lysosensitivity of the strains—i.e., confluent lysis or negative reaction. Some strains, with C.T.D. of certain phages, yielded isolated plaques. By including such strains in determining the C.T.D., and by careful titration, it was possible to select such a dilution that this reaction with isolated plaques could be clearly distinguished from a positive reaction with confluent lysis, as well as from a negative one. How reactions with isolated plaques are to be judged, and whether they can be used along with confluent lysis and negative reaction as a special criterion in distinguishing Sonne strains, must be left for future investigation. The above classification was not based on phage effects in the form of isolated plaques.

CLASSIFICATION OF STRAINS OF *Shigella sonnei* USING 7 BACTERIOPHAGES

Strains	Bacteriophages						
	IV	V	VI	VII	X	XIV	XVI
139	+	+	+	+	+	+	+
85	+	+	−	+	+	+	+
83	+	+	+	+	−	+	+
81	−	+	−	+	+	+	+
93	+	+	−	+	−	+	+
129	100	+	−	+	+	+	−
2770	100	−	−	+	+	+	100
25	+	+	+	+	−	−	+
6901	−	+	−	+	+	−	+
86	+	+	−	−	−	+	+
5	+	+	−	+	−	−	+
128	100	+	−	−	−	+	−
158	−	−	−	+	−	−	100
48	−	−	−	100	−	+	−

+ = confluent lysis; − = negative reaction.
100 = approximate number of isolated plaques.

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* The last-mentioned 16 filtrates were kindly placed at my disposal by Mr. Lilleengen, reader in bacteriology, School of Veterinary

The investigations hitherto made indicate constancy of the type. During a Sonne epidemic 46 strains were isolated from 42 persons. All of them belonged to the same type—i.e., that corresponding to strain 85 in the table. Moreover, groups of 2–10 epidemiologically related strains of several other types showed identity of type, and 3–7 strains from the same persons exhibited type constancy. This question is being made the subject of further studies.

SUMMARY

With 7 bacteriophages of different origin 108 strains of *Shigella sonnei* could be divided into 14 types. Judging from the investigations made up to the present, epidemiologically related strains, as well as strains from the same individual, display constancy of phage-types.

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PAROXYSMAL HYPERTENSION

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PAROXYSMAL hypertension is a clinical finding of the first importance. MacKeith (1944) classifies it as (1) essential, when the blood-pressure (B.P.) is persistently raised between the paroxysms; (2) symptomatic, as in lead poisoning, eclampsia, tabes dorsalis, aortic regurgitation, angina pectoris, thalamic tumour, angina vasomotoria of Nothnagel, and affections of the vagus; and (3) due to phæochromocytoma (adrenal medullary tumour).

It is important that a phæochromocytoma should not be missed, because permanent recovery may follow its surgical removal. That its recognition is not easy, however, and especially its distinction from a tumour of the brain, is shown by the following case.

CASE-RECORD

A man, aged 62, was admitted to the Eastern District Hospital, Glasgow, on Sept. 29, 1945. Two weeks previously, while walking along the street, he had suddenly felt giddy, lost consciousness, and fallen. He recovered consciousness in about half a minute, he thinks, and although a bit shaky he got up and walked on. He had two other similar attacks before admission to hospital; in the second, three days before admission, he did not lose consciousness completely, and he felt his left arm and left leg twitching violently. Throughout there had been no loss of power of arm or leg. Previously he had never been troubled by headaches, giddiness, fits, or similar complaints.

On examination he appeared healthy and rather highly coloured; he lay comfortably in bed and answered questions freely. There was no anæmia, no abnormal urinary constituent, and indeed no evidence of disease apart from a B.P. of 200/110. Radiography of the skull and ophthalmoscopy revealed no abnormality, and the Wassermann reaction was negative.

Repeated routine B.P. readings showed a progressive fall in pressure: 155/95 on Oct. 11, 145/85 on Oct. 15, and 140/95 on Oct. 18. He was about to be discharged, when on Oct. 22 he had an epileptiform seizure. He first of all lost the power of speech, then had twitchings, at first in the left arm and immediately thereafter in the left leg. He did not lose consciousness. The attack lasted about three minutes. The B.P. immediately after the attack was 190/110; next day it was 170/100.

Between that day and Nov. 18 he had three similar attacks. The B.P., read twice in this interval, was 130/68 and 160/95. On Nov. 18 a similar seizure was accompanied by a B.P. of 260+/140. In view of the association of the attack with a rise of B.P., it was decided to read the B.P. daily pending a further attack. Daily readings revealed pressures between 125/80 and 140/90 until Nov. 27, when another seizure was accompanied by a B.P. of 260+/140. An hour after the attack the B.P. was 200/120, two hours after 130/100, and five hours after 110/70.

On Nov. 6—i.e., after the fourth seizure—the left leg was weak, and on Nov. 22 the left arm was weak.

The differential diagnosis seemed to rest between cerebral tumour, suggested by the jacksonian epilepsy and gradually increasing hemiparesis, and phæochromocytoma, suggested by the paroxysmal variations in B.P. If the latter diagnosis were correct, the hemiparesis could be attributed to repeated damage to the internal capsule as a result of the recurring attacks of vasoconstriction.

Against the diagnosis of brain tumour were the absence of headache and of vomiting, a normal skull X-ray picture, and the absence of papillœdema on repeated ophthalmoscopy. Further, though it would be reasonable to expect a rise in B.P. as the result of a fit, such large increases seemed more than could be explained by the comparatively mild localised seizures. In addition, considerable fluctuations of pressure were noted in the absence of fits, and, as pointed out above, the pressure remained elevated for some time after a fit, only gradually falling to normal.

Accordingly, investigations were carried out to discover whether an adrenal medullary tumour was present. These were negative, apart from an apparently positive cold pressor test (Hines 1940). The B.P. before immersion of the hand, with the patient supine, was 135/95, immediately thereafter 175/110, and forty minutes later there was a seizure lasting five minutes and accompanied by a B.P. of 260+/150.

It had been decided that a laparotomy would be advisable, when the patient's condition became rapidly much worse. Some stiffness of the neck developed, and the right pupil became larger than the left. There was now little doubt but that there was a rapidly growing space-occupying lesion of the right hemisphere, perhaps a glioblastoma with developing tentorial pressure cone. The patient died on Dec. 28.

At necropsy the convolutions of the right cerebral hemisphere were greatly flattened, but there was no flattening of those of the left side. A large pressure cone had formed on the undersurface of the cerebellum, and the tentorium had grooved the uncinate gyrus. A large glioblastoma was present in the right cerebral hemisphere, occupying the parietal and occipital lobes. It was situated dorsally and did not encroach on the thalamus and hypothalamus. There was no adrenal medullary tumour.

DISCUSSION

Such large variations in B.P. are not a well-recognised feature of cerebral tumour. Further, the extremely high B.P. of 260+/140–150, in association with only mild jacksonian epilepsy, in a patient whose B.P. was normally 125–140/80–90 appears to be unusual. These findings, associated with an apparently positive cold pressor test, made the diagnosis of phæochromocytoma one to be seriously considered. The patient's rapid downhill course, however, left no doubt about the correct diagnosis.

SUMMARY

A patient, in whom a cerebral tumour was found at necropsy, was thought to have an adrenal medullary tumour, because of large variations in blood-pressure, both spontaneous and induced. The case shows that such paroxysms of hypertension may be caused by a rapidly growing cerebral tumour, even when it is not apparently invading the thalamus or hypothalamic region. Further, a well-marked rise in blood-pressure may take place when the hand of such a patient is immersed in cold water.

My thanks are due to Prof. Noah Morris and Mr. J. Eric Paterson for the interest they took in the case, and to Dr. M. Ross, Dr. M. McGowan, and the resident medical staff at the Eastern District Hospital for their coöperation.

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Reviews of Books

Operative Surgery

GEORGE BANKOFF, M.D. Florence and Erlangen, F.R.C.S.E., E.M.S. surgeon, SS. John and Elizabeth Hospital, London. London: Medical Publications. Pp. 416. 63*s.*

IN this short treatise on operative surgery the author's aim has been to produce a readable and complete work for medical students and general practitioners. The text—simple and lavishly illustrated—adequately describes the standard operative procedures students must know for examination purposes. Along with these everyday operations, diagrams of rarer—much rarer—operations are inserted. These will distract the novice, and they are inadequate for anyone wishing to master the procedure. For instance, besides the usual description of amputation at the lower end of the thigh, no fewer than three methods of osteoplastic amputation are illustrated but not described. The chapters on thoracic and plastic surgery are well written and complete, supplying a want in many students' textbooks. Orthopædists will not be pleased with the injunction to use the finger, "the gentlest and most sensitive instrument of all," in open operations for fractures; nor will most agree that removal of two-thirds or three-quarters of the medial meniscus is the usual result after making a 2–3-in. incision in the knee.

Omissions there must be in a first edition, but one would wish to include the modern standard method of ligation and injection in a chapter on varicose veins which details such older methods as stripping.

Oral Medicine

LESTER W. BURKET, D.D.S., M.D., professor of oral medicine, the Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania; professor of oral medicine, Graduate School of Medicine, University of Pennsylvania. London: J. B. Lippincott. Pp. 674. 72*s.*

THIS book represents an attempt to correlate general medical conditions with oral manifestations. The sections dealing with oral diseases associated with general conditions are good and the illustrations are excellent, but there is a tendency to find oral manifestations in nearly all diseases. Thus even hæmorrhoids are mentioned, though save in the presence of reversed peristalsis it must be somewhat difficult to demonstrate their effects in the mouth. Dental surgeons may be interested in the exhaustive chapter dealing with occupational diseases of dental practice, but the embryo dentist may well be alarmed to discover that among other things he is liable to hæmorrhoids, pulmonary infections, and—unless he wears cotton socks inside woollen ones—foot troubles. There is a section on oral aspects of aviation medicine by Major Alvin Goldhush.

La Cultura in Vitro del Midollo Osseo

A. FIESCHI; G. ASTALDI. Pavia: Tipografia del Libro. Pp. 306. 1000 lire.

THIS volume gives a comprehensive and exceptionally well-illustrated account of the behaviour of human bone-marrow explanted into tissue-culture medium. Marrow from normal subjects and from patients with pernicious anæmia, leukæmia, and Cooley's (Mediterranean) anæmia was cultured. The technique was simple; the explanting medium was a mixture of the subject's plasma, chick plasma, and chick-embryo extract; and all the usual methods of examination were exploited. Like others before them, Fieschi and Astaldi find that the most useful observations are those within the first four days of the culture; after that the human hæmopoietic cells show degeneration, and fibroblasts and phagocytes predominate. Recognising these limitations, they have made some very interesting observations. The hæmocytoblast is found to be a cell that is definitely hæmopoietic, but will develop into red-cell or granular white-cell series. The normoblast can lose its nucleus in one of three ways—extrusion, fragmentation, or lysis. Of these, extrusion is the commonest, and some photographs of the process are given. Evolution from pro-normoblast to erythrocyte takes about four *but in culture the red cells did not* become fully chromatic, owing presumably to lack of hæmo Myelocytes can mature into polymorphs, but ofte in an irregular and incomplete manner. Megaka could not be seen forming platelets. The authors confirm the suggestion that plasma cells are not derived from lymphocytes but from a separate line of precursors.

Observation of marrow from pernicious anæm before and after liver treatment shows that the effect of the liver principle is to make all non-hæmoglobinated cells—including those here called pro-megaloblasts mature along the normoblastic line and produce normocytes; all later megaloblasts continue to mature as megaloblasts and are not transformed into normoblasts; the action takes place without the addition of liver extract to the medium. In acute leukæmias, Fieschi and Astaldi conclude, the hæmocytoblasts are pathological cells incapable of further differentiation; in the chronic leukæmias the cells appear normal and the disease is of a different type. Culture of marrow from cases of Mediterranean anæmia suggests that the defect is in the mechanism by which the normoblast loses its nucleus.

This monograph is of great interest to hæmatologists, *and confirms, for the most part, the conclusions of* workers in this country and elsewhere. It is produced on good paper, with 122 first-class photomicrographs and 10 fine-colour-plates.

De behandeling van Hypertensie

Met Zoutloos Dieet en met Uitdrijving van Keukenzout. (Treatment of hypertension with salt-free diet and sodium-chloride depletion.) H. J. VIERSMA. Amsterdam: N. V. Noordhollandsche Uitgevers Maatschappy. Pp. 322.

THIS monograph chiefly concerns the influence of salt depletion on the level of hypertension and the course of hypertensive disease in a small but thoroughly investigated series of 8 cases of essential hypertension, 2 cases of chronic glomerulonephritis, and 4 cases of malignant hypertension. In benign essential hypertension and in chronic glomerulonephritis sodium-chloride depletion brought about by a salt-free diet and by the administration of mercurial diuretics and ammonium chloride *induces a moderate fall in the systolic and a very slight* fall in the diastolic pressures. The effect is achieved chiefly through a diminution in blood volume. In uncomplicated benign hypertension there is no abnormal NaCl retention and the treatment used depends on actual salt depletion. In malignant hypertension the treatment is without notable influence on the systolic and diastolic levels. In this condition there is spontaneously an excessive NaCl loss in the urine, chiefly it is supposed by virtue of the polyuria, and Dr. Viersma finds that therapeutic salt depletion has actually a harmful influence on renal function, depressing the urea-clearance values and precipitating the final uræmic phase.

The extensive data here presented on the whole confirm the old and the more recent literature which is extensively reviewed, but the work is important because it is so detailed and because the effect on malignant hypertension has not previously been widely recognised. The reader may gain the impression that salt depletion, *with its attendant loss of enjoyment of food,* has a restricted place in the treatment of uncomplicated benign and especially in the treatment of malignant hypertension, though it may be of value in complications such as cardiac failure and hypertensive encephalopathy.

Sir William Baynes has for many years been honorary legal adviser to the British Hospitals Association, and the second edition of his NOTES ON POINTS OF LAW AFFECTING VOLUNTARY HOSPITALS (London: British Hospitals Association. Pp. 136. 10*s.* 6*d.*) covers the most recent legal decisions besides including a number of useful model forms. Many problems not discussed in the first edition have been dealt with in recent years by memoranda prepared by Sir William and published by the Central Bureau of Hospital Information. These and others have been incorporated in this new edition. The whole is couched in terms easy for the non-legal mind to comprehend, and though it does not claim to be a complete compendium of hospital law it is indispensable to all concerned in hospital administration.

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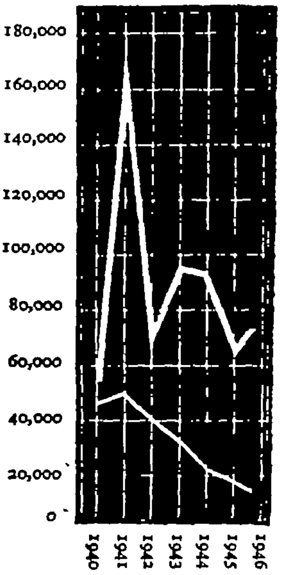

Left *Thick line* Whooping cough cases notified. *Thin line* Diphtheria cases notified.

Vital statistics embodied in this graph (England and Wales) were supplied by the Minister of Health in the House of Commons on 16th October 1946 (Hansard 1946, 197, 427, 227).

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THE LANCET

LONDON: SATURDAY, JAN. 18, 1947

Old and Ailing

"When people grow old there is a very narrow borderline between sickness and health." This simple fact, recalled by Lord Amulree in the Lords' debate on Oct. 8, is one which we cannot afford to forget when it comes to planning for the care of the aged. Healthy old people are common enough, and could be commoner if we gave the old better care: but like the very young they need shelter and protection if they are to keep well, for small ills readily attack them and readily grow to serious disease. Lord Amulree justly fears that if under the new Acts healthy old people are to be under a different authority from those who are ailing, some of the worst faults of the old poor-law infirmaries may be perpetuated. The distinction simply cannot be made: every old person is liable to need a few days or weeks in bed from time to time; he will have bouts of bronchitis, rheumatic joints which get better and worse, long-term foot troubles, eye and ear defects, bowel disturbances, cardiovascular disorders, or some other sign of a failing body. Some of these will clear up quickly with little treatment beyond rest; some will need investigation and regular treatment over several weeks or months. Because these disasters, great and small, are the common lot of the old, every institution housing the "healthy" aged will need a sick-bay; and if an old person is in a comfortable bed, getting some medical and nursing attendance, it is hard for him or anyone else to believe that he ought to be moved into a different bed in a different institution, even to get his illness properly investigated and actively treated. Delays from this cause are specially likely now, when any old person who has found a bed in an institution enjoys something of the proud singularity of a winner of the Irish Sweep.

The scarcity of beds for the chronic sick and the aged is an indirect outcome of the Public Health Act of 1929 and of the Emergency Medical Service. When the public-assistance authorities took over the poor-law infirmaries they converted many of them wholly or partly into general hospitals for the acutely ill; and though this meant an advance in standards, and a much-needed increase in acute beds, it also meant that many of the old and ailing now have nowhere to go. Nevertheless this situation may lead to a better state of things, for most of the old infirmaries were outside the hospital tradition, and even now there are many institutions where people lie in bed year after year without proper examination or treatment, as Lord Amulree pointed out. How much can be done for such patients has been demonstrated at the West Middlesex Hospital,[1] where 60% of the patients who come into the chronic-sick wards are discharged well enough to return either to their own homes or to homes taking healthy old people. Certainly very large numbers of old people now in infirmary beds might be living active and happy lives at home if thoroughly treated. Infirmaries are often seriously short of nurses and domestic staff, and rely for medical attendance on a visiting general practitioner. Housed in obsolete buildings, they are overcrowded, dingy, and wretched, lacking both the equipment and the staff necessary for the scientific investigation of disease.

Some of the neglect these patients suffer comes of referring to them as the "chronic sick." Rightly or wrongly, this term has come to imply hopeless and incurable disease, and has outlived its usefulness. Perhaps it might now give place to some such term as "ailing," which has no pessimistic connotation and suggests rather a challenge to medical skill.

The Nuffield committee whose report is summarised on p. 112 suggest two ways of caring for ailing old people, and think that both may have a place in our future health service. Certainly the old person should go first, they consider, into the wards of a general hospital for study and treatment; and afterwards he should go either to his relatives or to a home, or else to a unit for chronic cases attached to the general hospital. There are, of course, some old people who will need continued medical and nursing care of a high order for the rest of their lives; and it is certainly better that these should be warded in units attached to a general hospital than relegated to an infirmary. But most will be able to return to ordinary life for long spells; and it should be made easy for them to move between hospital and residential home as their condition requires or allows. If homes for old people are under the authority which controls the hospitals, their care will be conceived as a whole and it will be easier to transfer them directly into the wards without unnecessary delay when they fall sick, and to send them back to their familiar surroundings as soon as they are fit to go.

The question remains, what should these familiar surroundings be? Not the drab, unhomelike quarters of the old type of institution: we must try to get rid of the poor-law spirit in the care of the old as we are doing in the care of the young. Lord Amulree[2] suggests that we might follow the good example of the French, who have comfortable homes for old people who can pay about £1 a week, and simpler homes for those who can pay less or nothing at all. In these homes there are no rules worth talking about: the residents come and go as they like, go down to the neighbouring estaminet for coffee or beer and a game of dominoes, come in when they please—old people seldom care to keep late hours—and sometimes go to stay with their friends or their children for a week or two at their own discretion. Those who saw the French film *Fin du Jour* will know exactly the kind of home for old people that he has in mind—comfortable, friendly, run with humanity and the minimum of interference—as different as can well be imagined from the old type of poor-law infirmary where the sexes are segregated and rules are many and officious. These French homes, like the hospitals, are under the Assistance Publique. Whether an old person is ill or well never raises an administrative problem, because if he is well he is either with his family or is living a normal boarding-house life in a home; if he is ill he goes into hospital, where he can be investigated and treated properly. The kind of live-and-let-live spirit evident in the French homes does not come readily to the British today, though we once had it. It is worth reviving.

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[1] Warren, M. *Lancet*, 1946, i, 383, 841.

[2] *Lancet*, 1946, ii, 801.

Peritoneal Dialysis

THERE are few more harrowing situations for the physician than to have charge of a patient who is in uræmia because of renal damage from which recovery is known to be possible. Such constitute a minority of uræmic cases, since more often the failure is the inevitable and irreversible conclusion of a destructive renal process. This inevitably fatal uræmia is mostly seen in elderly subjects. Recoverable renal damage, on the other hand, is the result of incompatible blood-transfusion, renal crush syndrome, sulphonamide poisoning, renal failure of acute infections, or surgical shock, and all these events are as likely, if not more likely, to arise in the young. In such conditions there is reason to believe that if uræmic death can be averted the kidneys will in time resume their function, and eventually the patient will recover. The therapeutic problem is how to get rid of the urea in the blood while the kidneys are out of action.

In attempts to promote extrarenal excretion, sweating and purgation have been intensively practised, but quantitative estimations of the excretion of various nitrogenous products by dermal and alimentary routes have shown that these measures are pitifully inadequate. A profuse sweat may eliminate 2 g of urea, which would clear some 0·5–1 litre of uræmic blood. The devising of more physiological substitutes for renal action necessitates a consideration of renal function. Basically this consists in the production by the glomeruli of a dialysate of blood plasma, and its subsequent concentration in the tubules. With sufficient water the glomerular mechanism alone can probably maintain life for some time. VIMTRUP [1] has reckoned that the total area of the glomerular membrane in a pair of kidneys is about 3 square metres, so any substitute dialysing membrane should be of comparable dimensions. Recent years have seen two main avenues of approach to this problem. A few weeks ago we reviewed the remarkable work of KOLFF [2] in the construction of an artificial kidney. This consists of a 'Cellophane' tube 23 mm wide and 30–45 metres long—i.e., a total membrane area of between 2·2 and 3·3 sq metres—wound spirally round a cylinder rotating in a tank containing 70–100 litres of a solution of 0·6% NaCl, 0·2% $NaHCO_3$, 0·04% KCl, and 1·5–2% glucose. The blood is heparinised, and cannulæ inserted into the radial artery and vein enable the apparatus to be placed in circuit with the patient's circulation. By this means as much as 260 g. of urea has been removed from the circulation, and there is presumptive evidence that at least two patients owe their life to the apparatus.

An alternative method, to which REID and colleagues [3] have lately drawn attention, is to exploit the dialytic powers of the peritoneum. The total surface area of the peritoneal membrane is around 6 sq metres; and, as PUTNAM [4] demonstrated experimentally 23 years ago, it is freely permeable to crystalloids and the smaller organic ions, the exchanges following in general the theoretical laws of pure osmosis Lately in Boston, FINE, FRANK, and SELIGMAN [5] have applied peritoneal irrigation to the treatment of uræmia both experimentally in dogs and in human cases. They calculated that in the animals the procedure was 40–75% as effective as normal kidney function in clearing the blood of urea. In dogs made uræmic by bilateral nephrectomy peritoneal irrigation could prolong life by several days, and their death was apparently due not so much to uræmia as to peritonitis following bacterial contamination along the irrigation tracks. In four cases of uræmia in man peritoneal irrigation was followed by a striking biochemical improvement with reduction of blood-urea nitrogen to figures approaching normal. What is even more important, this change was associated with much relief of such symptoms as headache and stupor. One of these patients, suffering from sulphathiazole damage to the kidneys with 5 days of complete anuria, fully recovered. In one of the other three cases recovery was impossible because the uræmia was due to ureteral obstruction by carcinoma An important feature of the results is that in none of the cases did any gross peritonitis develop, although in two of them organisms such as *Bact. coli*, *Staph. albus*, *Cl. welchii*, and enterococci eventually appeared in the drainage fluid As Dr. FINE points out in his letter on another page, this tendency to the development of peritonitis is probably the biggest single danger in the procedure. Such relatively satisfactory results were obtained not only by strict asepsis but by the use in the irrigation fluid circuit of a large Berkefeld filter which permitted a flow of 40–60 ml. a minute, and by the inclusion of penicillin in the modified Tyrode solution Where there is no suggestion of renal sensitivity to sulphonamides, sodium sulphadiazine may be added. Complete bacteriostasis of the fluid awaits the plentiful supply of an antibiotic (perhaps streptomycin) which includes *Bact. coli* in its range; Dr. FINE notes that when streptomycin is used prophylactically *Bact coli* tends to become resistant to the drug. KOLFF,[2] who has used this method in ten cases, limits the duration of lavage to 36 hours because of the risk of peritonitis at the site of entry of the catheters.

Peritoneal irrigation requires a volume of fluid in the neighbourhood of 40 litres a day, corresponding to 28 ml. per min ; such a quantity makes possible a blood-urea clearance of 15–25 ml. per min. FINE and his colleagues [5] demonstrated clearly that the maintenance of the patient's water and electrolytic balance *is just as important as the mere reduction in blood nitrogen.* In two of their four cases pulmonary œdema resulted from the excessive administration of intravenous fluid and absorption from the irrigation The anuric patient requires only enough water (about a litre a day) to replace loss by vaporisation. The Boston workers eventually decided that 2% glucose in the irrigating fluid would prevent the absorption of water. Furthermore, the absorption of glucose from

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1. Vimtrup, B. *Amer J. Anat.* 1928, 41, 123.
2. Kolff, W. J. The Artificial Kidney, Kampen, Holland, 1946; see *Lancet*, 1946, ii, 720, 726.
3. Reid, R., Penfold, J. B., Jones, R. N. *Lancet*, 1946, ii, 749.
4. Putnam, T. J. *Amer. J. Physiol.* 1923, 63, 548
5. Fine, J., Frank, H. A., Seligman, A. M. *J. Amer. med. Ass.* 1946, 130, 703; *Ann. Surg.* 1946, 124, 857; *J. clin Invest* 1946, 25, 211.

5 litres of such fluid amounted to 200–300 g., con-ituting a valuable contribution to the patient's utrition. Another point emphasised is the necessity f using peritoneal drainage-tubes made of an "inert" etal, such as stainless steel. Such tubes showed no ndency to become blocked by adhesions forming ound their ostia, whereas rubber catheters, though uitable for the inflow, gave endless trouble when used or drainage. There is much useful detail in these dmirable papers, and anyone contemplating the pplication of the method should consult them in he original.

Peritoneal irrigation obviously has possibilities, ut its proper application demands the highest echnical, nursing, and chemical care. More work eeds to be done to determine the optimum com-osition of the irrigating fluid and to perfect the other letails. In cases of uræmia due to such intrinsically atal conditions as neoplastic blockage of the ureters, and uncomplicated by cardiovascular disease, the prospect of temporary benefit justifies a trial of the method. On the other hand, as DANZIGER[6] insists, peritoneal irrigation is not to be lightly embarked upon in moribund patients. With potentially recoverable cases of uræmia it will be difficult to decide when the procedure should be applied and when recovery will occur unaided. The safer peritoneal irrigation becomes, the less important will be the decision

Alternative to Curare

ANÆSTHESIA must be paid for in physiological injury to the organism. If modern surgery demanded no more than the relief of pain the price would be small; for light anæsthesia, maintained even for long periods, has strikingly few after-effects. Many important branches of surgery, however, involve regions of the body where surgical trauma initiates powerful reflexes. The abdomen and thorax are outstanding examples, where surgery is hardly possible unless these reflexes are obtunded. Reflex contraction of the muscles of the abdominal wall and of the larynx, for example, results in the well-known phenomena of "tight abdomen" and "pushing guts." In thoracic operations the responses consist in the peculiar type of coughing which Americans aptly term "bucking." These disturbing reflexes are abolished by profound anæsthesia; a level is reached at which the only signs of life are continued respiration and heart-beat. For this state—in reality one of approaching death—the patient pays heavily in terms of complications and delayed recovery Anæsthetists in the last few decades have therefore concentrated their efforts on providing a relaxed and tranquil abdomen for the surgeon in a way less costly to the patient than deep anæsthesia Until three years ago light general anæsthesia combined with some form of block of the nerves supplying the abdomen held the field. In this technique the particular variety of block is selected according to the patient's physique and the skill of the anæsthetist A robust patient may be suitable for spinal anæsthesia; the frail may need no more than the small dose of anæsthetic required to make him unconscious. The nature of the anæsthetic seems to be of secondary importance to the quantity given.

In 1943 curare burst on an astonished but receptive anæsthetic world. Astonished, because of the ease and simplicity with which it is administered; anybody capable of giving an intravenous injection could now produce a replica of a spinal anæsthetic so far as the abdominal surgeon is concerned. Receptive, because the imperfection of methods up to that time was fully realised. The skill required, and the time consumed by local anæsthetic techniques, coupled with the frequent and unpleasant cardiorespiratory and neurological sequelæ of spinal anæsthesia, assured any reasonable alternative a welcome. Curare has passed its early clinical trials with flying colours, and dozens of enthusiastic reports have been published from all parts of the world Its site of action is now well known. Instead of breaking the reflex arc in the manner of a regional block by interrupting the nerve pathway, curare prevents the muscles themselves from responding. Curare is of tremendous importance to anæsthesia and surgery, and it is unfortunate that its long-term investigation and appraisal is being hampered by shortage of supplies. The only source of the raw material is central South America, and it is intolerable that the availability of such a boon should depend on the moods of native witchdoctors, themselves swayed by all the imponderables of jungle magic Substitutes, natural or synthetic, are urgently needed Many substances are already known which have curare-like properties. These mostly belong, chemically, to the group designated by ING[1] as "onium salts"—a generic term for cations of the ammonium, phosphonium, and sulphonium type of the general formula $(CH_3)_4N^+$. At least two substances, beta-erythroidine[2] and quinine methochloride,[3] have been tried with success on human subjects for the relief of myotonic conditions. The freedom from side-effects which characterises curare prompts the hope that such synthetics as the quaternary ammonium salts,[1] which have a similar chemical structure to curare, will be given a clinical trial.

In this issue appear reports of 'Myanesin,' a synthetic glycerol ether which, when injected, produces clinical effects not unlike those of curare but with some important and valuable differences The new drug shows a well-marked antagonism to strychnine and an apparent potentiation of barbiturate anæsthesia, besides other features, which give the investigators the impression that its pharmacological action is as different from that of curare as is its chemical formula While curare acts on the myoneural junction, myanesin appears to act on the spinal cord. To myanesin are ascribed virtues such as a selective action on the abdominal muscles, a high therapeutic ratio, and an absence of side-effects which, if extended clinical and pharmacological studies confirm them, will make this drug even more useful to the anæsthetist than curare. Moreover, there are possible applications in obstetrics and neurology which have yet to be explored. The British Drug Houses Ltd, who have made this new drug in their laboratories, are for the present confining its issue to a small number of anæsthetists. Their reports will be eagerly awaited if he is well he is either with his family or is living a normal boarding-house life in a home; if he is ill he goes into hospital, where he can be investigated and treated properly. The kind of live-and-let-live spirit evident in the French homes does not come readily to the British today, though we once had it. It is worth reviving.

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[6] Danziger, R. W. *Lancet*, 1946, ii, 848.

[1] Ing, H. R. *Physiol. Rev.* 1936, 16, 527
[2] Burman, M. S. *J. Pharmacol.* 1940, 69, 143.
[3] Harvey, A. M. *J. Physiol* 1939, 95, 45; Harvey, A. M., Masland R. L. *J. Pharmacol.* 1941, 73, 304.

Peritoneal Dialysis

THERE are few more harrowing situations for the physician than to have charge of a patient who is in uræmia because of renal damage from which recovery is known to be possible. Such constitute a minority of uræmic cases, since more often the failure is the inevitable and irreversible conclusion of a destructive renal process. This inevitably fatal uræmia is mostly seen in elderly subjects. Recoverable renal damage, on the other hand, is the result of incompatible blood-transfusion, renal crush syndrome, sulphonamide poisoning, renal failure of acute infections, or surgical shock, and all these events are as likely, if not more likely, to arise in the young. In such conditions there is reason to believe that if uræmic death can be averted the kidneys will in time resume their function, and eventually the patient will recover. The therapeutic problem is how to get rid of the urea in the blood while the kidneys are out of action.

In attempts to promote extrarenal excretion, sweating and purgation have been intensively practised, but quantitative estimations of the excretion of various nitrogenous products by dermal and alimentary routes have shown that these measures are pitifully inadequate. A profuse sweat may eliminate 2 g. of urea, which would clear some 0·5–1 litre of uræmic blood. The devising of more physiological substitutes for renal action necessitates a consideration of renal function. Basically this consists in the production by the glomeruli of a dialysate of blood plasma, and its subsequent concentration in the tubules. With sufficient water the glomerular mechanism alone can probably maintain life for some time. VIMTRUP [1] has reckoned that the total area of the glomerular membrane in a pair of kidneys is about 3 square metres, so any substitute dialysing membrane should be of comparable dimensions. Recent years have seen two main avenues of approach to this problem. A few weeks ago we reviewed the remarkable work of KOLFF [2] in the construction of an artificial kidney. This consists of a 'Cellophane' tube 23 mm. wide and 30–45 metres long—i.e., a total membrane area of between 2·2 and 3·3 sq. metres—wound spirally round a cylinder rotating in a tank containing 70–100 litres of a solution of 0·6% NaCl, 0·2% $NaHCO_3$, 0·04% KCl, and 1·5–2% glucose. The blood is heparinised, and cannulæ inserted into the radial artery and vein enable the apparatus to be placed in circuit with the patient's circulation. By this means as much as 200 g. of urea has been removed from the circulation, and there is presumptive evidence that at least two patients owe their life to the apparatus.

An alternative method, to which REID and colleagues [3], have lately drawn attention, is to exploit the dialytic powers of the peritoneum. The total surface area of the peritoneal membrane is around 6 sq. metres; and, as PUTNAM [4] demonstrated experimentally 23 years ago, it is freely permeable to crystalloids and the smaller organic ions, the exchanges following in general the theoretical laws of pure osmosis. Later in Boston, FINE, FRANK, and SELIGMAN [5] have applied peritoneal irrigation to the treatment of uræmia both experimentally in dogs and in human cases. They calculated that in the animals the procedure was 40–75% as effective as normal kidney function in clearing the blood of urea. In dogs made uræmic by bilateral nephrectomy peritoneal irrigation could prolong life by several days, and their death was apparently due not so much to uræmia as to peritonitis following bacterial contamination along the irrigation tracks. In four cases of uræmia in man peritoneal irrigation was followed by a striking biochemical improvement with reduction of blood-urea nitrogen to figures approaching normal. What is even more important, this change was associated with much relief of such symptoms as headache and stupor. One of these patients, suffering from sulphathiazole damage to the kidneys with 5 days of complete anuria, fully recovered. In one of the other three cases recovery was impossible because the uræmia was due to ureteral obstruction by carcinoma. An important feature of the results is that in none of the cases did any gross peritonitis develop, although in two of them organisms such as *Bact. coli*, *Staph. albus*, *Cl. welchii*, and enterococci eventually appeared in the drainage fluid. As Dr. FINE points out in his letter on another page, this tendency to the development of peritonitis is probably the biggest single danger in the procedure. Such relatively satisfactory results were obtained not only by strict asepsis but by the use in the irrigation fluid circuit of a large Berkefeld filter which permitted a flow of 40–60 ml. a minute, and by the inclusion of penicillin in the modified Tyrode solution. Where there is no suggestion of renal sensitivity to sulphonamides, sodium sulphadiazine may be added. Complete bacteriostasis of the fluid awaits the plentiful supply of an antibiotic (perhaps streptomycin) which includes *Bact. coli* in its range; Dr. FINE notes that when streptomycin is used prophylactically *Bact. coli* *tends to become resistant to the drug.* KOLFF,[2] who has used this method in ten cases, limits the duration of lavage to 36 hours because of the risk of peritonitis at the site of entry of the catheters.

Peritoneal irrigation requires a volume of fluid in the neighbourhood of 40 litres a day, corresponding to 28 ml. per min.; such a quantity makes possible a blood-urea clearance of 15–25 ml. per min. FINE *and his colleagues* [5] *demonstrated clearly that* the maintenance of the patient's water and electrolytic balance is just as important as the mere reduction in blood nitrogen. In two of their four cases pulmonary *œdema resulted from* the excessive administration of intravenous fluid and absorption from the irrigation. The anuric patient requires only enough water (about a litre a day) to replace loss by vaporisation. The Boston workers eventually decided that 2% glucose in the irrigating fluid would prevent the absorption of water. Furthermore, the absorption of glucose from

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1. Vimtrup, B. *Amer. J. Anat.* 1928, 41, 123.
2. Kolff, W. J. The Artificial Kidney. Kampen, Holland, 1946; see *Lancet*, 1946, ii, 725.
3. Reid, R., Penfold, J. B., Jones, R. N. *Lancet*, 1946, ii, 749.
4. Putnam, T. J. *Amer. J. Physiol.* 1923, 63, 548.
5. Fine, J., Frank, H. A., Seligman, A. M. *J. Amer. med. Ass.* 1946, 130, 703; *Ann. Surg.* 1946, 124, 857; *J. clin. Invest.* 1946, 25, 211.

equired 600 a year. Last week a press conference was eld to announce the formation of a national panel of olunteers.

It was emphasised that rapid progress is not to be xpected; the work must be measured in years rather han months, the first aim being to find a susceptible nimal or to develop a laboratory technique. It is at east encouraging, however, that the problem of the cold s at last being energetically tackled on both sides of the Atlantic.[2]

SEX HORMONES IN PERIPHERAL VASOSPASM

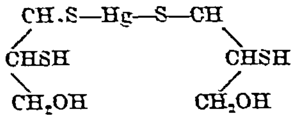
IN his classical description of the syndrome named after him Raynaud observed that "the complete disappearance of local syncope has always been noted by this lady as the first index of a commencing pregnancy."[1] Nearly 70 years later, in 1929, Snapper[2] noticed that a female patient's acrocyanosis improved when she received œstrogenic hormone for ovarian dysfunction; and similar clinical observations have since been repeatedly made. In 1935 McGrath[3] injected ergotamine tartrate into albino rats, some of which were also given an œstrogen. Gangrene of the tail developed in all male rats and in every female which had not received the hormone; but among 40 females protected with the hormone gangrene resulted in only 2. It has also been shown that castrated male rats treated with the hormone have the same immunity as females.[4] The physiological explanation seems to be that œstrogens cause local liberation of acetylcholine.[5]

Recently Burckhardt,[6] recording the time taken for artificially lowered skin-temperature to return to normal, has confirmed the vasodilator effect of œstrogens when administered by injection or in the form of linguets by mouth. Their action persisted for several weeks after the implantation of crystals. Male sex hormone had a similar, but less pronounced, effect, which is difficult to explain, seeing that more men than women get Raynaud's disease. A series of 345 patients treated for vasomotor disturbances with the female hormone have been followed up by McGrath and Herrmann,[7] who have no doubt of its efficacy, though White and Smithwick[8] deny that œstrogens will prevent vasospasm in the early stages of Raynaud's disease. It is well to remember that spontaneous improvement is common, and though this is usually temporary it may be sustained. Furthermore, sex hormones are not lightly to be prescribed for women between puberty and the climacteric; it is seldom justifiable to interfere with the menstrual cycle to avoid a harmless frostbite.

SULPHYDRYL COMPOUNDS IN MERCURY POISONING

IT has long been known that —SH compounds will reduce or abolish the toxicity of mercury salts. In 1908, for instance, Chick[1] reported that ammonium sulphide not only stopped the disinfectant action of mercuric chloride on bacteria, but apparently reversed toxic compounds formed between the metal and the substance of the bacterial cell. Again Rapkine[2] in 1931 found that cysteine or thioglycollic acid could protect sea-urchin eggs against the toxic action of mercuric chloride on cell division, and Fildes[3] in 1940 noted that the antibacterial growth effect could be reversed by sulphydryl compounds. These observations were an indication that mercuric salts combine with some —SH constituent in the cells.

Research on B.A.L.[4] (2, 3-dimercaptopropanol) has demonstrated its effectiveness against poisoning by some other metals, such as cadmium and mercury, in addition to arsenic, and Gilman et al.[5] have used it successfully in mercuric-chloride poisoning in dogs. In Baltimore Prof. W. T. Longcope and his associates have found B.A.L. a remarkably effective antidote in patients with mercuric-chloride poisoning. (Oddly enough, this is a fairly common drug for suicides to choose.) It has been suggested that the complex formed by B.A.L. with mercury salts has the composition:



A recent study by Long and Farah[6] at Harvard is instructive. The organic mercurial diuretic, mersalyl ('Salyrgan'), is toxic to the heart-lung preparation of the dog. 150 mg. producing a severe heart-failure. This can be immediately relieved by as little as 10 mg. of B.A.L.; it is interesting that a larger amount (100 mg.) of glutathione had a similar effect. In the intact cat or dog, the cardiac changes produced by a lethal dose of the mercurial—such as sudden drop in blood-pressure and electrocardiographic changes—were counteracted immediately by the —SH compounds, B.A.L. again proving more effective. It seems advisable therefore to have a —SH compound ready where there is any possibility of mercurial poisoning.

EMERGENCY BEDS

IN quite a small room in Old Jewry three recent WRENS sit taking and making telephone calls. They face a wall covered with the names of hospitals and coloured tallies hung on hooks. The King's Fund emergency bed service began work on June 21, 1938, in an experimental and hopeful mood. Hospitals had agreed to play in this new game of snap, where beds must be matched with patients; so every day a report of vacant beds was obtained from all hospitals of substantial size. Tallies showing not only the number but the types of beds available were then hung on the wall so that the girls at the telephones could see at a glance where a gynæcological bed, say, could be found for a postpartum hæmorrhage in Putney, or where a native of St. Pancras could take his perforated gastric ulcer. An early fear was that calls would be too few to justify the experiment. On the first day there were only seven calls, and beds were easily found; but they were the first of a total now exceeding over 40,000, and bed-finding is sometimes not easy at all. Apart from looking for beds the service undertakes to answer urgent inquiries from doctors, finding what they want, from iron lungs to mother's milk. The first request for mother's milk, made before the days of milk banks, stumped the girl on duty, but she answered hardily: "Yes, doctor, I'll ring you back in five minutes"; and then with brilliant aplomb rang up the General Nursing Council. There was silence for a moment at the other end; then the voice said firmly: "Try the London Hospital." Within very little over five minutes the doctor had been put in touch with the milk-supply.

When hospitals were evacuated, at the Munich crisis, the emergency bed service, on its own responsibility, collected a daily report of the bed state of all hospitals

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[2] *Ibid.* 1946, ii, 355.

[1] Raynaud, A. G. M. De l'asphyxie locale et de la gangrène symétrique des extrémités, Paris, 1862.
[2] Cited by Hitzenberger, K. *Wien. klin. Wschr.* 1937, 50, 465.
[3] McGrath, E. J. *Arch. intern. Med.* 1935, 65, 942.
[4] Suzman, M. M., Freed, C. C., Prag, J. J. *S. Afr. J. med. Sci.* 1938, 3, 29.
[5] Reynolds, S. R. M. *Science*, 1938, 87, 537.
[6] Burckhardt, W. *Schweiz. med. Wschr.* 1946, 76, 1147.
[7] McGrath, E. J., Herrmann, L. G. *Ann. Surg.* 1944, 120, 607.
[8] White, J. C., Smithwick, R. Autonomic Nervous System, 2nd ed., London, 1942.

[1] Chick, H. *J. Hyg., Camb.* 1908, 8, 92.
[2] Rapkine, L. *Ann. Physiol. Physicochim. biol.* 1931, 7, 382.
[3] Fildes, P. *Brit. J. exp. Path.* 1940, 21, 67.
[4] Peters, R. A., Stocken, L. A., Thompson, R. H. S. *Nature, Lond.* 1945, 156, 616. Waters, Ll., Stock, P. C. *Science*, 1946, 102, 601. Young, L. *Ibid*, 1946, 103, 439.
[5] Gilman, A., Allen, R. P., Phillips, F. S., St. John, E. *J. clin. Invest.* 1946, 25, 549.
[6] Long, W. K., Farah, A. *Science*, 1946, 104, 220.

Annotations

THE CAPITATION FEE

LAST week the Ministry of Health announced that—

> "An agreement has now been reached between the Minister of Health and the Insurance Acts Committee of the British Medical Association on the application of the Spens report to the current capitation fee under the existing National Health Insurance scheme. Mr. Bevan has proposed that the present capitation fee of 12*s*. 6*d*. should be increased to 15*s*. 6*d*., with effect from Jan. 1, 1946, and that there should, in addition, be an increase in the special payments made to rural practitioners."

This announcement will be received with general satisfaction. It resolves a controversy which only a few weeks ago seemed about to disrupt relations with the Ministry and precipitate widespread resignations of doctors from the panel service.

The principal cause of disagreement was the Minister's unwillingness to discuss the proper level of the N.H.I. capitation fee without at the same time discussing the mode and amount of remuneration appropriate for the new National Health Service. The Insurance Acts Committee, having neither the power nor the wish to negotiate on anything other than National Health Insurance matters, maintained that they should be allowed to settle the single issue of the current fee without having to enter into the much more controversial field of future remuneration. Their will eventually prevailed, and a settlement has been reached. The figure agreed, although not as high as some doctors may have hoped in view of the high betterment figure quoted by Dr. Dain in his Exeter speech, is very appreciably higher than Mr. Bevan's interim payment of 12*s*. 6*d*., and is even in excess of the I.A.C.'s own suggestion of a 15*s*. fee made less than a year ago. Before answering the Minister, the I.A.C. submitted his offer to meetings of local medical and panel committees throughout the country, and in these meetings acceptance was strongly favoured. In accepting the offer the committee have, however, stated that they do so "without prejudice to the assessment of remuneration in any future service." It is of course now generally agreed that new factors arising in the new service, such as the inclusion of children and the extension of the service to all people in all income groups, will make it necessary for the doctor to have higher remuneration for each patient than under National Health Insurance. This necessity is well recognised by the Minister himself; it is, in fact, stressed in the official statement from the Ministry, which continues:

> "In making this offer the Minister has made it clear that remuneration under the new National Health Service will be a matter for negotiation with the medical profession. Some of the factors on which the 15*s*. 6*d*. is based will, in his view, have a bearing on the negotiations for the remuneration in the new service which, it is agreed, will be on a higher level than the remuneration now settled for health insurance."

Altogether, this is a very satisfactory position to have reached, and one reflecting credit on the negotiators on both sides.

CARE OF SPASTICS

THE British Council for the Welfare of Spastics was established on Dec. 12 at a meeting held in the London School of Hygiene and Tropical Medicine.[1] Prof. J. M. Mackintosh, who took the chair, could give no exact estimate of the numbers of cases of spasticity due to cerebral palsy in Great Britain, though he noted that 234 spastic children are known to the school medical officer in Glasgow alone. The meeting was attended by representatives of 7 Government departments, 12 medical associations, 9 ancillary medical services, 26 educational and welfare bodies, 2 organisations of medical officers, and 2 schools for spastics—evidence of a wide national interest in the care of children and grown people affected in this way. The Ministries of Education, Labour and National Service, Health, and Pensions, and the Scottish Departments of Health and Education, all assured the council of their support in a task which at this stage is well suited to the voluntary approach. The council will act as an advisory and consultative body, coördinating the work of all agencies for the care, education, and training of patients with cerebral palsy. It will also foster interest in this condition, help to provide schools, clinics, and equipment for the care and education of those affected, will train staff in educational methods and in treatment, and will encourage research. One school for spastic children has already been founded at Croydon, and another is being established in Birmingham. The Birmingham school has been given by Mr. Paul S. Cadbury, and is to be named Carlson House after Dr. Earl R. Carlson, the American pioneer in work for spastics.

The council appointed Lord Horder as medical vice-president, Professor Mackintosh as chairman, Mr. Cadbury as vice-chairman, Mr. H. P. Weston as secretary, and Mr. Isaac Wolfson as treasurer. The executive committee was composed of Mrs. Lionel Hitchens, Mr. R. A. S. Lloyd, Dr. Hamilton Hogben, and Mr. S. K. Quale, who has taken an active part in the founding of the council. The headquarters of the council will be at 34, Eccleston Square, London, S.W.1.

VOLUNTEERS FOR COLDS

THE virus of the common cold has not yet been cultured, and the only susceptible laboratory animal, the chimpanzee, is hard to obtain, expensive, and difficult to handle. Hence the only practicable way of establishing the presence of the virus is by human inoculation, and our knowledge of the cold virus today is as limited as was our knowledge of the influenza virus up to 1933, when the ferret was found to be susceptible.

Last summer the Medical Research Council and the Ministry of Health set up a common-cold research unit.[1] Since July volunteers have been received at the Harvard Hospital, Salisbury, which was built during the war for American volunteers, was later occupied by the United States Army, and has since been presented to the Ministry of Health. The volunteer must be aged between 18 and 40, must be free from respiratory infection, and should have a normal susceptibility to the cold. On arrival he is thoroughly examined and his chest is radiographed. He remains for ten days, during the first four of which he is observed for the cold he may have contracted before arrival. Fluid is then instilled into his nose, half the volunteers receiving infected fluid and the other half acting as controls to check the efficiency of the isolation measures and the accuracy of observations by doctor and volunteer. So far no control has developed a cold. The need for isolation calls for gentle discipline, but the volunteers, who live in pairs, are free to make use of the opportunities for games and to walk where they will, provided they do not approach other people.

The principal source of volunteers so far has been university students, in whose estimation the less-than-even chance of a mild cold is a trifling price for ten days' peaceful retirement in a comfortable flat, with all found and three shillings a day pocket-money. In term-time, however, the number of students does not suffice to keep the investigation going. Although the British Red Cross has stimulated recruitment, and a few industrial undertakings have encouraged their employees to volunteer, still more are needed to bring the total to the

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[1] See *Lancet*, 1946, ii, 624, 889.

[1] See *Lancet*, 1946, i, 822.

Reconstruction

THE PRINCIPLES AND THE PRACTICES

FROM A CORRESPONDENT

THE success or failure of the National Health Service ct will depend on the future action of the medical rofession. The Act has been much criticised, but few of s critics have made more than passing reference to its erits or have pointed out how far the claims of the rofession have been met in its passage through Parlia-ent. The need for a comprehensive and national edical service has been acknowledged, and the Act nbodies many of the suggestions put forward by the rofession from time to time.

When the Bill was formulated the Negotiating Com-ittee had published seven principles thought essential r the proper organisation of the country's medical rvices. It may be useful to consider these principles nd see to what extent they have been implemented the Act.

SALARIED SERVANTS

Principle I.—The medical profession is, in the public interest, opposed to any form of service which leads directly or indirectly to the profession as a whole becoming full-time salaried servants of the State or local authorities.

This is the principle which, it is claimed, has been hiefly violated by the Act. It is recognised of course hat at the present time there are several thousand full-ime salaried doctors. Nor is very strong objection taken o salaried remuneration of specialists on the staff of ospitals, most of whom will be holding part-time ppointments and will continue private practice. But the case of general practitioners it is widely believed hat abolition of the power to buy and sell practices, nd payment partly by a basic salary, as suggested by he Minister of Health, must eventually lead to a full-time alaried service.

It should be remembered that on these points the rofession may be held to have changed its mind. Among hose doctors who answered the questionary of two years go there was a clear majority for the abolition of the ower to sell any practice—quite apart from the question f its being publicly remunerated—so long as reasonable ompensation were given. Negotiations were entered into ith the Ministry—of course without commitment—as o the amount of compensation which would be equitable o compensate the whole body of general practitioners, nd the sum of £66 million was considered reasonable. hough the drawbacks of the sale of practices have oubtless been over-emphasised, and it has generally roved itself a fair method of procedure, it cannot be enied that there are many objectionable features onnected with sale and purchase; otherwise it would e hard to understand why 56% of the doctors who replied o the questionary voted for its abolition. In any case bolition of the sale of practices would not necessarily ead to full-time salaried service. Of course those who emain outside the National Health Service will retain he goodwill of their practices and can sell them if they ish, and it is by no means certain that the value of hese private practices will fall to the degree anticipated n some quarters.

The basic salary is not referred to in the Act, and y negotiation it might be reduced to a minimum, or iven only a limited application to which none would ake exception. But even if it became a regular feature f the method of remuneration it would not necessarily be a step towards a full-time salaried service. Rather the contrary. The principle of free choice of doctor has been allowed by everyone and by all political parties; and in recognising it as a basic right the present Government have clearly shown that they regard the retention of a capitation fee as necessary to attain the free choice of doctor. (This was made plain in the debate on clause 33 in the committee stage in the House of Commons.) It is difficult therefore to maintain that the adoption of a basic salary, even if it materialises, must have the evil consequences which some expect.

FREEDOM FOR DOCTOR AND PATIENT

Principle II.—The medical profession should remain free to exercise the art and science of medicine according to its traditions, standards, and knowledge, the individual doctor retaining full responsibility for the care of the patient, freedom of judgment, action, speech and publication, without interference in his professional work.

The second principle has certainly not been infringed, and those who (like myself) were very indignant over the action of the Willesden borough council should be encouraged to know that the new Act will take away the power of such high-handed conduct from the local authorities and transfer the hospitals to the control of the regional hospital board which will be at the university level. In this connexion it is notable that the white-paper proposals of the Coalition Government put most hospital doctors directly or indirectly under a committee which had a majority of local-authority members—a position abhorrent to the profession and corrected in the present Act.

Principle III.—The citizen should be free to choose or change his or her family doctor, to choose, in consultation with his family doctor, the hospital at which he should be treated, and free to decide whether he avails himself of the public service or obtains the medical service he needs independently.

So far as one can judge, the patient within the National Health Service will have much the same freedom of choice of doctor and hospital as at present. If he wishes to obtain medical attention outside the service he can do so, though he must foot the bill himself.

Principle IV.—Doctors should, like other workers, be free to choose the form, place, and type of work they prefer without governmental or other direction.

Here the main discussion has concerned the word "place"; for some hold that the new Act permits the Government to exercise undue control over the place where the doctor is to practise—that he will have to go whither the Minister wishes and will thereby lose much of his freedom. Mr. Bevan, on the other hand, denies this, saying that the Act gives him "no power to direct a doctor to go anywhere or do anything."

The words "control" and "direction" carry odium, particularly when joined to the word "governmental." Nevertheless one should not allow the dislike of a word to prevent impartial examination of the scheme proposed.

Here again we must differentiate the position of the consultant from that of the general practitioner. At present nearly all consultants are under the direct control of lay boards of management. No consultant would claim, without qualifying the statement, that he is free to practise where he likes. He must satisfy a lay committee before he can gain his position. Under the new scheme the procedure of his election to posts on hospital staffs should not be worse and may be better than at present.

With the general practitioner it will be different. Anyone who wishes to start in practice or to change his area of practice in the new service must obtain the consent of the Medical Practices Committee; but we are assured that normally the arrangements will be made by the local executive council (advised by its medical committee), the consent of the central committee being formal. Should there be no vacancy in the district where he wants to settle he must either wait till there is one or put his name down for another district. Should there be several applicants for a vacancy there will be competition. From the decisions of the Medical Practices in Greater London and sent it to an astonished Ministry of Health. After that crisis passed the service, on the instructions of the Ministry, told the hospitals to return to normal. But the experience had been useful, leading the service to plan, with the Ministry, what eventually became the sector casualty bureaux. When action stations were called, in August, 1939, the service closed, and on Sept. 1 ten of the staff were sent out to the sectors, one girl to each sector, to stiffen the inexperienced staff of civil servants in the bureaux. It was a tall order to get a daily return of vacant beds from 400 hospitals, most of which were new to the idea, but on Sept. 2 the first complete bed state, covering some 40,000 vacant beds, was received at London regional H.Q.

Things were so quiet in those early war days that by the middle of September a new staff had been recruited and the service had opened again at Old Jewry; and there it stayed, through blitz and rockets, though the telephones were twice destroyed and the office set on fire once. Each time it started again; its last blow fell in August, 1944, when the windows were blown in by a flying bomb. One of the staff, slightly injured, waited till the dust had settled to finish the case she was engaged on, and ten minutes later the ambulance was picking up the patient she was working for. Calls fell off as London emptied, so the night service and, late in the war, the regular return of vacant beds were given up; but once the last rocket had fallen, demands on the service rose, straining the skeleton staff and reaching a peak of 1100 in January last year, which nearly overwhelmed them. By summer additional staff released from the Services could be appointed; it was as well, for the war staff were beginning to leave as husbands came home from the Forces. Now the service is running at full strength, twenty-four hours a day, and more and more doctors are learning how it can save their time and patience. The telephone number is Mon. 8515.

BONY NODULES IN THE LUNG

RADIOLOGISTS have long been familiar with opaque nodules in the lungs which often turn out to be tuberculous or silicotic, but are sometimes associated with leukæmia, Hodgkin's disease, sarcoidosis, or lymphangitis carcinomatosa, and rarely with fungus infection, histoplasmosis, or (in children) hæmosiderosis. In recent years a few isolated cases of mitral stenosis with disseminated calcified pulmonary nodules have been reported on the Continent and in the U.S.A., but this curious finding has not so far been convincingly explained. In recording the first case from this country, Elkeles and Glynn[1] put forward an ingenious hypothesis.

A young man with long-standing mitral stenosis terminating in auricular fibrillation and congestive cardiac failure showed on X-ray examination numerous tiny, densely opaque nodules in both lung fields. The lesions were mainly in the right lower zone, particularly in its periphery, though they could also be seen low down in the left lung; the apices were clear. Autopsy confirmed the diagnosis of stenosed mitral cusps and showed that the lung lesions were truly osseous particles occupying alveoli or groups of alveoli and their corresponding alveolar ducts. The framework of the lung was incorporated in the developing bone, and in some areas acellular material resembling osseous ground substance pointed to a precursor of the true bone found elsewhere in the lung. Degenerative and inflammatory changes were present in the smaller pulmonary arteries (diameter 0·1–2 mm.), chief among which was severe fibrinoid medial necrosis with destruction of the elastic membranes. The intima of such vessels was remarkably thickened by fibrocellular tissue containing capillaries, and the adventitia was moderately infiltrated with lymphocytes and polymorphs. The vasa vasorum in the larger of the arteries showed some obliterative endarteritis. Such changes appeared to be independent of thrombosis and mural hæmorrhage. Some of the smaller arterioles presented endothelial cell proliferation.

In excluding the usual causes of disseminated bony nodules in the lungs, Elkeles and Glynn suggest that they may be the late result of rheumatic pneumonia. The concept of rheumatic infection of the lungs has clearly emerged from a mass of disconnected facts, largely owing to the pioneer observations of Hadfield.[2] The characteristics of this condition are a fibrinous, almost acellular alveolitis, followed some days later by a monocytic infiltration, the lesions being confined to the regions of gaseous exchange. Alveolar ducts remain widely open and are lined by a hyaline eosinophil membrane, which may contain a protein exudate which later may be replaced by fibroblasts, leading to an interstitial fibrosis. The distribution of the bony particles in Elkeles and Glynn's case is similar to that of the more acute lesions described by Hadfield. In both conditions the same characteristic lung unit is affected, and it is reasonable to suppose that the intra-alveolar exudate has undergone organisation and later ossification, possibly because of some peculiar quality which the rheumatic exudate possesses. A hypothesis based on a single case calls for caution, but this study will stimulate others to look for and investigate similar curiosities.

THE END OF UNRRA

THE United Nations Relief and Rehabilitation Administration, established in 1943, is closing down. Difficulties both political and practical have disappointed some of the hopes of those who saw it as the first stage in a tremendous international effort for the restoration of general prosperity and peace; yet we can all be grateful that even in its more limited task of applying first-aid to devastated countries it has made further reconstruction possible. It has averted terrible disasters; and, whatever the recipients may think of the deficiencies of its help, the participating nations can take a certain pride in the knowledge that despite their own troubles they have devoted some £900 million to the relief of people abroad, without any condition save need. Of this large sum, £650 million has come from the United States and £105 million from Britain.

On the health side UNRRA was by far the biggest international undertaking in history: it did much to prevent major epidemics; it bridged the gap in the work of the international sanitary conventions, and its dying gesture was to aid in setting up the World Health Organisation. Its major efforts were in China, Greece, Italy, and Poland, and for displaced persons; of its total health budget of some 168 million dollars, 140 million was spent on medical supplies. Among these it provided and shipped 3 million pounds of D.D.T. powder, of which 600,000 lb. (of 10% concentration) was for typhus control, and it is fair to link this with the fact that, despite all the destruction and poverty, the incidence of typhus in Poland, for example, has been less than a tenth of what it was in a comparable period after the first world war.

Imperfect no doubt, and certainly incomplete, the work of UNRRA has nevertheless saved innumerable lives and preserved hope. Incidentally it has enabled many of our colleagues to continue a great tradition by giving as good service to the world as they could give to their own country. The growth of that tradition is one of the necessities of our time.

Sir HENRY MARTYN, K.C.V.O., F.R.C.S., formerly surgeon apothecary to H.M. Household at Windsor and consulting surgeon to the ear, nose, and throat department of the King Edward VII Hospital, Windsor, died in Devon on Jan. 7, at the age of 58.

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[1] Elkeles, A., Glynn, L. E. *J. Path. Bact.* 1946, 58, 517.

[2] Hadfield, G. *Lancet*, 1938, ii, 710.

BUILDING

The need to build special houses for the old can be exaggerated, because many of them do not want to live in such houses, most of which would have to be placed on the outskirts of towns, far from social and shopping centres, and from the friends of the residents. Moreover, there are many existing small houses suitable for old people which are occupied by young couples or others. They found that old people occupying houses too large for them can often be persuaded to move to a suitable small house. The committee suggest that in the national house-building programme 5% of all houses should be for the aged; and that the exact number needed in any area should be decided after a local-authority survey.

Where building for old people is undertaken the sites should be as close as possible to the places where they previously lived, and near to a bus stop, shops, a place of worship, and a cinema. The dwellings should have a living-room with a ventilated bed-recess or a separate living-room and bedroom, a kitchen, bathroom, and water-closet, storage for provisions, indoor storage for coal, and ready means of getting hot water and disposing of refuse. In rural areas a second bedroom should be provided for a relative or friend coming to look after the old person in case of illness.

Large private houses could be converted into one- or two-roomed dwellings, provided with cooking facilities and a sink. One bathroom and water-closet on each floor should suffice.

ALMSHOUSES AND CHARITIES

Many almshouses are in bad repair, but even where funds exist to cover reconditioning, trust deeds may compel their use for other purposes. A body with funds at its disposal might well undertake the repair and modernisation of the country's almshouses.

The committee note that the administration of many endowed charities is so confused, and the trust deeds often so archaic, that the spirit in which the charities were originally endowed is frustrated. The administration of many such charities needs to be overhauled, the trust deeds being altered to give the trustees wider scope. The committee suggest that an ad-hoc body, on which the Charity Commission should be represented, should be appointed by the Government to review endowed charities for old people and indicate the changes needed to make full use of these resources.

FINANCIAL SECURITY

As a result of the supplementary pensions scheme introduced by the Old Age and Widows' Pensions Act, 1940, acute poverty is no longer the lot of the aged, and the flexible administration of the Assistance Board adjusts benefits to need. Thanks to the retirement pensions introduced under the National Insurance Act, 1946, many people will be better off, and none of the present old-age pensioners worse off. A supplementary pension scheme remains in force to cover individual cases of difficulty. The National Health Service will provide free spectacles, dentures, and hearing-aids, and other medical appliances; but old people need to have this made known to them personally—press or radio announcements will not suffice.

INSTITUTIONS AND HOMES

Nearly all the 5% of old people who do not live independent lives are in public-assistance institutions or homes administered by public authorities or voluntary bodies. In most of these the structure, equipment, and regulations are unsuited to the needs of most old people. The committee recommend:

1. That enough homes should be provided by local authorities and voluntary bodies to receive all the old people now living in institutions, and also the many now seeking but unable to find places in homes. Several thousand such homes will be needed in the course of the next 15–20 years. Homes for 30–35 residents can be run at a cost per head little if at all greater than that of an institution.
2. Meanwhile, as an interim measure, highly classified institutions should be provided, offering reasonable comfort for up to 200 old people. Restrictive rules should be reduced to a minimum. Few, if any, of the old workhouse buildings are suitable for this purpose.
3. An all-purposes institution should take old people who are unsuited to the freer life of a home.
4. There should be institutions for senile dements, but the residents must often be carefully examined by a doctor to ensure that those who improve sufficiently are removed at once to the care of their relatives or to a home or institution.

THOSE ABLE TO PAY

At present there are hardly any homes for old people with private means, able to pay between £2 10s. and £5 a week. These might well be provided.

In some existing homes run for profit old people are exploited and neglected.

Though statutory inspection of these and all other voluntary homes is desirable, the committee were unable to find a definition which would make such inspection administratively possible. They suggest that the way to get rid of ill-conducted homes is to provide enough good ones at competitive prices.

AILING OLD PEOPLE

The committee put forward two methods of caring for the long-term sick. In all cases the patient should first be admitted to a general hospital for examination and treatment. After that he should go, either to a unit for such cases closely associated with the general hospital, or else to an ordinary home under a good matron.

They found that many authorities were uncertain about the best ways of dealing with various categories of ailing old people; and also that those nursing them had not been suitably trained for the work. They wish to see a centre established in which the best ways of caring for the three following groups could be studied:

1. Those merely feeble through old age.
2. Those with sight and hearing failing to a degree that makes life difficult.
3. Those suffering from such long-term illnesses as rheumatism, arthritis or partial paralysis, or from senile changes.

Those wishing to specialise in the care of the aged could be trained in such a centre.

RECREATIONS

More clubs are needed where old men can meet, talk, and play cards or billiards. Handicrafts and reading could be encouraged in institutions and homes. Since employment delays the appearance of senile changes the old should be encouraged to stay at work as long as they wish to do so, and the committee suggest financial inducements. Employers insisting on a retiring age of 65 should reconsider the matter in the new circumstances of full employment, social security, and an ageing population.

A CENTRAL BODY?

Continued systematic study of all matters affecting the aged is needed. The committee see that a strong case can be made for a central body with authority and resources to focus interest and increase activity on behalf of the aged; but they do not specifically recommend its formation, though they think it may develop spontaneously as a result of the discussions which the Nuffield Foundation hopes to arrange with other bodies.

The Medical Aspects

A medical subcommittee was composed of the following members: Mr. A. S. Parkes, SC.D., F.R.S. (chairman), Dr. A. Greig Anderson, Dr. A. D. Briggs, Prof. Aubrey Lewis, Dr. J. H. Sheldon, and Dr. F. Yates.

They reported briefly on directions in which research into the process of ageing is being or might be conducted.

Committee (of whose 9 members 7 will be medical and 5 in active practice) there will be a final appeal to the Minister.

How does this compare with the present system? Today when a man wishes to practise in a particular area he may go to an agency and see whether there be a practice for sale in that area; if not he must either wait till there is or must choose another district. Or he may go to the district and squat; but squatting is no longer favourably regarded. Hence it is quite common for a doctor in search of a practice to spend many weeks or months going from one part of the country to another till he obtains a suitable opening. The new scheme may not be better than the old one, but it should not be worse.

Those who followed the debate in the House of Lords will be aware that an amendment was inserted there by which "regard should be paid to any desire expressed by an applicant to practise with other medical practitioners already providing medical services in the area, and of any desire expressed by such other medical practitioners to take an applicant into practice with them." This addition is valuable and reasonable.

> *Principle V.*—Every registered medical practitioner should be entitled as a right to participate in the public service.

This is a curious claim. Though there is no manner of doubt that in the working of the Act every registered doctor who wishes to participate will be allowed to do so, it would be difficult for any Government to guarantee this in the wording of an Act. It would mean that a doctor would be able to compel the Minister to take him into the service, although the Minister would have no power to compel the doctor to enter. Such one-sided compulsion could not be accepted by any Government. It would be defensible only if the Ministry had a monopoly of all medical services, whereas we know that a practitioner may continue in practice outside the service. The consultant on the staff of a hospital is in a different category, and should receive some guarantee from the Ministry. His position has been improved by the statements in Mr. Bevan's letter to the Presidents last week.

PLANNING AND ADMINISTRATION

> *Principle VI.*—The hospital service should be planned over natural hospital areas centred on universities in order that these centres of education and research may influence the whole service.
>
> *Principle VII.*—There should be adequate representation of the medical profession on all administrative bodies associated with the new service in order that doctors may make their contribution to the efficiency of the service.

These two last principles are fulfilled in the Act. Due regard has been paid to medical education and research. The Government has given way on an important point which the Negotiating Committee pressed—namely, that the regional board should have administrative and not merely advisory powers. And the claim for adequate representation on all administrative bodies has been fairly met.

CONCLUSION

This brief review shows that there are in fact few respects in which the Act contravenes any principle enunciated by the profession; and it certainly embodies much for which the profession has been working. Nevertheless the scheme has blemishes, and the only means by which these are likely to be removed or minimised is the "free negotiation" which the Minister invites.

The profession is full of exaggerated fears about the curtailment of freedom. But perhaps we are not yet sufficiently alarmed about the consequences of refusing our help in deciding the conditions under which the doctor of the future will work.

Special Articles

OLD PEOPLE

NUFFIELD FOUNDATION'S REPORT

DISJOINTED evidence of hardships suffered in old age has been reaching the lay and medical press for some time; and an authoritative survey of the problems of *ageing and the care of old people is therefore* timely.[1] This has been undertaken by a committee, appointed by the Nuffield Foundation, with Mr. B. Seebohm Rowntree as chairman.

The other members of the committee were Miss Ellinor Black, Mr. E. C. Bligh, Dr. A. D. Briggs, Mr. L. Farrer Brown, Mrs. A. V. Hill, Prof. Aubrey Lewis, F.R.C.P., Mr. Fred Messer M.P., and Mr. Roger Wilson. Two members of the committee as originally appointed—Mr. W. Hyde and Mr. F. D. Stuart—died while the work was in progress. Advisory members were Mr. Howell E. James for the Ministry of Health, Mr. J. Mason Allan and Mr. W. Birrell for the Department of Health for Scotland, and Sir Geoffrey King and Mr. H. Fieldhouse for the Assistance Board.

As Mr. Farrer-Brown, secretary of the Nuffield Foundation, says in the preface, the report "makes abundantly clear the great opportunity for voluntary enterprise to help in securing a happy life for our old people." The Nuffield trustees intend to further such enterprise, and hope other bodies of similar views will join them in discussion and action. The foundation's programme of assistance is to be announced shortly.

SCOPE OF THE SURVEY

The committee have studied the incomes of the old, their houses and living conditions, the homes and institutions provided for their care, their recreations, their possible employment.

In addition the report carries fifteen informative appendices, listing such things as existing charities for old people, the number of people of pensionable age living in public-assistance institutions or receiving outdoor relief under the poor-law on May 1, 1946, and the public assistance homes and institutions visited by the committee; describing endowed charities for old people in a large city (York), life in an institution for old men, and welfare facilities in an urban and a rural district (Merseyside and Cambridgeshire); and analysing the living conditions of old people in five county boroughs, the employment of elderly workers in four county boroughs, and the circumstances of old people applying for admission to a voluntary home.

Recommendations Summarised

Though sympathy for the hardships of old people is widespread just at present, the committee remind us that our country's resources of wealth and labour are now limited, and that the proportion of old people in the population is growing. Nevertheless they see much that can and should be done.

THE INDEPENDENT AGED

The great majority of old people—perhaps more than *95% of them—live in their* own *homes or* those o members of their family. But many old people living independently or with their children are unfit on physica or mental grounds to do so. Their enthusiasm fo independence is undoubtedly due to the lack of suitabl homes and the fear (often, but not always, justified) o regimentation. If enough homes with a homelike atmosphere can be provided more old people will prefer t enter them, and this will lessen the need for extensiv home-help, home-nursing, home-visiting, and home meals services.

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1. Old People. Published for the trustees of the Nuffield Foundation. London: Oxford U

the London County Council provided before the war for their schools. These may be judged trivial points, but anyone who has attended as a patient some of our older hospitals will vouch for the depression fostered by dim lighting, tiled walls, chocolate paint, and wooden benches. Chairs should be of the steel-framed "stacking" variety, with canvas seats and backs, or better. Clearly legible on or above each consulting-room door should be the name of the doctor occupying it, and, when he is not available, the name of the locum doing his work.

As has been indicated, practitioners may at first have difficulty in meeting all demands; so nothing should be overlooked which might save their time. A most potent source of lost time at surgeries is the undressing and dressing of patients before and after examination. If the proposal for a large central waiting-room is accepted, this waste could be overcome by placing an examination room, with separate cubicles, between each of the doctors' rooms. Male and female rooms would alternate, and they would have doors leading to the doctor's room on each side, so that every doctor would share his examination rooms with one of his two neighbours. The contention that this arrangement would introduce an institutional atmosphere seems to be outweighed by the advantage to the patient in being able to undress and dress at leisure and in privacy.

RECEPTION AND RECORDS

On arrival patients go to the reception desk and get an interview "card" in the form of a clearly numbered ivorine tablet, inscribed "Please hand this to the doctor when your turn comes." A set of these cards for each consulting-room, consecutively numbered and either differently coloured or inscribed with the doctor's name, will help to prevent place-jumping. (The same colour could be inset on a panel on each consulting-room door.) It might be helpful to give all casual patients even-numbered cards, reserving the odd numbers for patients who deserve priority, because they have made appointments or for some other good reason.[1]

The medical records in the centre are kept in a locked filing cabinet near the receptionist's desk. As each patient receives his numbered card at the desk his record is found and a metal clip (coloured and numbered to correspond to the ivorine card) is attached to the notes. From time to time the reception clerk takes a bundle of these into the doctor's room, bringing out with her the records of patients already seen.

The form that these records shall take must be finally cided before the Act comes into operation: the rvices know by experience the difficulty of altering system in being. The desiderata are simplicity and andardisation. Any complex method would waste luable time; it would, moreover, not be fully used. otes should be contained in a standard canvas envelope owing the patient's name on the outside; it should be rong enough to bear repeated sealing with paper labels, that it can accompany the patient attending hospital. oth envelope and record would, of course, be taken by e doctor visiting the patient at home. The record itself ould be on a form similar to the present "panel" cards. here notes are written conscientiously little more than simple request should be needed when the patient is ferred to hospital; the hospital returning the patient, hether after outpatient or inpatient treatment, should port on a sheet of the same standard size.

There would be great advantage in duplicating all ecords by the simple expedient of making a carbon copy hrough a "flimsy" upper sheet; for some years this ethod has been used, with conspicuous success, by he Royal Air Force. The "flimsies" would remain in the patient's envelope; the copies would be collected by a central registry, direct from hospitals, and at regular intervals from health centres. The registry, containing as it would birth-to-death records of all who use the service, would provide invaluable statistical data. But—more important—it would be a never-failing source of information about the previous health of patients. Local records are easily lost through patients moving or other causes. Any initial opposition to the registry would certainly subside when doctors found that it provided photostat copies of missing records.

At all costs copying of notes must be taboo, except by the very skilled, who are likely to be few. The doctor's writing is sometimes not easily read; and the uninitiated when they cannot decipher often guess. Better a record which, if illegible, is correct, than one which is readable but wrong.

Prescriptions will, no doubt, for everyone's convenience be based on the successor to the present *National Health Insurance Formulary*, with the same freedom for the doctor to order whatever is suited to his patient's condition. Should the health centre have its own dispensary, the procedure of obtaining medicines will be relatively simple; if not, a prescription in due form, signed (not stamped) by the doctor (desirable always and essential in the case of dangerous drugs), will be needed.

Otherwise, practitioners should have virtually no clerical work. Certificates should be standardised, and certified copies granted by a lay clerk. Any other information required centrally should be got by lay examination of the record cards.

SECRETARY, NURSES, AND SOCIAL SERVICE

To make sure that the doctor is relieved of clerical and other non-essential work will be one of the tasks of the centre secretary, who must be an able person. As the senior lay officer on the staff, she (or possibly he) is selected with care for experience and tact in dealing with the great variety of questions that come to her. The title "secretary" is deliberately chosen, because, apart from its original suggestion of a person who can keep confidences, it avoids the "illness atmosphere" of any title associated primarily with a hospital. For this latter reason it is important that the secretary should not be a nurse; a qualification in social service might be an advantage but would not be essential. According to the size of the centre, the secretary would have on her staff additional lay workers qualified to deal with various aspects of the work—e.g., reception, shorthand-typing, filing, and so on. Her room should be readily accessible, but not necessarily beside the waiting-room.

The question of how much nursing service will be required and how it should be provided has already been briefly discussed: a good deal of experiment may be needed before the answer—or answers—become clear. On these answers may depend the amount of service required from trained social workers or almoners. Inevitably there will be patients for whom the services of a medical-social worker are needed, and these will be sent by the doctor to the almoner for the area. Whether she is on the staff of the local hospital, or directly available for a group of health centres, will depend on circumstances.

Outpatient and kindred appointments will be made through the centre secretary, who will also be able to give information about local health services which people may need to use.

HEALTH CENTRE AND HOSPITAL

At present the hospitals undertake a good deal of minor treatment that comes within the province of the family doctor. With a properly equipped health centre, having a nurse always on duty, much of the unnecessary

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[1] We owe this ingenious suggestion to Mr. Austen Spearing. If it is found in practice that patients cannot be prevented from taking the ivorine tablets home, paper tickets might serve the same purpose.

There should be no centralisation, they think, of research on ageing, which on the contrary could be most effectively promoted by supporting over a period of years research units tackling special problems; by establishing fellowships at suitable research centres; by providing grants and research expense grants; by offering bibliographic and other guidance to research-workers; and by using a medical subcommittee to coördinate the whole research programme and advise on fellowships and grants.

A HOME FOR THOSE IN NEED

THE R.M.B.F.'S NEW VENTURE

FOR several years the Royal Medical Benevolent Fund have been considering the foundation of a home for some of their beneficiaries, especially widows. A substantial endowment fund was left for the purpose by Dr. Arthur Holdsworth Davis, and at the end of the war a subcommittee appointed for the purpose began to look for a suitable house. This has now been found at Westmoreland Lodge, Inner Park Road, Wimbledon Common, London, and has been purchased freehold. It is a mid-Victorian house, without a basement: it has a good garden, and is near a bus stop and within easy reach of shops and cinemas. It will receive twelve women residents as well as the warden, and each resident will have her own bed-sitting room with either gas or electric heating and cooking arrangements. There will also, it is hoped, be central heating. The warden and her staff will provide a substantial midday meal; for other meals residents will have the opportunity and interest of fending for themselves. Two large refrigerators have been provided for their foodstuffs, and they will have the use of convenient washing-up places. The dining-room on the ground floor is large enough to serve as a common-room as well; it has a glass-enclosed verandah for use on sunny days. Some furnishings have already been given, but more are needed, including carpets (especially stair-carpet) and curtains. The cost of purchase and of alterations, amounting to some £10,000, is being provided out of Dr. Davis's bequest. This large initial outlay naturally reduces the income of the fund; and since the cost of upkeep is likely to be considerable the profession are asked to help financially.

Only candidates able to look after themselves, clean their own rooms, and cook their own breakfasts and suppers will be accepted; but if the experiment is successful a hostel for infirm or bedridden beneficiaries may be considered. The name of Dr. Davis is to be associated with the new home, which will be opened, it is hoped, by the early summer of this year. Visitors who wish to view the home are already welcome, but should telephone Putney 0128 in order to be sure they will find someone there. Further information about the home may be had from the secretary of the R.M.B.F., 1, Balliol House, Manor Fields, Putney, S.W.15.

In Westmoreland Lodge the Royal Medical Benevolent Fund have an opportunity to create an example of the right kind of home for old people, and by doing so could perform a valuable service to others besides their own beneficiaries. One of the principal aims of such a home should be to give its occupants at once a sense of security and a sense of freedom, rules being reduced to a minimum. The residents should enjoy the same consideration as occupants of a good boarding-house, and should be spared any of the regimentation so often associated with otherwise excellent charitable undertakings. Nobody would wish to see them burdened unduly with affairs, but perhaps it would be possible for them to take an active part in the management of their own home. Many doctors would certainly be willing to contribute to an experiment on these lines.

Sir ALFRED WEBB-JOHNSON, P.R.C.S., has been elected a foreign member of the Academy of Surgery of Paris.

Major-General R. J. BLACKHAM, M.D., has been re-elected a member of the court of common council of the Corporation of London for the 22nd consecutive year.

Health Centres of Tomorrow

III—STRUCTURE AND FUNCTION

THE internal organisation and furnishings of the health centre offer an opportunity for emphasis on the new approach to positive health. Here can be evolved something quite different in plan and appearance from the well-known pattern of the hospital outpatient department.

To a large proportion of the population the health centre will afford their first contact with the health service; so it is important that as far as possible they shall be free of apprehension, embarrassment, or discomfort, and that the convenience of those who seek advice shall be a primary consideration. Let us see how this principle might be applied in the kind of urban centre sketched in the previous article.

WAITING AND CONSULTING ROOMS

Harley Street discovered long ago that it is sound psychology to furnish consulting-rooms and waiting rooms in the style of an ordinary dwelling. The health centre may be furnished on the same principle—except of course the room where minor surgery is undertaken.

A centre housing from four to six doctors will have to accommodate a good many patients during "surgery" hours, particularly in winter. By some the suggestion of a common waiting-room is rejected for fear of cheerlessness, lack of privacy, and an "outpatient" atmosphere Instead, they favour small waiting-rooms for each doctor, which would open off a common entrance hall, as also would offices for receptionist and/or telephonist and for nurses. Others, however, still advocate the single large waiting-room. This would certainly cost less and avoid architectural complication; and it would ease the work of shepherding patients. It might, moreover, offer the best hope of reasonable space and ventilation, thus minimising the risk of droplet-infection. Where ground is not scarce or expensive this waiting-room could be placed centrally as a single-story structure with roof windows. The reception desk should be in this waiting room near its entrance. At busy surgery hours patients may often have to wait their turn before being dealt with, and it is less depressing to wait in an open room with chairs, than in a corridor queue. Large waiting-rooms when cheerfully decorated, as they have been in a few modern clinics, have commended themselves to their users as preferable to the small isolated purgatories of tradition. When, in the years to come, people from all walks of life meet at the centres the spaciousness of the large room may prove more acceptable than the enforced intimacy of the small. Radio and magazines, perhaps supplied by patients themselves, might be welcome amenities; but if these are to fulfil their purpose the sound must be subdued and only the less dog-eared papers retained.

Whichever type is selected, special provision should be made for children. Some healthy adults, and certainly most of the sick, resent the normal noisiness of the young, who should be diverted to a separate play-waiting-room. There should also be ample washing and lavatory facilities, conveniently placed, for both adults and children.

The atmosphere of the centres will be largely determined by their interior decoration. The halls and waiting-rooms should be light, spacious, cheerful, and as comfortable as possible, while the doctors' rooms should be arranged in a personal style, to encourage relaxation and confidence. Much can be done—and at little extra cost—by good lighting, by the intelligent use of light woods and of bright but restful colours (pale blue and shell-pink, for example), and by decoration of the walls with a few middle-brow pictures such as those which

In England Now

A Running Commentary by Peripatetic Correspondents

It's all very well when these people come back from the States with new ideas to stimulate us, but there are limits to stimulation. We don't mind when they sit around at supper and discuss whether the Alpha Zunc blood-levels should be done hourly in all patients or only in diabetics. We don't mind when they put up an intravenous infusion in 48 seconds while taking a history from the patient in the next bed. (As far as I can make out, in the States they put up a drip in every patient before breakfast each morning, and if the nurses, who are all honeys, have not taken down the previous one they just go into the other arm.) But when it comes to Tannoy—to loudspeakers in all the rooms—well, really, stimulation has become excessive. There are loudspeakers in our billiards-room, in the dining-room, in the corridors; even in the lavatory—is nothing sacred? They are not yet in action, but the front-door porters are working up an American accent: "Calling Ducter Kil-da-er! Calling Ducter Kil-da-er!" We are not yet sure who will do the broadcasting. Perhaps orders for the day will be read by the house-governor. The effect of the first pronunciamento will be terrific: there will be a great leaping of startled housemen out of armchairs, a great ripping of the cloth on the billiards-table, and then, no doubt, a great volley of missiles at the loudspeaker. Would the Editor like me to interview the recipient of the first message? "Handsome twenty-five-year-old Peter Widger had breakfasted lightly on sausages and toast, little guessing that before the day was out. . . ."

I suppose that Progress will triumph after a time and we shall accept the system with joy at increased efficiency. We may even get outside phone calls before the caller has given up waiting. The most serious opposition will come from a more advanced brain than the "let's pull 'em all down" reactionary. He proposes to loop his own transmitter into the circuit somewhere and set up a Freedom Radio. This will open up great possibilities; a wandering microphone (or one which purports to be) could pick up the most extraordinary remarks. However, by the time this appears in print we shall know the worst. For the time being we watch the loudspeakers anxiously as we slink past, waiting for the first words from the Porter With the Golden Voice. Oh, for the good old days: "There's an urgent note for you, sir; I've been looking for you since Tuesday."

* * *

When the time comes round for it, getting out of the Army is easier than going in. Going in, dignified by the name of "initial training," takes three weeks, whereas becoming to all outside appearance a civilian takes less than three hours, including the last meal on Army rations. I was demobbed at York, and found myself wondering whether Shakespeare's astonishing prevision had extended to the demob centre there when he wrote: "Now is the winter of our discontent made glorious summer by this sun of York."

It soon becomes clear, however, that simple transit from the Army to civil life cannot be equated with complete civilian rehabilitation. Technical courses are very well in their way, and sometimes surprisingly adequate—I met a plumber who said he was on a six months' refresher course, and assured me that of course this didn't cover the whole art of plumbing, but only what we would call "recent advances." But no technical course teaches us how to handle ration-books and clothing-coupons, and the art of finding somewhere to stay.

I had to find rooms in a northern industrial city which I hadn't visited before, and I spent a very informative afternoon in doing so. All the landladies looked like outpatients, and some more so than others. My first prospective hausfrau fixed me firmly with the eye that didn't squint (the other was engaged in an innocuous flirtation with some sparrows outside the window), and said that she hoped I wouldn't want any cooking. I took it she meant the food, and said I was, it so happened, rather fond of a hot breakfast and supper. This drew forth a sigh, and the statement that "My last young man just helped himself to bread and cheese from the cupboard." For this privilege he had been paying £3 10s. a week, and I decided I was not sufficient for these things, and passed on. The next on my list, Mrs. Guildencrantz, said she only had anyone because her attacks prevented her from living alone; just now she had a student, but would I pay her half a crown more, in which case I could have the room. I didn't like this much, for I foresaw that some really affluent person like a poultry-farmer might come along, with five shillings jingling in his pockets, and I would be out on the streets. I went away quietly, for I thought that any discussion of the quantitative relationship between living alone and the 2s. 6d. doctor-student difference might bring on an attack. After some trials of this kind I did find a place where I am being well done for; the only snare which has appeared so far has been a tendency to monologues on the weather. I am gradually bringing this under control with a persistent attitude of no-enthusiasm; the weather itself is proving a big help in the campaign, for it is quite lacking in that variation which is the spice of pseudo-conversation.

* * *

Those with innocent-looking numbers tattooed on the extensor surface of their forearms were the worst offenders. I suppose that anyone with such a permanent souvenir from Auschwitz would be bound to show possessive traits which are irritating to us who have never been dispossessed or suffered the constant threat of losing everything that is near and dear. But with mothers and their newborn babies these traits are not only irritating but dangerous. "This is my baby," said the ex-Auschwitz mother. "Mine to play with at all hours, mine to disturb when asleep, my baby." And because of this the baby was to be constantly picked up, continually given the breast when the whim arose. At Belsen there was Samuel, aged four months, whose three brothers had all died long before that age in the concentration camp, and who spent a whole afternoon, with the rest of the clinic waiting, in being powdered and dressed by a pathetic over-anxious mother, assisted by father, aunt, and grandmother, all getting in each other's way. Here, also, the convalescence was still too short for us to expect a normal maternal instinct, tempered by a maternal sense as to the welfare of her offspring. So I had to go on explaining in French, to a mother who understood Greek but spoke Polish, that breast-feeding every four hours was quite sufficient; and that it was a good thing for baby to sleep between times.

* * *

Cautionary Tale.—You still read about clinical trials of new drugs in which it is cheerfully assumed that every drop, tablet, or capsule written up on the bed-letter must have reached the patient's tum-tum—I have even seen it assumed with outpatients—so my first and last bit of research may (as they say) be of interest.

When I was H.P. at St. Ethel's Hospital for Men, Women, and Children (no dogs admitted) my physician suggested I should try a certain barbiturate in the chorea ward. It had been successful abroad but had not been used before for chorea in England. We had about a dozen cases, so I wrote the stuff up on the bed-letter and stood back for results. Roughly they came to this: in severe chorea the drug had absolutely no effect; in the rest it produced a drug fever with morbilliform rash after 5–10 days, and as the rash cleared the chorea went too. One or two of the children looked pretty dicky at the height of their reaction; but all was well. So the complete failure in the severe cases was disappointing—and quite inexplicable. Somebody else published a full-dress article on the subject soon afterwards, and I remember thinking it odd that he hadn't noticed any lack of response in severe cases.

I learnt the explanation ten years later, but only by the drastic method of marrying the junior pro in the chorea ward. Sister had heard about this drug from the physician over a cup of tea in her room, and thought it dangerous stuff, so she gave it herself—full doses to the slight and moderate cases, and none at all to the severe.

hospital attendance could be obviated. The patient's time would thus be saved, while the hospitals, confining themselves to consultation and the treatment of major illness, could give the practitioner a better service.

When every patient has a family doctor, the aim should be for nearly all patients to reach hospital through their practitioner. When the facilities for treatment at the health centre are known to the hospital, the patient could often be referred straight back to the practitioner for treatment instead of continuing to attend hospital.

It is highly desirable that in all difficult cases the practitioner should himself go with the patient to the specialist, and take part in a consultation at the hospital just as today he takes part in consultations at the specialist's private house. In an ideal service he would also visit the patients who have been admitted to hospital, and continue to hold a watching brief for them. A growing habit of consultation, in the consulting-room or at the bedside, is necessary to the salvation of general practice.

Not all consultations, however, need be held at hospital. Six *doctors practising in cooperation will probably* accumulate enough non-urgent cases requiring a consultant opinion to justify fortnightly medical, surgical, and gynæcological sessions at the centre itself. This would be a great convenience to both patient and practitioner, and if the other doctors working in the centre could find time to attend the session they would enjoy on their own premises the equivalent of a ward round or outpatient attendance.

There would probably be no need for a special consulting-room, since at any given time there is sure to be either a vacant surgery, a minor-ailment room, or an infant-welfare room which could easily be put at the consultant's disposal. On the other hand every centre ought to possess a common-room, supplied with books and journals, where the doctors and their specialist guests can talk in armchairs round the fire. On a long view this is perhaps the most important room in the place.

Should the general practitioner be further encouraged by giving him beds at the health centre? That seems to depend on circumstances. In rural areas they would often be invaluable; but in towns a hospital is more appropriate for the patient who cannot be nursed at home—even for the accident case which has had first-aid at a centre.

In emphasising the value of ready access to hospital resources, both physical and intellectual, we must not minimise the need for frequent informal consultation between the health-centre practitioners themselves. Most of these will have a bent towards a particular branch of medicine, and some may indeed be aiming at a specialist qualification later. So long as a man is working at a health centre rather than a hospital, he must continue to undertake general practice: the kind of health centre we are trying to develop is not a group of specialists—a minor Mayo Clinic. But if he is particularly keen on ears, or eyes, or children, or anæsthetics he should be encouraged to attach himself in some way to the appropriate department of the local hospital, and his colleagues should make use of any special skill he may possess or attain. So far as the specialty is concerned, he would have to be content to regard himself as junior to the hospital specialist, who would have to take all major decisions; but he might come to be considered the specialist's representative on the health-centre staff.

One of the great errors to be guarded against in the new service is the error of rigidity. It would be disastrous, for example, if the qualifications demanded for specialist practice were such as to prevent suitable men and women transferring from general practice to a specialty: nor should a specialist feel that he would lose face by deciding to change to general practice. People do not necessarily find their proper work early in their careers, and the system should not only allow them, but positively encourage them, to do what they can do best.

Medicine and the Law

What Constitutes Live Birth?

A PERIPATETIC correspondent in our issue of Dec. 2 told the story of a five months' fœtus which, according to the midwife present at the delivery, cried feebly for a moment or so after the cord was cut. The coroner's officer advised the doctor that no birth, death, or burial certificate was necessary and that he could do what he liked with the fœtus. It has since been suggested that the officer was wrong—that if a child is born, and after complete birth shows signs of life and subsequently dies, both the birth and the death must be registered irrespective of the duration of pregnancy.

The law on the registration of births is governed by the Births and Deaths Registration Acts, 1874–1926, which place primarily on the parents, and in default of them on certain others, including persons present at the birth the duty of registering, within 42 days (21 days in Scotland), *the birth of every child born alive.* Stillbirths must be similarly registered, and at the time of such registration the registrar must be handed a certificate signed by a doctor or midwife stating that the child was not born alive, or in default of a certificate a statutory declaration to the same effect in the prescribed form. It is unlawful to have a stillborn child buried without the written sanction of a coroner or registrar.

The Acts do not give us a definition of "born alive." They do, however, define "stillborn" as any child *which has issued forth from its mother after* the twenty-eighth week of pregnancy and which did not breathe or show any other signs of life. It is clear, therefore, that there is no obligation to register a fœtus born dead before the twenty-ninth week. Is there an obligation to register a fœtus born before the twenty-ninth week which has shown signs of life?

Registration, as we have seen, depends on live birth. At common law, to be born alive the child must have (1) been fully extruded and (2) achieved an independent living existence. It is not necessary that it should have breathed, or that the cord should have been cut; but it must have given some active evidence of life. Under the Infant Life Preservation Act, 1929, evidence that the mother had been pregnant for 28 weeks is prima-facie evidence that the child is capable of being born alive. The presumption is therefore implicit in both this Act and the Registration Acts that a child is only capable of being born alive after the twenty-eighth week. This does not mean that if, by some freak of nature, a healthy living child were to be born at, say, 24 weeks the law would refuse to recognise its existence (though this may have been in the mind of the sapient coroner's jury, quoted by Professor Kenny, who returned a verdict on "a child found dead, *aged about three months*; but no evidence as to whether or not it had been born alive").

The true position is that live birth is a question of fact and that up to the beginning of the twenty-ninth week there is probably a presumption against viability. If the doctor is of the opinion that a child was born alive the presumption is rebutted and the birth must be registered. But the law says that, for registration to be required, "a child" must be born alive—not merely that living tissue must have been extruded. It is common knowledge that long before the period of viability newborn fœtuses may make feeble cries and movements, and it would be absurd to suggest that every abortion or miscarriage in which these phenomena are observed must be registered as a live birth. The dividing line is indefinite, but for the purposes of the law the arbitrary line is drawn at 28 weeks. Above that line the fœtus is "a child," and the common-law rules given above will apply. Below that line it is not "a child" unless exceptional circumstances justify the doctor in calling it such. Except in such circumstances there will be no need for regi
has exhibited such transient si
the common-law conditions.

whilst we will continue our work as in the past, fortified by the knowledge that no service can be implemented without coöperation from the poor G.P.

Kent. F. M. S.

IMPENDING DEATH UNDER ANÆSTHESIA

SIR,—I read with great interest Mr. Hamilton Bailey's excellent article of Jan. 4. I would support wholeheartedly his plea for early cardiac massage.

There is one sign which I have found invaluable and which has led to complete recovery in my last three cases of collapse on the table: it is that of a silent heart. The moment I see the anæsthetist anxious or in difficulties I put my ear over the patient's apex-beat. If the heart is beating, the surgeon need do no more than give the anæsthetist any help and encouragement he may require. If, on the other hand, no sounds are audible, I thrust a needle into the heart and listen again; and if no beat is heard I massage the heart immediately. In this way it is possible to be off the mark within a minute of the alarm being raised.

In so serious an emergency palpation of the radial or carotid pulse is, I submit, not certain enough; this is an occasion when we must go to the fountain-head. The method also has the advantage of keeping the surgeon sterile. The cardiac area has to be cleared in any case, and this direct access leaves no doubt whatever as to the heart's action.

London, W.1. HAROLD DODD.

SIR,—I consider it unfortunate, at least, that Mr. Hamilton Bailey should so publicise cardiac massage—a procedure which in 25 years of major surgery I have never found necessary. I should indeed be most irate with my anæsthetist if it were necessary.

I can visualise excited surgeons all over the world hurriedly opening the thorax because of a temporary asphyxia due to a light anæsthesia, maltreating a perfectly good heart, and triumphantly publishing so many lives saved because of Mr. Bailey's teaching. Yet I fear that the number of lives saved by this technique will by no means balance the number of lives lost through its unnecessary performance. Were I to shock my patients to such a degree that "cardiac massage" were required, I should give up surgery. If my anæsthetists produced such a state, I should give up my anæsthetists.

London, W.1. MORTIMER REDDINGTON.

LAY OR MEDICAL ADMINISTRATORS?

SIR,—Your correspondent of Jan. 4 (p. 30) in his logical though biased dissertation on hospital administration discloses, I suggest, a lack of practical experience.

In my turn I should like, admittedly also with considerable bias engendered from long experience in voluntary and municipal hospitals, to set out my reasons for pressing for a medical rather than a lay administrator. Though I have known house-governors in voluntary hospitals who could not have been advantageously replaced by a medical man, I have also known many others who could not be so extolled.

Hospitals exist to relieve or cure the sick as expeditiously as possible, and not for the benefit of the staff or of any particular department of the hospital, although these of course do enter into efficient administration. As all matters of policy eventually concern the welfare of the patient, in every discussion one question should always be asked: "Is it in the interest of the patients?" I suggest that the only people who can answer this question with all its implications are medical men, experienced in hospital administration and in constant contact with the wards of the hospital and its needs. Policy should therefore be presented to the managing committee by the medical staff through its medical committee, of which the medical superintendent may or may not be a member. I think that he should be, as no medical man knows better what is required than a full-time medical superintendent who is on the spot and in touch with all that transpires in the hospital.

A full-time medical superintendent supported by a deputy is, I suggest, desirable to deal with inquiries from general practitioners, members of the committee of management, patients, their relatives, interested visitors and outside official bodies; to consider suggestions from the staff and others: and to investigate complaints promptly. Again a medical superintendent is better fitted than a lay administrator to guard against specialist blocs becoming real "blocks" to the efficiency of the hospital; to coördinate the departments of the hospital to prevent the formation of watertight compartments, not only in medical and nursing matters but also in the clerical, catering, and cleansing departments; to prevent policy being recommended to the committee of management by heads of these departments without previous consultation with the medical staff committee. His duties should also include the admission of patients and their allocation to appropriate beds and specialists. He should be able to allocate patients to any vacant beds in emergency. There should be only one waiting-list, and this he should carefully scrutinise from time to time, for only a medical man can adjudicate upon the urgency of admission without fear or favour.

The medical superintendent should be acquainted with everything that goes on in the hospital—even if there is a lay administrator, to which I am not entirely opposed, provided there are efficient safeguards to prevent untoward clashes. What this medical administrator is called is immaterial, provided the name makes it clear that he is the internal administrator and medical man in control of the hospital and avoids confusion with the medical officer of health, who is often called medical superintendent, though usually without exercising any internal administrative control.

Under the National Health Service, it must also be remembered, one of the functions of the lay administrators of voluntary hospitals will disappear, for there will no longer be the same need to secure funds from the public.

Leicester. ERNEST C. HADLEY.

SIR,—The internal management of hospitals in the new health service is to be vested in responsible committees: such is the intention of the Act. It is nevertheless of paramount importance that the daily routine of the busy hospital shall be ever present in the minds of the planners; for, though committees may control finance, direct policy, maintain proper relations with other bodies, and generally superintend the activities of the hospital, they will not themselves do the work!

Efficient service depends on the willing discharge of the daily duty by every member of the hospital staff, from the junior ward orderly to the visiting consultant, and to that end all hospitals, of whatever type, have so far found it necessary to have at least three executive officers to provide for, direct, control, supervise, reprove, advise, report—what you will—the activities of the hospital staff. One of these officers, a layman, is house-governor, secretary, secretary-superintendent, steward, or adjutant. The second is the matron, or lady superintendent of nurses. And the third—and not least—is the senior resident medical officer, medical director or superintendent, medical officer in charge, commanding officer, or (as your correspondent of Jan. 4 suggests) "dean."

In practice it is usually to be observed that unless there is close understanding between these officers, their respective committees, and their colleagues and subordinates there will not be a good morale, and without a "happy-ship atmosphere" there will not be complete efficiency. It should also be remembered that the reputation of the hospital depends not only upon efficiency within but on good liaison with all those individuals who may knock at its doors; and the busier the hospital the greater the need for close attention to all its gates.

The very essence of hospital tradition is team service, and good team-work depends upon the skilful blending of the autocrat, the democrat, and—yes—the bureaucrat. For what is a hospital without its bureau? Or its surgeon or ward sister, who when needful will insist on being more than a "bedside adviser"? Or the rest, mostly good democrats (when their own toes are not being trodden on)?

There will be room to spare in our future hospitals for a medical man who can exercise that fatherly care with the tact and dignity upon which your correspondent so rightly insists. Is it not time, then, that hair-splitting over his title, designation, or "status" should stop? And likewise the attempt to deny him that measure of authority which his office requires, and will continue to require?

London, W.1. H. W. BREESE.

without "early"—and, if inconclusive, repeated—X-ray examination. Apart from periodical (and compulsory) mass surveys in hazardous industries it is the Health Centres of Tomorrow which ought to be the Target for Tomorrow of mass routine radiography.

E. G. W. Hoffstaedt.

Holywood Hall Sanatorium, Wolsingham.

PREVENTION OF EPIDEMIC NEONATAL DIARRHŒA

Sir,—Mr. Stern (Jan. 11), in indicating the film which forms inside feeding-bottles, may well have found one of the causal factors of otherwise baffling epidemics of neonatal diarrhœa. Removal of this very adherent film is difficult but desirable even though the bottles are sterilised after use. Mr. Stern does not recommend a method by which the bottles may be "thoroughly cleansed of film." I have found the best cleansing agent to be one of the sulphonated alcohols or soapless detergents called 'Teepol' (Technical Products Ltd.). A small quantity of this in the washing-up water and the use of a bottle brush will quickly remove film.

London, N.14. C. Allan Birch.

PSYCHOTHERAPY OF ULCERATIVE COLITIS

Sir,—Dr. West (Dec. 21) remarks on the disregard in the 1920's of the emotional element in the causation of colitis.

It may be of historical interest to record that in the summer of 1921, after a preliminary psychological investigation to prove the need, I referred a patient to Dr. Millais Culpin for psychotherapy. She was a musically talented woman with aspirations to become a professional, who for 23 years, from the age of 15, had been virtually a prisoner confined to the vicinity of a w.c. The treatment was completely successful. Before long I was successfully treating colonic spasm in the same way.

Those were the days when the appendix was stitched to the abdominal wall and used as a channel through which to wash out the colon in an attempt to rid it of an irritant existing, as Groddeck had shown long before, only in the mind. Neither Culpin nor I had heard of Groddeck then.

Portsmouth. W. S. Inman.

A MORAL PROBLEM

Sir,—Leaving out of consideration the sense of degradation which most of your readers would feel on reading details of experiments on innocent outraged human victims, the argument against the German medical atrocities is that any small step forward in medical knowledge is at the expense of an immense step backward in civilisation. I realised from the beginning that someone would put the entirely hypothetical question whether such atrocities would be justified if they produced a major medical advance such as a cure for tuberculosis, and my answer would still be No; for even the hurrying by some years of such great relief of human suffering would be too dearly purchased by the immeasurably greater harm done to the respect for the human personality on which civilised human life depends. It is better to be a Keats or a Stevenson with tuberculosis than a Himmler or a Goebbels without it.

The publication of medical knowledge obtained by the treatment of war wounds or Belsen starvation is not at all analogous, because that was obtained in the proper medical function of rendering aid to the sick and wounded, and not in its perversion in experimental atrocity. There is all the difference.

The point to consider therefore, apart from the sense of degradation and shame which editors, secretaries, printers, and readers would feel in dealing with such stuff (which some would discount as mere sentiment), is whether the consummation of such "research" by its publication and use would make us accessories after the crime. I personally feel that they would, and that they would make it considerably easier for some future would-be human vivisectionists to give way to their inhuman instincts.

The records should be destroyed—the sooner the better. They should never be published.

London, S.W.15 A. Nelson-Jones.

Obituary

WILLIAM HAROLD WHITE

M.R.C.S.

For the past 25 years Dr. W. H. White put into practice in his maternity home at Blackheath his theories on the advantages of a vegetarian diet and suitable exercises for expectant mothers. Born in 1882, the son of the Rev. Samuel White, vicar of Marley Hill, near Durham, he was educated at the Clergy Orphanage School at Canterbury, and at first worked in an insurance office. But the conditions of midwifery at the time of the birth of his first child so shocked him that he determined to become a doctor. In 1917 he took the Conjoint qualification at St. Thomas's Hospital, later serving with the R.A.M.C. in India. But he had not forgotten why he had joined his new profession, and on demobilisation, after holding a house-appointment at the General Lying-in Hospital in York Road, he opened Stonefield Maternity Home with Dr. Cyril Pink in 1920. "Perhaps the most valuable contribution Dr. White made to obstetrics," writes a colleague, "was his encouragement of the use of exercise during pregnancy and the puerperium, and through his enthusiasm many patients received great benefits. He tried to plan antenatal care so as to secure a small child, and so was an experimental observer in one of the most complex biochemical fields."

Dr. White died at Hindhead on Dec. 29. His wife, Miss Ethel Hutchings, whom he married in 1907, survives him with three sons and two daughters.

CHARLES GRANT PUGH

M.D., B.SC. LOND., D.P.H.

Dr. C. Grant Pugh, for 32 years medical officer of health for Southend-on-Sea, died on Dec. 19. Of Scottish and Welsh descent, he came of a family with a medical bent, for his elder brother, the late W. T. Gordon Pugh, was for many years medical superintendent of Queen Mary's Hospital for Children, Carshalton, his sister was formerly a senior member of the London County Council nursing staff, and his surviving brother is a dental surgeon in practice in Streatham.

He was educated at Aberystwyth and at the Middlesex Hospital, which characteristically he chose as his medical school because the house-appointments were made on the examination results. He had already graduated B.SC. Lond. in 1894, and in 1899, after winning the senior Broderip and Murray scholarships, he took his M.B. Lond. with honours in medicine. The following year he was awarded the gold medal for his M.D. At that period it seemed unlikely that he could expect promotion to the honorary staff of the Middlesex for a considerable time, and Pugh accordingly relinquished the project of setting up in consultant practice. In 1902 he took the D.P.H. at Cambridge, and after some fruitful years with the Metropolitan Asylums Board and experience as deputy medical superintendent at Bethnal Green Infirmary he became one of J. C. Thresh's assistants in Essex, and Thresh was for him a formative influence of the first importance.

In 1908 Pugh was appointed M.O.H. for Southend, and there he found ample scope both as physician and administrator, for, in those days when the area was less well served by consultants, his opinion was often sought by his colleagues in difficult medical cases. The health services of this rapidly growing population were developed by him on sound lines till the outbreak of the first world war temporarily arrested progress. After serving in the Balkans with the rank of captain, R.A.M.C., he returned to Southend where he was foremost in calling attention to the urgent needs for better hospital provision, and within a few years the generosity of Lord Iveagh and a spirited local initiative had created the new Southend General Hospital.

The Local Government Act of 1929 offered a great opportunity of which, on Pugh's advice, the corporation took full advantage. The sick wards of the poor-law institution at Rochford were transferred from the board of guardians and appropriated for hospital purposes, and, when the extensions begun by the guardians were completed, Pugh set himself the task of modernising the hospital. In 1940, a few weeks before his retirement,

AMPHETAMINE

SIR,—May I suggest that Dr. Howard's case (Jan. 4), in which the possibility of a coincidental remission of symptoms on withdrawal of amphetamine cannot be ruled out, does not provide grounds for his opinion that more cases of idiosyncrasy are observed with amphetamine than with other drugs? In fact, I submit, the literature inclines the other way. There have been remarkably few published reports of idiosyncrasy to this drug, and in a recent survey Bett[1] states that "the great preponderance of competent clinical opinion favours the view that the incidence of undesirable reactions complicating 'Benzedrine' therapy in normal dosage range is negligible and that the few cases reported in the literature are usually traceable to indiscriminate or unsupervised use."

Menley & James Ltd., London, S.E 5. T. C. BLACK.

PERITONEAL DIALYSIS

SIR,—I was interested to read of the use of peritoneal dialysis by Mr. Reid and his colleagues (Nov. 23, p. 749) in a case of anuria treated by renal decapsulation. You will note the recovery of 7 g. of urea from the peritoneal efflux. (It should be emphasised that measurement of urea excretion is only a convenient way of measuring the excretion of all diffusible retention products.) Although more urea escaped in the unrecovered fluid which leaked out, it is not likely that the total extracted during the three days of saline drip exceeded the 20–24 g. per day which continuous peritoneal irrigation achieves. Even at this rate, the uræmic patient must be treated for not less than three or four days before substantial clinical improvement is manifest. Had the urea excretion via the kidney after decapsulation been measured, a valid estimate of the comparative benefits of decapsulation versus dialysis would have been possible. The evidence as far as it goes leaves little doubt that dialysis contributed only a very small benefit and that decapsulation brought about recovery.

We are apprehensive that peritoneal dialysis will be discredited unless the precautions we have lately described[1] with respect to the correct formula and the control of peritonitis—an ever-present danger—are adopted. In a number of cases the method has failed because of incorrect technique, neglect of the principles of fluid balance, or poor choice of case. Our published reports consider the type of tube and the fluid formulas to be used as well as the diffusion processes involved in peritoneal dialysis, the problem of œdema, &c. We believe these problems are not insurmountable, whereas that of peritonitis may well prove to be. We are now improving the method so as to eliminate, or at least reduce to a minimum, the possibility of infection from extraperitoneal sources. Once this has been achieved the occurrence of peritonitis will be traceable to invasion from the gut, and if this proves to be the case the method may well have to be discarded. The usual invader is *Bact. coli* when penicillin, alone or with sulphonamides, is used. We had hoped that when streptomycin became available in sufficient quantity to maintain a bacteriostatic concentration throughout the period of irrigation this organism would come under control. But we have now learnt that streptomycin prophylactically has the disadvantage of inducing increasing resistance in *Bact. coli*. Chemotherapy alone, even including streptomycin, will not prevent or cure *Bact. coli* peritonitis.

A number of otherwise salvageable patients will be lost from pulmonary œdema due to using too much fluid intravenously or to errors in the make-up of the formula or failure to alter it as the circumstances in the individual case require. Some patients will be waterlogged as a result of useless efforts at forcing diuresis before the start of peritoneal irrigation. The depth of acidosis and its variations require alterations of the formula. Much work remains to be done before the method becomes sufficiently standardised to permit its general use.

Kolff's "artificial kidney" method deserves to be explored at the same time, for it avoids the complication of peritonitis and presumbly is as capable of establishing fluid balance as our method. It has the obvious disadvantages of complicated apparatus, the need of total heparinisation, the establishment of an arteriovenous anastomosis, and the possibility of leakage from injury to the 'Cellophane' coil.

Department of Surgery, Harvard
University, Boston, Mass.
JACOB FINE.

HEALTH CENTRES OF TOMORROW

SIR,—Your new series of articles should be of considerable value, for the subject can do with a great deal of public discussion. I thought I had made my own views fairly clear, but a note on p. 46 of your issue of Jan. 4 suggests that I advocate an "enormous, elaborate, all-purpose centre." I certainly advocate an all-purpose centre so far as general practice is concerned, and agree with your own definition of a "centre in which general practitioners undertake all work ordinarily coming within their scope, and where they assist each other, with ample aid from technicians." I include among those technicians the specialists of the medical profession.

It is, however (among other reasons), because I do not advocate elaborate health centres that I disagree with your suggestions about laboratory provision in the centres. I do not believe that the finest service for patients and for general practitioners, which is what we are aiming at, can be given by multiplying the number of small laboratory units and placing them in charge of technicians however well trained. There is, as you say, "undoubtedly a very wide undisclosed demand" for laboratory help; but can you produce figures to justify the multiplication of laboratories and the employment of full-time technicians at every one of them? I have already tried to give such figures.[1]

My experience in a laboratory which has made a special point of providing every possible facility for every general practitioner in its area indicates that, even when saturation-point is reached, a health centre for ten general practitioners or less will still not have enough work—that can be done unaided on the spot by one technician—to justify the inclusion of a laboratory. General practitioners with experience of a service in which a central laboratory handles the whole of the clinical pathology of an area cheaply, rapidly, and willingly, will not easily be convinced that any other method is preferable. From those who believe that each centre should have its laboratory it would be helpful to have estimates of the volume of work likely to be done there.

Richmond, Surrey. D. STARK MURRAY.

SIR,—It seems pretty obvious that in the new health centres for some time to come we shall have neither enough X-ray plants nor the trained staff to work them. It may take several years until "the ideal arrangement for the future," as visualised by the more progressive advocates of well-equipped health centres, will become a reality. Surely something could and should be done in the meantime to provide a sort of "basic X-ray service" for the patients attending their doctors at these centres.

So far 19 local authorities in England and Wales have been equipped with mass-radiography units; and it can, I believe, be assumed that all major local authorities in the country will have a mobile mass-radiography unit, adequately staffed, at their disposal in the near future. It has already been demonstrated that voluntary mass radiography of the supposedly healthy, working-fit population in single surveys gives a relatively poor return. The time has now come to shift these mobile units from the fit to the sick people. The experimental stage of mass surveys of cross-sections of the working population could now be followed by the more promising enterprise of employing mass radiography as a routine examination of contacts and as an unrivalled aid to the early diagnosis of clinical chest diseases.

Our clinical experience in chest clinics as well as in sanatoria shows every day the disturbing fact that too many cases of tuberculosis, as well as of bronchial carcinoma, severe bronchiectasis, and other clinical chest diseases, are being missed because of inadequate examination. Present-day knowledge, however, tells us that no chest examination can be considered "adequate" ithout "early"—and, if inconclusive, repeated—X-ray amination. Apart from periodical (and compulsory) ass surveys in hazardous industries it is the Health entres of Tomorrow which ought to be the Target for omorrow of mass routine radiography.

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[1] Bett, W. R. *Post-grad. med. J.* 1946, **22**, 205.

[1] Fine, J., Frank, H. A., Seligman, A. M. *Ann. Surg.* 1946, **124**, 857.

[1] Clinical Pathology in the National Health Service. *Med. Pr.* 1944, **211**, 166.

E. G. W. HOFFSTAEDT.

Holywood Hall Sanatorium, Wolsingham.

PREVENTION OF EPIDEMIC NEONATAL DIARRHŒA

SIR,—Mr. Stern (Jan. 11), in indicating the film which orms inside feeding-bottles, may well have found one f the causal factors of otherwise baffling epidemics of eonatal diarrhœa. Removal of this very adherent ilm is difficult but desirable even though the bottles re sterilised after use. Mr. Stern does not recommend method by which the bottles may be "thoroughly leansed of film." I have found the best cleansing agent o be one of the sulphonated alcohols or soapless deterents called 'Teepol' (Technical Products Ltd.). A mall quantity of this in the washing-up water and the use of a bottle brush will quickly remove film.

London, N.14. C. ALLAN BIRCH.

PSYCHOTHERAPY OF ULCERATIVE COLITIS

SIR,—Dr. West (Dec. 21) remarks on the disregard in he 1920's of the emotional element in the causation of olitis.

It may be of historical interest to record that in the summer of 1921, after a preliminary psychological investigation to prove the need, I referred a patient to Dr. Millais Culpin for psychotherapy. She was a musically talented woman with aspirations to become a professional, who for 23 years, *from the age of 15*, had been virtually a prisoner confined to the vicinity of a w.c. The treatment was completely successful. Before long I was successfully treating colonic spasm in the same way.

Those were the days when the appendix was stitched to the abdominal wall and used as a channel through which to wash out the colon in an attempt to rid it of an irritant existing, as Groddeck had shown long before, only in the mind. Neither Culpin nor I had heard of Groddeck then.

Portsmouth. W. S. INMAN.

A MORAL PROBLEM

SIR,—Leaving out of consideration the sense of degradation which most of your readers would feel on reading letails of experiments on innocent outraged human ictims, the argument against the German medical trocities is that any small step forward in medical nowledge is at the expense of an immense step backward in civilisation. I realised from the beginning that omeone would put the entirely hypothetical question whether such atrocities would be justified if they produced major medical advance such as a cure for tuberculosis, nd my answer would still be No; for even the hurrying by some years of such great relief of human suffering would be too dearly purchased by the immeasurably greater harm done to the respect for the human personality on which civilised human life depends. *It is better* o be a Keats or a Stevenson with tuberculosis than a Iimmler or a Goebbels without it.

The publication of medical knowledge obtained by he treatment of war wounds or Belsen starvation is not t all analogous, because that was obtained in the proper nedical function of rendering aid to the sick and wounded, nd not in its perversion in experimental atrocity. There s all the difference.

The point to consider therefore, apart from the sense of degradation and shame which editors, secretaries, printers, and readers would feel in dealing with such stuff (which some would discount as mere sentiment), is whether the consummation of such "research" by its publication and use would make us accessories after the crime. I personally feel that they would, and that they would make it considerably easier for some future would-be human vivisectionists to give way to their inhuman instincts.

The records should be destroyed—the sooner the better. They should never be published.

London, S.W.15. A. NELSON-JONES.

Obituary

WILLIAM HAROLD WHITE

M.R.C.S.

FOR the past 25 years Dr. W. H. White put into practice in his maternity home at Blackheath his theories on the advantages of a vegetarian diet and suitable exercises for expectant mothers. Born in 1882, the son of the Rev. Samuel White, vicar of Marley Hill, near Durham, he was educated at the Clergy Orphanage School at Canterbury, and at first worked in an insurance office. But the conditions of midwifery at the time of the birth of his first child so shocked him that he determined to become a doctor. In 1917 he took the Conjoint qualification at St. Thomas's Hospital, later serving with the R.A.M.C. in India. But he had not forgotten why he had joined his new profession, and on demobilisation, after holding a house-appointment at the General Lying-in Hospital in York Road, he opened Stonefield Maternity Home with Dr. Cyril Pink in 1920. "Perhaps the most valuable contribution Dr. White made to obstetrics," writes a colleague, "was his encouragement of the use of exercise during pregnancy and the puerperium, and through his enthusiasm many patients received great benefits. He tried to plan antenatal care so as to secure a small child, and so was an experimental observer in one of the most complex biochemical fields."

Dr. White died at Hindhead on Dec. 29. His wife, Miss Ethel Hutchings, whom he married in 1907, survives him with three sons and two daughters.

CHARLES GRANT PUGH

M.D., B.SC. LOND., D.P.H.

Dr. C. Grant Pugh, for 32 years medical officer of health for Southend-on-Sea, died on Dec. 19. Of Scottish and Welsh descent, he came of a family with a medical bent, for his elder brother, the late W. T. Gordon Pugh, was for many years medical superintendent of Queen Mary's Hospital for Children, Carshalton, his sister was formerly a senior member of the London County Council nursing staff, and his surviving brother is a dental surgeon in practice in Streatham.

He was educated at Aberystwyth and at the Middlesex Hospital, which characteristically he chose as his medical school because the house-appointments were made on the examination results. He had already graduated B.SC. Lond. in 1894, and in 1899, after winning the senior Broderip and Murray scholarships, he took his M.B. Lond. with honours in medicine. The following year he was awarded the gold medal for his M.D. At that period it seemed unlikely that he could expect promotion to the honorary staff of the Middlesex for a considerable time, and Pugh accordingly relinquished the project of setting up in consultant practice. In 1902 he took the D.P.H. at Cambridge, and after some fruitful years with the Metropolitan Asylums Board and experience as deputy medical superintendent at Bethnal Green Infirmary he became one of J. C. Thresh's assistants in Essex, and Thresh was for him a formative influence of the first importance.

In 1908 Pugh was appointed M.O.H. for Southend, and there he found ample scope both as physician and administrator, for, in those days when the area was less well served by consultants, his opinion was often sought by his colleagues in difficult medical cases. The health services of this rapidly growing population were developed by him on sound lines till the outbreak of the first world war temporarily arrested progress. After serving in the Balkans with the rank of captain, R.A.M.C., he returned to Southend where he was foremost in calling attention to the urgent needs for better hospital provision, and within a few years the generosity of Lord Iveagh and a spirited local initiative had created the new Southend General Hospital.

The Local Government Act of 1929 offered a great opportunity of which, on Pugh's advice, the corporation took full advantage. The sick wards of the poor-law institution at Rochford were transferred from the board of guardians and appropriated for hospital purposes, and, when the extensions begun by the guardians were completed, Pugh set himself the task of modernising the hospital. In 1940, a few weeks before his retirement, he had the satisfaction of seeing the completion, at a cost of £400,000, of new buildings of the most modern design.

An arresting figure in any company, Pugh was distinguished in appearance, courtly in manner, and deadly in argument. There were few gatherings which he failed to dominate through sheer personality, and his committees invariably found him a shrewd, far-sighted, and courageous adviser. To his staff he set an example of all that is best in the public service, and with his colleagues he was invariably helpful, considerate, and popular. Children liked and trusted him, and some of his happiest hours were spent in their company in the wards of his infectious-diseases hospital.

He faced the inevitable end with all the stoic courage and lack of complaint which were characteristic of the man. His staff retained their affectionate admiration for him, undimmed by his absence in retirement, and his passing is felt acutely by all who knew and worked with him.

J. S. L.

Appointments

HAYES, D. S., M.R.C.S.: asst. M.O.H. for tuberculosis, St. Helens.
HILDICK-SMITH, GAVIN, M.B. Camb.: Wander scholar and registrar, children's department, Westminster Hospital.
KENNISH, P. F., M.R.C.S.: resident M.O., Hertford British Hospital, Perret (Seine), France.
SWIFT, JOHN DE, M.D. Lond., M.R.C.P.: consulting physician, Llanelly and district medical service.

London County Council:

BARKER, G. B., M.A. Camb., M.R.C.S.: asst. M.O., Tooting Bec Hospital.
BOYD, A. M., M.B.: asst. M.O., Long Grove Hospital.
BULLMORE, G. H. L., B.M. Oxfd: asst. M.O., St. Ebba's Hospital.
DUDDINGTON, A. J. E., M.D. Lond.: asst. M.O., Friern Hospital.
DUGGAN-KEEN, G. E., M.R.C.S.: asst. M.O., St. Bernard's Hospital.
GILMOUR, HELEN M., M.B. Glasg.: asst. M.O., St. Bernard's Hospital.
IVES, E. L., M.R.C.S.: asst. M.O., Claybury Hospital.
JOHNSTON, J.: asst. M.O., Claybury Hospital.
KAY, D. W. K., B.M. Oxfd: asst. M.O., West Park Hospital.
LIVINGSTON, W. V., M.R.C.S.: asst. M.O., Manor Hospital.
MURRAY, NEVILLE, M.B. St. And.: asst. M.O., Cane Hill Hospital.
PALMER, MARION E. F.: asst. M.O., Banstead Hospital.
RICHMOND, HUGH, M.B. Glasg.: asst. M.O., Bexley Hospital.

Middlesex County Council:

BARNES, C. G., M.D. Lond., F.R.C.P.: physician, Hillingdon County Hospital.
DAVIES, J. V., M.D. Lond., M.R.C.P.: tuberculosis M.O., Edmonton Chest Clinic.
DYNSKIE-KLEIN, MARTHA, M.D. Prague, M.R.C.S., D.C.H.: pædiatrician, West Middlesex County Hospital.
EDEN, JOHN, M.B. Durh.: senior pathologist, West Middlesex County Hospital.
EDWARDS, PHYLLIS M., B.SC. West Australia, M.B. Lond., D.A.: senior anæsthetist, West Middlesex County Hospital.
EDWARDS, T. A. W., M.B. Camb., M.R.C.P.: chief assistant, Clare Hall County Hospital.
EWEN, J. B., M.D. Aberd., D.P.H.: principal asst. M.O., Public *Health* Department.
HARTSTON, W. L., M.D. Lond., M.R.C.P., D.P.H.: principal asst. M.O., Public Health Department.
HOUNSLOW, A. G., M.D. Lond.: physician, Clare Hall County Hospital.
MCKELVIE, I. L., M.R.C.S.: asst. radiologist, North Middlesex County Hospital.
RANKIN, A. C. R., M.B. Belf., D.A.: senior anæsthetist, Central Middlesex County Hospital.
ROBERTS, J. C., M.D. Lond., M.R.C.P.: physician, Harefield County Hospital.
SIMPSON, THOMAS, M.SC. Chicago, M.D. Leeds, M.R.C.P.: physician, Chase Farm Hospital.
STEPHEN, GEORGE, M.B. Aberd., F.R.C.S.E.: medical director, Ashford County Hospital.
TELLING, MAXWELL, D.M. Oxfd, M.R.C.P.: physician, Clare Hall County Hospital.
WHITTAKER, NORMAN, M.D. Camb., M.R.C.P.: physician, North Middlesex County Hospital.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED JAN. 4

Notifications.—Smallpox, 0; scarlet fever, 1101; *whooping-cough, 2030; diphtheria, 242; paratyphoid,* 3; typhoid, 5; measles (excluding rubella), 10,823; pneumonia (primary or influenzal), 1264; cerebrospinal fever, 61; poliomyelitis, 9; polioencephalitis, 1; encephalitis lethargica, 2; dysentery, 65; puerperal pyrexia, 120; ophthalmia neonatorum, 67. No case of cholera, plague, or typhus was notified during the week.

Deaths.—In 126 great towns there were no deaths from enteric fever or scarlet fever, 4 (0) from diphtheria, 10 (0) from measles, 17 (2) from whooping-cough, 76 (9) from diarrhœa and enteritis under two years, and 36 (5) from influenza. The figures in parentheses are those for London itself.

Liverpool had 4 deaths from whooping-cough. Birmingham had 5 deaths from influenza. Sheffield and Birmingham each had 7 fatal cases of diarrhœa and enteritis.

The number of stillbirths notified during the week was 336 (corresponding to a rate of 28 per thousand total births), including 41 in London.

Diary of the Week

JAN. 19 TO 25

Monday, 20th

HUNTERIAN SOCIETY
8.30 P.M. (Mansion House.) Prof. G. Debaisieux (Louvain): Hypotension in Intracranial Injuries. (Hunterian lecture.)

Tuesday, 21st

UNIVERSITY COLLEGE, Gower Street, W.C.1
5.15 P.M. Mr. F. Bergel, PH.D.: Aspects of Pharmacological Chemistry—(1) Relationship between Pharmacology and Organic Chemistry.
ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.1
5 P.M. Prof. F. C. Bartlett, F.R.S.: Measurement of Human Skill. (First Oliver-Sharpey lecture.)
ROYAL SOCIETY OF MEDICINE
4 P.M. (Inoculation Department, St. Mary's Hospital, W.2.) *Pathology.* Demonstrations.
EUGENICS SOCIETY
5.30 P.M. (Burlington House, Piccadilly, W.1.) Sir Alexander Carr-Saunders, Sir Cyril Burt, Dr. J. A. Fraser Roberts: Relation of Intelligence to Fertility.
SOCIETY FOR THE STUDY OF ADDICTION
4 P.M. (11, Chandos Street, W.1.) Dr. A. P. Rossiter Lewis: Alcohol and Abnormal Behaviour in Head Injury Cases.
CHELSEA CLINICAL SOCIETY
6.30 P.M. (South Kensington Hotel, 41, Queens Gate Terrace, S.W.7.) Dr. G. A. MacDonald, Dr. G. Beauchamp: Osteopathy.

Wednesday, 22nd

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5 P.M. *Endocrinology* and *Obstetrics and Gynæcology.* Mr. A. S. Parkes, F.R.S., Mr. Aleck Bourne, Miss Meave Kenny, Dr. P. M. F. Bishop: Use of Œstrogens in Gynæcology.
BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck Street, W.1
5 P.M. Prof. W. V. Mayneord, D.SC.: Applications of Atomic *Physics in Medicine. (Fourth of six lectures.)*

Thursday, 23rd

ROYAL COLLEGE OF PHYSICIANS
5 P.M. Prof. F. C. Bartlett, F.R.S.: Measurement of Human Skill. (Second Oliver-Sharpey lecture.)
ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
5 P.M. Mr. H. A. Haxton: Regeneration after Sympathectomy and its Effects in Raynaud's Disease. (Hunterian lecture.)
ROYAL SOCIETY OF MEDICINE
8 P.M. *Urology.* Clinico-pathological meeting.

Friday, 24th

ROYAL SOCIETY OF MEDICINE
2.30 P.M. *Epidemiology and State Medicine.* Lieut.-Colonel William Butler: Whooping-cough and Measles—an Epidemiological Concurrence and Contrast.
5 P.M. *Pædiatrics.* Mr. Denis Browne: Tuberculous and Streptococcal Infections of the Cervical Lymph-glands.
ASSOCIATION OF INDUSTRIAL MEDICAL OFFICERS
5 P.M. (London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1.) Joint meeting with the school medical service group of the Society of Medical Officers of Health. Dr. A. A. E. Newth, Dr. T. A. Lloyd Davies: Change from School to Industry.
ASSOCIATION OF CLINICAL PATHOLOGISTS
9.45 A.M. (National Hospital, Queen Square, W.C.1.) 37th scientific meeting.
WEST LONDON MEDICO-CHIRURGICAL SOCIETY
8.30 P.M. (West London Hospital.) Ciné meeting.
LONDON CHEST HOSPITAL, Victoria Park, E.2
5 P.M. Mr. D. S. M. Barlow: Malignant Diseases of the Lung.
ROYAL MEDICAL SOCIETY, 7, Melbourne Place, Edinburgh
8 P.M. Mr. A. H. McIndoe: Surgery of Congenital Defects.

Saturday, 25th

ROYAL SANITARY INSTITUTE
10.15 A.M. (Town Hall, South Shields.) Dr. T. Lloyd Hughes: Future Public Health Responsibilities of Local Authorities. Lieut.-Colonel John Reid: Present Trend of Local Government Administration from an Engineer's Point of View.
ASSOCIATION OF INDUSTRIAL MEDICAL OFFICERS
10.30 A.M. Mr. R. H. Young: *Diagnosis, Pathology, and Treatment of Intervertebral Disks.*
BIOCHEMICAL SOCIETY
11 A.M. (British Postgraduate Medical School, Hammersmith, W.12.) Papers and demonstrations.
ASSOCIATION OF CLINICAL PATHOLOGISTS
12 NOON. 37th scientific meeting, continued.

Notes and News

CONTROL OF HOSPITAL ESTABLISHMENTS

In recent months, owing to the diminishing needs of the rvices for new recruits for general medical duty, the Central dical War Committee has been able to deal more generously th hospital authorities seeking permission to increase their ablishments of resident medical officers. In fact so many ditional appointments have been approved that it is thought at there are now few hospitals with a serious shortage of sident medical staff, and that the removal of control would t result in any great increase in the rate at which estab- lments are being enlarged. It has therefore been decided, an experiment, to discontinue for six months the control establishments exercised by the committee (and, in London, the Committee of Reference). But it is emphasised that o rapid an increase should be avoided because it would not ly have a serious effect on recruitment to the Forces but ould also add greatly to the difficulty experienced by some the smaller and more remote hospitals in attracting house- ficers.

A moderate increase in the number of B1 posts would be advantage; for the chief difficulty confronting the com- ittee is to secure enough recruits of specialist and graded ecialist status, and men who have occupied B1 posts must future form the great bulk of the new specialist recruits. lospitals are urged to regard any new posts in this category s training posts for men destined for service as specialists or raded specialists in the Forces, and to restrict them to men nown to be liable and medically fit for military service later.

It remains necessary for hospitals to inform the committee romptly of all modifications of establishments and to notify he names of all practitioners appointed or vacating appointments. In connexion with its recruitment activities the ommittee must continue to maintain accurate records of the ppointments and their occupants.

No change is proposed in the wording of advertisements of acant A, B2, and B1 posts or in the present regulations elating to the periods of tenure of such posts by practitioners iable to military service. A and B2 posts will continue to e held for six months and B1 posts for not less than twelve months. Recruitment will be initiated automatically after a two years' tenure of a B1 post if it has not taken place earlier.

DENTAL DISCORD

No settlement has yet been reached in the controversy between dentists and the Ministers of National Insurance and Health on the scale of fees for work done for insured persons. Of the three dental societies, the British Dental Association has rejected the scale approved by the Joint Advisory Council, and the Public Dental Services Association has accepted it. The head council of the Incorporated Dental Society has voted for acceptance, but the Metropolitan and Southern Counties branch of the society, by a majority of 150 votes to 6, decided on Jan. 12 to reject this decision and called for an inquiry into the council's actions.

ASSISTANT NURSES

In the 1943 Nurses Act for Scotland it was laid down that no-one who began a course of training after August, 1948, could be admitted to the roll of assistant nurses. This provision will be repealed under clause 76 of the National Health Service (Scotland) Bill. There is no such restriction in England and it was incorporated in the Scottish Act in deference to the views of several Scottish organisations at that time opposed to the permanent establishment of the assistant nurses' roll. There are now nearly 3000 assistant nurses in Scotland and the recently approved rules of the General Nursing Council for Scotland have made it possible for hospitals to become assistant-nurse training schools. The repeal of the restriction will enable the recruitment and training of this grade of nurse to proceed without interruption.

In moving the second reading of the National Health Service (Scotland) Bill, Mr. Joseph Westwood, Secretary of State for Scotland, said: "The new service will make increased demands upon the services of nurses of all types, and we consider it essential that all channels of recruitment to the profession should be kept open. The position will, however, be kept under review and if in say ten years' time it should be considered undesirable to continue the recruitment of assistant nurses, the Government of the day will, of course, be free to come to Parliament for further legislation."

OLD FRIEND IN NEW GUISE

THE *British Dental Journal* appears this year in a new form. The pages have been widened by an inch, which makes it possible to print the text in double columns. A return has been made to the pre-war practice of publishing B.D.A. intelligence in a separate supplement, circulated to members only. More space can thus be given to scientific papers and to correspondence. In a foreword Mrs. Lilian Lindsay, president of the B.D.A., describes the birth of the journal 67 years ago. The new format foreshadows a progressive and prosperous old age, and every reader will reciprocate her good wishes.

University of Oxford

The following degrees were conferred on Dec. 14:

B.M.—J. B. Louden, H. D. Leggatt, M. G. D. Davys, Alison M. Miles.

The following have been successful in examinations for the diploma in ophthalmology:

R. W. Carey, K. J. L. de Silva, R. G. S. Ferguson, S. A. H. Firdosi, G. C. Laszlo, D. G. Mody, Vincent Tabone, H. J. R. Thorne, A. R. Wear.

University of London

Mr. Leslie Young, PH.D., is returning from the University of Toronto to fill the new readership in biochemistry at University College.

University of Edinburgh

Mr. C. H. Waddington, SC.D., of the National Animal Breeding Research Station, Edinburgh, has been appointed to the chair of animal genetics.

University of St. Andrews

Mr. A. D. Hitchin, M.D.S., has been appointed to the chair of dental surgery.

Royal College of Surgeons of England

At a meeting of the council of the college held on Jan. 9, with Sir Alfred Webb-Johnson, the president, in the chair, the honorary fellowship was conferred on Dr. Louis Bazy, formerly president of the Académie de Chirurgie, and consulting surgeon to the French Army, and Dr. Leopold Mayer, president of the International Society of Surgery.

Prof. G. Grey Turner was appointed as honorary curator of the instrument collection in the college. It was agreed that Dr. James Craigie, formerly of Toronto, should give an Imperial Cancer Research Fund lecture in the college in place of Prof. W. E. Gye.

The council reiterated their opinion that a statutory register of specialists is neither necessary nor desirable.

The post of R.S.O. at the Princess Beatrice Hospital, London, and the additional post of R.S.O. at the Victoria Hospital, Blackpool, were recognised for the final fellowship examination.

On April 10 the council will elect a member of the court of examiners. The retiring member, Mr. E. A. Crook, is applying for re-election. Fellows who wish to become candidates must apply in writing to the assistant secretary on or before Monday, Feb. 3.

A diploma of fellowship was granted to J. G. Coxon, and diplomas of membership to Harry Rawlings and Michael Redfern.

The following diplomas were granted, jointly with the Royal College of Physicians:

D.C.H.—N. F. E. Burrows.

D.P.M.—H. S. Capoore, Margaret T. Collins, John Cowen, G. R. Debenham, John Farr, T. C. N. Gibbens, J. R. Hawkings, R. M. M. Hunter, Ali Kamal, P. W. W. Leach, L. F. E. Lewis, D. O. Lloyd, N. J. de V. Mather, P. R. A. May, A. R. Norton, Gerald O'Gorman, M. A. Partridge, Mildred I. Pott, David Rice, R. A. B. Rorie, David Rumney, F. T. Shadforth, K. C. P. Smith, K. R. Stallworthy, K. R. Thomas, M. G. Valentine, G. A. van Someren.

D.L.O.—A. D. Bateman, Prem Chandra, J. V. De Sa, P. R. B. Grimaldi, A. R. Harper, Stephen Kavanagh, D. G. Lloyd-Davies, W. McO. Macgregor, John Magill, T. A. Narayanan, H. N. Perkins, H. C. Purcer Smith, S. N. Sarma, C. J. Scott, J. B. Scott, E. M. Sewell, H. J. M. Stratton, A. S. Walker, H. A. Ware.

D.I.H.—A. L. L. Silver.

Royal College of Surgeons in Ireland

Applications are invited, on or before April 22, for the professorship of anatomy at the college. Terms of appointment can be had from the registrar, and the election will be made by the council on May 8.

University College, London

A course of four public lectures on Some Aspects of Pharmacological Chemistry is to be delivered by Mr. F. Bergel, PH.D., in the physiology theatre at University College, Gower Street, W.C.1, on Tuesdays, Jan. 21, Feb. 4, Feb. 18, and March 4. The lectures will be at 5.15 P.M. on each day.

Edinburgh Postgraduate Lectures

The following lectures will be given at the Royal Infirmary on Thursdays at 4.30 P.M.: Jan. 30, Dr. Ninian Bruce, Limitations of Personality; Feb. 13, Mr. A. Logan, Prognosis in Empyema Thoracis; Feb. 20, Prof. R. W. B. Ellis, Growth and Maturity in Relation to Age; and Feb. 27, Mr. A. G. Ross Lowdon, Gastrojejunal Ulceration.

Medical Art Society

The activities of this society are to be revived, and it is hoped to hold an exhibition of members' work in the summer. Doctors who paint or sketch are asked to write to the secretary, Dr. Henry Wilson, 142, Harley Street, London, W.1.

Lectureship in Industrial Health

Boots Pure Drug Company have endowed for seven years a lectureship at Roffey Park Rehabilitation Centre, Horsham, Sussex, at a salary of £1200 per annum. Dr. R. F. Tredgold has been appointed the first lecturer.

Inoculation against Yellow Fever

The Ministry of Health has arranged for intending travellers to have yellow-fever inoculations without charge at centres in Newcastle, Leeds, Oxford, Bristol, Cardiff, and Birmingham; centres are also to be established at Liverpool and in the London area, where at the present time the Wellcome Foundation, Euston Road, N.W.1, meets requests for inoculation. Similar arrangements for Scotland were announced in our columns last week (p. 88).

National Collection of Type Cultures

The Medical Research Council has appointed Dr. S. T. Cowan curator of the collection, which is at present housed at the Lister Institute, Elstree.

Dr. Cowan studied medicine at Manchester University, where he qualified M.B. in 1930. At Manchester Royal Infirmary he held resident posts as house-physician, assistant medical officer, and clinical pathologist. In 1932 he was awarded a Dickinson medical research scholarship, and in the following year graduated M.D., with commendation. In 1934 he became research assistant in the university department of bacteriology and preventive medicine. He went to London in 1935 as first assistant in bacteriology at the British Postgraduate Medical School, Hammersmith, and in 1936 was appointed to a Freedom research fellowship at the London Hospital. In 1938 he returned to Manchester as university lecturer in bacteriology. During the late war he served, from 1940 to 1945, with the rank of major, as specialist in pathology to Army hospitals; he was also in charge of a mobile bacteriological laboratory in the Middle East. His publications include papers on the classification of staphylococci.

Blood-group Reference Laboratory

When the Galton Laboratory Serum Unit (Medical Research Council), formerly at Cambridge, closed last May, Dr. R. R. Race, the former director, took charge of the new blood-group research unit of the council at the Lister Institute, London. Dr. A. E. Mourant, his assistant at Cambridge, has become director of the new blood-group reference laboratory of the Ministry of Health, which will provide grouping serum and investigate clinical blood-group problems. The laboratory is also housed at the Lister Institute and its juxtaposition with the M.R.C. research unit will ensure the close association of theory and practice. Hospitals and doctors who need grouping serum should, in the first instance, apply to their local regional transfusion centre, through which it will be issued.

Congress of Legal and Social Medicine

The International Academy of Legal and Social Medicine are holding their first post-war congress in Belgium at Brussels and Liége from June 25 to 28, immediately after the Journées Médicales de Bruxelles. The work of the congress will be divided into the following sections: legal medicine in its applications to crime; social medicine; industrial medicine; medicolegal and social psychiatry; and scientific police. The official languages will be English and French, and those who wish to read papers should notify without delay the president of the congress, Prof. M. De Laet, Faculté de Médecine, 7, Rue de la Gendarmerie, Brussels, or one of the general secretaries, Prof. P. Moureau, 7, Rue Villette, Liége, or Prof. F. Thomas, 23, Kluyskensstraat, Ghent.

King Edward's Hospital Fund for London

The King has sent his annual subscription of £1000 for 1947 to the Fund.

Kaiser-i-Hind Medal

In the New Year honours the Kaiser-i-Hind medal for public services in India was awarded to Dr. Margaret McMillan, who is in charge of the Women's Mission Hospital at Ajmer.

London School of Dermatology

A course of lectures in skin diseases will be given at St. John's Hospital, Leicester Square, London, W.C.2, on Tuesdays and Thursdays at 5 P.M., from Feb. 4 to March 27 (except on the third Thursday in each month).

American Research into High Blood-pressure

A group of Cleveland business men have decided, according to a B.U.P. message, to establish an organisation to be known as the American Foundation for High Blood Pressure, which will raise funds to assist research into the causes and cure of arteriosclerosis and high blood-pressure.

Special Diets for Patients

In view of the instances recently reported by doctors in which their recommendations for additional food allowances for patients have either been rejected or tardily and partially granted by the Ministry of Food, the British Medical Association has asked the Ministry to supply details of how these applications, especially those submitted under clause 19 of Med. 2, are dealt with, "both within the Ministry and within the Food Rationing (Special Diets) Advisory Committee of the Medical Research Council."

A New Approach to Nurses

At a nurses' prize-giving at Lewisham Hospital on Jan. 9 Mr. Charles Key, parliamentary secretary to the Ministry of Health, announced that a working party was drawing up a report on the recruitment of nurses which would shortly be submitted to the Minister. The working party had collected all their facts by personal investigations and contacts through a cross-section of hospitals and members of different groups of the profession, and Mr. Key was sure that this new method of approach would lead to a series of important recommendations.

Return to Practice

The Central Medical War Committee announces that the following have resumed civilian practice:

Mr. M. GORDON, F.R.C.S., 55, Harley Street, W.1.
Mr. H. OSMOND CLARKE, F.R.C.S., 80, Harley Street, W.1.

DETECTION OF TUBERCLE BACILLI IN C.S.F.—Mr. B. S. N. Shamyeh writes that in his method (*Lancet*, 1946, ii, 810) 10 c.cm. of normal saline should be substituted for the distilled water (see paragraph 4), since saline has proved "to be of far greater value in finding the bacilli on staining."

Births, Marriages, and Deaths

BIRTHS

HALLIDAY.—On Jan. 1, in London, the wife of Dr. J. H. G. Halliday—a daughter.

ISMAY.—On Dec. 27, at Johannesburg, the wife of Dr. D. G. Ismay—a daughter.

PAGE.—On Jan. 7, in London, the wife of Mr. B. H. Page, F.R.C.S.—a daughter.

SCOTT.—On Jan. 7, the wife of Dr. H. C. Scott—a daughter.

TAIT.—On Jan. 6, at Windsor, the wife of Dr. Charles Tait—a daughter.

WAYCOTT.—On Jan. 3, at Horsham, the wife of Dr. J. A. Waycott—twin daughters.

MARRIAGES

COUNIHAN—BEDWORTH.—On Jan. 11, in London, Francis Harold Counihan, M.B., to Patricia Maureen Bedworth.

FALLOWS—BONE.—On Jan. 7, at Coatham, Redcar, Harold Fallows, M.B., to Isabel Bone.

DEATHS

CASSIDY.—On Jan. 8, Matthew Ignatius Thornton Cassidy, M.B. Glasg.

HOLFORD.—On Jan. 4, Christopher Tredwell Holford, F.R.C.S.I., aged 69.

MARTYN.—On Jan. 7, Sir Henry Linnington Martyn, K.C.V.O., M.B. Lond., F.R.C.S.

MILL.—On Jan. 5, at Lyme Regis, William Mill, M.R.C.S., aged 89.

REDWOOD.—On Jan. 3, at Crickhowell, Breconshire, Robert Vachell de Acton Redwood, F.R.C.S.E., aged 67.

WILLIAMS.—On Jan. 10, at Thornbury, Glos, Lionel Henry Williams, M.D. Durh., aged 84.

PSYCHOSOMATIC APPROACH TO ORTHOPÆDIC SURGERY

A. DAVID LE VAY
M.S. Lond., F.R.C.S.

ORTHOPÆDIC SURGEON, WOOLWICH MEMORIAL HOSPITAL; SURGICAL REGISTRAR, ROYAL NATIONAL ORTHOPÆDIC HOSPITAL

> "All good and evil, whether in the body or in human nature, originates in the soul and overflows from thence . . . therefore if the . . . body is to be well, you must begin by curing the soul . . . and the cure has to be effected by the use of certain charms, and these charms are fair words, and by them temperance is implanted in the soul; and, when temperance is there, health is steadily imparted to the whole body. . . . Let no one persuade you to cure him until he has first given you his soul to be cured, for this is the great error of our day in the treatment of the human body, that physicians separate the soul from the body."
> —*Socrates.*

THOUGH the "great error" of Socrates' day is dying under the impact of modern civilisation on our mental and physical organisms, it may still be necessary to demontrate to orthopædic surgeons the need for considering other things in their patients than the fit of a bone-graft or the snugness of a plaster.

It is unfortunate that the rapid development of the psychosomatic approach has led not to all-embracing and catholic clinicians but to psychiatrists interested n the genesis of certain physical phenomena or to philosophically minded physicians and surgeons. The concept of the essential unity of mind and body has not led to a synthesis of physician and psychiatrist at a higher level, and its adherents are unavoidably psychological in attitude and jargon and bracketed with the psychiatrists by the orthodox bulk of the profession.

Nevertheless, the mental aspect of orthopædic work has gained considerable attention in the treatment and rehabilitation of injured men in the late war, and emphasis has been laid on the emotional factor in recovery. But there are two dangers in adhering to the Platonic aphorism that "there are physicians for the soul and physicians for the body, and yet the two are one and indivisible." One is of paying it only lip service and believing that the mind will look after itself if the body is put right. The other is of accepting it on a negative basis: emphasising, rightly, the prevention of neurosis by reassurance and active rehabilitation from the outset and, wrongly, the exclusion of the neurotic from the charmed circle for fear of contagion. Doubtless no more emphasis on the emotional aspect is usually needed than is given by a positive impetus to recovery at every stage, by group encouragement of patients, and by the stimulus of outstanding surgical personalities; and doubtless some segregation is necessary, and treatment is available for those excluded. But they *have* been excluded, often an irretrievable downward step we should try to avoid.

The magnificent results in the Royal Air Force were achieved with such first-class material that it was possible to separate the sheep from the goats without being wasteful, and for a specific end. Civilian colleagues know they cannot apply the same methods, or only in limited industrial sectors, because the goats might soon come to outnumber the sheep. In civil life patients must obtain their own security; there is risk of unemployment; retention of State direction implies some chronic frustration; and living standards are lower than before the war. These factors contribute to subjective difficulties which may or may not amount to frank neurosis but which will affect industrial collaboration, accident proneness, and illness in general.

All this is of prime importance to the orthopædic surgeon; for to the concept of an industrial army needed to revive our export trade must be added that of an expanded industrial medical service; and of this the orthopædic section will be a major, perhaps the major, part. Including the increasing scope of traumatic surgery and possibly of burns, and overlapping into plastic repair, it must comprise, besides routine orthopædic practice, preventive work on posture and the feet in adolescents and young factory workers. The orthopædic department of any medical general staff planning the prevention and treatment of illness in the new industrial Britain must therefore possess considerable autonomy, and may find it increasingly useful to adopt the *psychosomatic approach* to problems formerly regarded as purely physical.

PRACTICAL RÔLE OF THE ORTHOPÆDIC SURGEON

Let us assess the duties of the orthopædic surgeon conscious of these wider responsibilities, which, if ignored, may sterilise his activities and produce the futile waste of time and treatment familiar in our outpatient departments. It is not desirable or possible for him to develop a psychological approach to those patients in whom physical disability is obviously not the sole factor. But he must expand his horizon so as to recognise the need for psychiatric assistance; and this may mean having a psychiatric social worker at the other side of his outpatient table to take up the thread where he leaves off. He must abandon the classical and obtuse distinction between "organic" and "functional" disorder which jettisons the luckless patient assigned to the latter group, and reserve "functional" for its proper description of physical performance.

There is no longer the query whether there is an "organic" lesion or not, but what are the relative proportions of the physical and psychological factors in each case, to answer the question: "Does this patient need surgery only, or personal adjustment alone, or both; and, if the latter, how much of each?" For patients will fall in three main groups: (1) those in need of orthopædic care alone; (2) those needing both orthopædic and psychiatric attention, even if the latter is confined to simple readjustment of personal attitudes, family tensions, and work situations; and (3) those where the orthopædic complaint merely masks a serious mental derangement which is the real condition for treatment.

In all cases we should aim at treating patients to a conclusion as far as possible, and the American system of a social service pursuing its investigations outside the walls of the institution is admirable for this purpose. Admittedly there is a hard road to travel to this goal.

> "Psychoneurotics are persona non grata in medical practice. They tire and exhaust the general practitioner and are the stumbling-block of all specialists. When all ordinary methods of investigation fail to disclose definite lesions, and when special laboratory tests and clinical studies do not reveal abnormal function, the cases are generally dumped into the garbage pail labelled 'psychoneurosis' where they are supposed to rot" (Yaskin 1935).

In considering disposal and treatment it is important to consider, as the best surgeons have always done, the total social position of the patient. The cardinal question with the many chronic orthopædic lesions, such as pes cavus or osteoarthritis of the knees, is: "Why have you come up *now* for treatment, at this particular moment?" These patients attend because their threshold to discomfort has been lowered by some alteration in working conditions or by a shift of family relations setting up an altered emotional state. Time spent on eliciting the answer to this question may be revealing, but we should be prepared to follow up the answers. The intimate relation of immediate environment to orthopædic disability, and the infrequent need for surgery, once the circumstances could be fitted to the individual, were made clear to orthopædic surgeons in the Services during the late war.

The development of a wider awareness in orthopædic work will be worked out empirically in the next few years; the needs of industry and the stresses of the age will ensure it. Experiment in the design of outpatient departments, a system of clinical conferences with social workers and employers, and an increasing availability of psychiatric assistance are important factors. But the orthopædist's education in these matters must start a little earlier, and there is substance in Rees's (1945) suggestion that psychiatric postgraduate education might become an essential facet of his training. And in human terms let us remember that we should aim at restoring to our patients the dignity to which they are entitled and of which modern civilisation increasingly tends to deprive them.

PSYCHOLOGICAL MECHANISMS

The general purpose of this essay is to show that psychological factors are often the cause of what is usually regarded as gross physical orthopædic disease; that emotion may greatly modify muscular tension, posture, and even osseous structure; that these end-results may completely obscure the prime causes; and that the physical outcome is often of symbolic value to the patient.

A preliminary review of the basic emotional mechanisms operating in orthopædic patients is not meant to conceal their working in all disease groups, and for that matter in all individuals. Handicapped orthopædic patients must choose their limited activities by substituting for the original response to a desire one more possible in the circumstances, a process of sublimation common in normal life. This acceptance of the reality of physical disability is their basic and most difficult adjustment, and in helping them, particularly children, we must recognise their real need for love and affection, especially in emotionally labile spastics, at the same time avoiding the harmful effects of overprotection. The cripple unable to make this adjustment may escape into a fantasy world, particularly in adolescence, a reaction calling for energetic treatment by social activity and occupational therapy. At any age an aggrieved person confronted with unexpected disability may regress to an infantile state or to an insidious general helplessness, which must be firmly discouraged. The advantages of illness for the helpless invalid are obvious; he is the focus of attention and served by the whole family. There is some analogy between this and the "secondary gain" of any psychoneurosis (though a fearful price may have to be paid for it); and an unwillingness to lose these real advantages by recovering leads to rationalisation of the unconscious wishes as logical objections or assertions of incapacity. In accident cases there may be added delay in rehabilitation due to an associated phobia, a fear of repetition based on some childhood trauma.

Analysis reveals that accident proneness in industry is often due to an unconscious wish for punishment, an instance of the guilt mechanisms which operate in relation to disease and injury, depicting them as retribution for some childhood fantasy. Identification is frequent in hospital patients, who incorporate in their own ego desirable facets of other personalities. This may operate between patient and surgeon (hence it is important for the surgeon to be regarded as a good as well as a powerful father-figure) or between patient and patient. Thus a victim of senile kyphosis may identify himself with a superficially similar case of spinal curvature from metastases and be correspondingly affected emotionally in his own progress. Appliances and plasters are also regarded as part of the patient and so rendered tolerable. Orthopædic patients blaming the surgeon for inadequate and delayed treatment, and the nurses for neglect, exhibit the reverse of identification, the projection of one's own inadequacy and guilt on others.

Throughout the guidance of his patient's destiny the orthopædic surgeon must be prepared to be receptive, to listen to all the patient has to say, a mental catharsis which relieves anxiety. Many clinicians allow for these considerations, often unconsciously; no wiser statement of the patient's needs in this respect could be found than that of Girdlestone (1945) in his address at Oxford. Others do harm by futile reassurance of the neurotic and by unwitting implantation of hypochondriasis; and these reject the psychological approach on the grounds that common sense is adequate. Since, unfortunately, both these types may adhere to the common-sense argument, this is a good reason for discarding it.

PERSONAL SIGNIFICANCE OF THE SURGEON

A valuable part of dealing with orthopædic patients, particularly in long-term cases, is the winning of their affection and respect. The patient identifies himself with the surgeon, wants to please him by getting well, in other words "gives him his soul to be cured." Psycho-analysts are familiar with this as a positive transference which inevitably alternates in their work with a negative transference of hatred and delay in recovery. Though these forces are unconscious and uncontrollable they may be set off by the most trivial errors in handling, and it is worth while for the orthopædist to aim at achieving a strong positive transference at the outset of treatment and maintaining it as long as possible. He should also scrutinise his own reactions to troublesome and irritating patients, for to respond in the same vein is to encourage the growth of neurosis. Indeed, the psychological considerations affecting the behaviour of the surgeon offer an attractive and almost unexplored field, ranging from an ill-judged readiness to operate, which is the projection of an inner search for perfection, to a nihilism in treatment, which reflects a personal despair.

All these factors, and the element of sadism potential in all patient relationships, apply with only less force to the nursing staff. The ward sister is a mother-substitute, and it is essential for the two new parents to be in agreement about progress and treatment both overtly and covertly. In fact, the simile between becoming a ward patient and returning to childish dependence in the original family situation is apparent to observation.

PSYCHOSOMATIC VIEWPOINT

Every disease must have a psychic as well as a physical component, if only because of the mental reactions to bodily disease and the somatic manifestations of neuroses and psychosis. But the psychosomatic concept is of the deeper integral unity of mind and body, with the primitive emotional drives manifested equally in the mind and in the physical organs; and the pathology of disease is that of the organism and not merely of cells and tissues.

The physical manifestations are called organ neuroses, and the site is determined by an unconscious "organ *inferiority*," which is the product of infantile fantasies about the body, or by previous physical disease or injury, or its symbolic value. Primitive symbolism is important in the manifest end-result; it may be crudely obvious, as in a rheumatic stiff neck marking a refusal to accept an adverse situation, or may remain obscure until analytic probing reveals its origin in infantile experience.

Though all very well in general terms, this often leads in practice to what appears a fantastic theory of disease; but one point may be made to explain the over-hostile reception of the approach. We do not differ essentially from our patients and are equally neurotic in potential; hence these explanations, aimed at the intellect, hit us below the belt; ridicule them and rationalise as we may, we complain because they *threaten our own integrity*.

It must also be emphasised that we are not dealing with the relatively simple matter of the psychic overlay and perpetuation of physical symptoms. At the same time it is too little realised how much added and often pidly curable hysterical disability may complicate such seases as tabes and disseminated sclerosis. A classic stance of the interlocking between the latter illness d neurosis is found in Barbellion's *Diary of a isappointed Man*, which also shows a peculiarly current feature in crippling disease, the fact that a rson may be prepared for disability by the whole course his life-history.

CLINICAL EVOLUTION OF PSYCHOSOMATIC DISORDER

It will be shown in a moment that the thought of an ction causes the actual contraction of muscle-fibres. ow, the mind is thronged with ideas of all kinds: memories, fantasies, and projected actions. Though the urrent of daily life thrusts these to the fringes of onsciousness or beyond, psychoanalysis has shown that he content of the unconscious mind and, in masked form, f conscious ideation also, is the working out of a pattern f childhood origin of which violent actions of aggression nd flight may be essential parts. These break through o objective observation in the defensive or aggressive novements occurring in sleep, the tics and gestures of onscious life, and the repetitive movements of schizophrenics; but, while they are still minimal and not open o observation, they are affecting the appropriate muscles. As John Hunter put it in his *Essays and Observations*, '. . . the mind, which is awake while we are asleep, can and does put a muscle in motion. . . . Those insensible actions arising from the state of the mind . . . may take place whether we be asleep or awake: for as an idea can be formed when asleep, and as the mind can carry that idea into ideal action, so the real action often takes place on these occasions. . . . State of mind produces action of voluntary parts prior to volition and indeed prior to sensation."

This is a channel for the impact of the instinctual drives on the locomotor system, and an analogy is needed to suggest its rôle in the ætiology of disease. Everyone as a child has seen the films in which the growth of plants is speeded up by the camera. The plant is normally caught by the eye at any moment in real life in a fixed and meaningless pose, perhaps with some distortion as an end-result whose significance is not clear. Here it is seen as an active and *purposeful* organism, growing and twisting in an inevitable response to stimulation, and altogether animal-like. The obvious animal behaviour of man should not obscure his slower vegetative responses of bone and muscle, which would be clearer if we could speed up our time-scale as observers. The orthopædic surgeon is pre-eminently concerned with the evolutionary aspect of disease; and, if he could reel off his patients' life-histories in a few minutes, he might be struck by the way in which deformity has, if not purpose, at any rate meaning. If, for instance, he could see the fingers in Dupuytren's contracture snap shut on the palm in a moment of time instead of over several years he might feel disposed to regard that process as akin to the ordinary purposive grasping of the hand, and less likely to reject Jelliffe's (1931) views on the unconscious origin of the contracture. He regards it as the result, in a tenacious grasping person, of unconscious muscular activity in the palmaris longus, which sets up a chronic slight tension along the fibres of the palmar fascia, causing reactive hypertrophy. Analysis of his own case of severe bilateral contracture beginning in adolescence clearly showed its relation to primitive greed and acquisitive tendencies.

This serves as a text for an interpretation of deforming disease, in which the essential features are the unconscious fantasy, the symbolic action, and the physical effects of chronic local spasm. This does not affect the need to treat the physical end-results as such. The position is comparable to the visceral neuroses, in which first the motility and behaviour of an organ are affected, but in which final structural alterations appear, a gastric ulcer or ulcerative colitis requiring treatment in their own right. And it cannot be expected that the patient's conscious attitude to such an end-result will be other than the normal wish to be cured.

But there is a gradation of time-scale among the locomotor disorders of psychogenic origin. At one end of the scale the unconscious mind produces a long-drawn-out modification of structure whose symbolic origin is deeply buried, a deformity distressing the sufferer which we accept as physical disease. At the other end of the scale a rapid onset of disability protects from an immediately unbearable situation but only crudely simulates ordinary disease; these are the conversion hysterias, with changes equally unconscious but the motive now apparent—e.g., a paralysis of the hand in a soldier who has had enough of the battle. And the subjective reaction to the latter is more like the classical "belle indifférence" of Charcot. Between these extremes come intermediate speeds of clinical evolution, until in the longest cases the "functional element" appears to be minimal, though in fact it may be fundamental. In these there is no obvious gain, the crippling is severe, but a need for self-punishment and mutilation has been satisfied.

It will be of value for the orthopædic surgeon provisionally to accept that a disease may have a symbolic meaning for a patient, and a particular end-result its significance. If this be allowed, progress would lie in demonstrating the way in which the mind obtains these results, and the core of this essay is the attempt to present this pathogenesis as it affects the muscular and skeletal systems.

MUSCLES

Observation and introspection both confirm the intimate reflection of the emotional state of the mind in the tonus of skeletal and visceral muscle. Anxiety is particularly responsible for hypertonicity, and it is not untrue, if facile, to equate mental and muscular tension. Jacobson's (1929) concept of a reciprocal relation, so that trained muscular relaxation lessens anxiety, is less easy to accept; the painfully acute hallucinosis and ideation of severe anxiety cannot be relieved in this way. But a vicious circle may exist; psychoneurotic fatigue may be due to prolonged hypertonicity, and much self-maintained tonus is relieved by deliberate relaxation; and Ellman et al. (1942) have shown the relation of "fibrositis" and local tension in neurotic states. There is a familiar suprascapular "fibrositis" common in the depressive, with habitual elevation of the shoulders, and due to local spasm of trapezius fibres, reminiscent of the focal myalgias of the buttock typical of a prolapsed intervertebral disk. Elliott (1944) has shown electromyographically that these focal myalgias are associated with a central excitatory state of the appropriate cord segment due to root-irritation by the disk. If some analogous central (psychic) excitatory state were shown to maintain spasm similarly in voluntary muscle, it would largely solve the problem of myalgia and fibrositis.

Jacobson (1930) made this advance sixteen years ago, though his work has escaped attention. Investigating the effects of an *imagined* contraction, he measured the action currents in the muscle with skin electrodes and a string galvanometer, and obtained unequivocal results. The deliberate mental conception of such an action as clenching the fist invariably produced action currents in the forearm flexors, whereas no currents were noted without the idea of the movement being in the mind. It is unnecessary to speculate on the reason for some fibres undergoing isometric contraction; the practical point emerging is *the impossibility of conceiving an activity without causing fine contractions in all those muscles which produce that activity in reality.* Quantitatively, the "imagined" action currents are much smaller than

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A preliminary review of the basic emotional mechanisms operating in orthopædic patients is not meant to conceal their working in all disease groups, and for that matter in all individuals. Handicapped orthopædic patients must choose their limited activities by substituting for the original response to a desire one more possible in the circumstances, a process of sublimation common in normal life. This acceptance of the reality of physical disability is their basic and most difficult adjustment, and in helping them, particularly children, we must recognise their real need for love and affection, especially in emotionally labile spastics, at the same time avoiding the harmful effects of overprotection. The cripple unable to make this adjustment may escape into a fantasy world, particularly in adolescence, a reaction calling for energetic treatment by social activity and occupational therapy. At any age an aggrieved person confronted with unexpected disability may regress to an infantile state or to an insidious general helplessness, which must be firmly discouraged. The advantages of illness for the helpless invalid are obvious; he is the focus of attention and served by the whole family. There is some analogy between this and the "secondary gain" of any psychoneurosis (though a fearful price may have to be paid for it); and an unwillingness to lose these real advantages by recovering leads to rationalisation of the *unconscious* wishes as logical objections or assertions of incapacity. In accident cases there may be added delay in rehabilitation due to an associated phobia, a fear of repetition based on some childhood trauma.

Analysis reveals that accident proneness in industry is often due to an unconscious wish for punishment, an instance of the guilt mechanisms which operate in relation to disease and injury, depicting them as retribution for some childhood fantasy. Identification is frequent in hospital patients, who incorporate in their own ego desirable facets of other personalities. This may operate between patient and surgeon (hence it is important for the surgeon to be regarded as a good as well as a powerful father-figure) or between patient and patient. Thus a victim of senile kyphosis may identify himself with a superficially similar case of spinal curvature from metastases and be correspondingly affected emotionally in his own progress. Appliances and plasters are also regarded as part of the patient and so rendered tolerable. Orthopædic patients blaming the surgeon for inadequate and delayed treatment, and the nurses for neglect, exhibit the reverse of identification, the projection of one's own inadequacy and guilt on others.

Throughout the guidance of his patient's destiny
orthopædic surgeon must be prepared to be
to listen to all the patient has to say, a mental ca
which relieves anxiety. Many clinicians allow for
considerations, often unconsciously; no wiser stat
of the patient's needs in this *respect could be found*
that of Girdlestone (1945) in his address at Oxford.
do harm by futile reassurance of the neurotic a
unwitting implantation of hypochondriasis; and
reject the psychological approach on the ground
common sense is adequate. Since, unfortunately
these types may adhere to the common-sense arg
this is a good reason for discarding it.

PERSONAL SIGNIFICANCE OF THE SURGEON

A valuable part of dealing with orthopædic pa
particularly in long-term cases, is the winning o
affection and respect. The patient identifies h
with the surgeon, wants to please him by getting w
other words "gives him his soul to be cured." P
analysts are familiar with this as a positive transf
which inevitably alternates in their work with a ne
transference of hatred and delay in recovery. T
these forces are unconscious and uncontrollable the
be set off by the most trivial errors in handling, ar
worth while for the orthopædist to aim at achie
strong positive transference at the outset of trea
and maintaining it as long as possible. He shoul
scrutinise his own reactions to troublesome and im
patients, for to respond in the same vein is to enc
the growth of neurosis. Indeed, the psychol
considerations affecting the behaviour of the su
offer an attractive and almost unexplored field, ra
from an ill-judged readiness to operate, which
projection of an inner search for perfection, to a nih
in treatment, which reflects a personal despair.

All these factors, and the element of sadism pote
in all patient relationships, apply with *only* less fo
the nursing staff. The ward sister is a mother-subs
and it is essential for the two new parents to be in
ment about progress and *treatment both* overtl
covertly. In fact, the simile between becoming a
patient and returning to childish dependence i
original family situation is apparent to observat

PSYCHOSOMATIC VIEWPOINT

Every disease must have a psychic as well as a pl
component, if only because of the mental reacti
bodily disease and the somatic manifestations of n
and psychosis. But the psychosomatic concept
the deeper integral unity of mind and body, wi
primitive emotional drives manifested equally in th
and in the physical organs; and the pathology of dis
that of the organism and not merely of cells and

The physical manifestations are called organ ne
and the site is determined by an unconscious "
inferiority," which is the product of infantile fa
about the body, or by previous physical disease or
or its symbolic value. *Primitive symbolism* is imp
in the manifest end-result; it may be crudely obvi
in a rheumatic stiff neck marking a refusal to acc
adverse situation, or may remain obscure until a
probing reveals its origin in infantile experience.

Though all very well in general terms, this ofte
in practice to what appears a fantastic theory of d
but one point may be made to explain the over-
reception of the approach. We do not differ esse
from our patients and are equally neurotic in pot
hence these explanations, aimed at the intellect,
below the belt; ridicule them and rationalise as w
we complain because they threaten our own integr

It must also be emphasised that we are not
with the relatively simple matter of the psychic c
and perpetuation of physical symptoms. At the
time it is too little realised how much added and

lly curable hysterical disability may complicate such ises as tabes and disseminated sclerosis. A classic ince of the interlocking between the latter illness neurosis is found in Barbellion's *Diary of a ippointed Man*, which also shows a peculiarly rrent feature in crippling disease, the fact that a on may be prepared for disability by the whole course is life-history.

LINICAL EVOLUTION OF PSYCHOSOMATIC DISORDER

t will be shown in a moment that the thought of an on causes the actual contraction of muscle-fibres. w, the mind is thronged with ideas of all kinds: mories, fantasies, and projected actions. Though the rent of daily life thrusts these to the fringes of sciousness or beyond, psychoanalysis has shown that content of the unconscious mind and, in masked form, onscious ideation also, is the working out of a pattern hildhood origin of which violent actions of aggression l flight may be essential parts. These break through objective observation in the defensive or aggressive vements occurring in sleep, the tics and gestures of iscious life, and the repetitive movements of schizorenics; but, while they are still minimal and not open observation, they are affecting the appropriate muscles. John Hunter put it in his *Essays and Observations*, ... the mind, which is awake while we are asleep, can d does put a muscle in motion. . . . Those insensible tions arising from the state of the mind . . . may take ice whether we be asleep or awake; for as an idea can formed when asleep, and as the mind can carry that a into ideal action, so the real action often takes ice on these occasions. . . . State of mind produces tion of voluntary parts prior to volition and indeed ior to sensation."

This is a channel for the impact of the instinctual ives on the locomotor system, and an analogy is needed suggest its rôle in the ætiology of disease. Everyone a child has seen the films in which the growth of plants speeded up by the camera. The plant is normally aught by the eye at any moment in real life in a fixed nd meaningless pose, perhaps with some distortion as n end-result whose significance is not clear. Here it is een as an active and *purposeful* organism, growing and wisting in an inevitable response to stimulation, and ltogether animal-like. The obvious animal behaviour of nan should not obscure his slower vegetative responses f bone and muscle, which would be clearer if we could peed up our time-scale as observers. The orthopædic urgeon is pre-eminently concerned with the evolutionary spect of disease; and, if he could reel off his patients' fe-histories in a few minutes, he might be struck by the ray in which deformity has, if not purpose, at any rate neaning. If, for instance, he could see the fingers in upuytren's contracture snap shut on the palm in a noment of time instead of over several years he might eel disposed to regard that process as akin to the ordinary urposive grasping of the hand, and less likely to reject elliffe's (1931) views on the unconscious origin of the ontracture. He regards it as the result, in a tenacious rasping person, of unconscious muscular activity in he palmaris longus, which sets up a chronic slight tension long the fibres of the palmar fascia, causing reactive iypertrophy. Analysis of his own case of severe bilateral ontracture beginning in adolescence clearly showed its elation to primitive greed and acquisitive tendencies.

This serves as a text for an interpretation of deforming lisease, in which the essential features are the unconscious fantasy, the symbolic action, and the physical effects of chronic local spasm. This does not affect the need to treat the physical end-results as such. The position is comparable to the visceral neuroses, in which first the motility and behaviour of an organ are affected, but in which final structural alterations appear, a gastric ulcer or ulcerative colitis requiring treatment in their own right. And it cannot be expected that the patient's conscious attitude to such an end-result will be other than the normal wish to be cured.

But there is a gradation of time-scale among the locomotor disorders of psychogenic origin. At one end of the scale the unconscious mind produces a long-drawn-out modification of structure whose symbolic origin is deeply buried, a deformity distressing the sufferer which we accept as physical disease. At the other end of the scale a rapid onset of disability protects from an immediately unbearable situation but only crudely simulates ordinary disease; these are the conversion hysterias, with changes equally unconscious but the motive now apparent—e.g., a paralysis of the hand in a soldier who has had enough of the battle. And the subjective reaction to the latter is more like the classical "belle indifférence" of Charcot. Between these extremes come intermediate speeds of clinical evolution, until in the longest cases the "functional element" appears to be minimal, though in fact it may be fundamental. In these there is no obvious gain, the crippling is severe, but a need for self-punishment and mutilation has been satisfied.

It will be of value for the orthopædic surgeon provisionally to accept that a disease may have a symbolic meaning for a patient, and a particular end-result its significance. If this be allowed, progress would lie in demonstrating the way in which the mind obtains these results, and the core of this essay is the attempt to present this pathogenesis as it affects the muscular and skeletal systems.

MUSCLES

Observation and introspection both confirm the intimate reflection of the emotional state of the mind in the tonus of skeletal and visceral muscle. Anxiety is particularly responsible for hypertonicity, and it is not untrue, if facile, to equate mental and muscular tension. Jacobson's (1929) concept of a reciprocal relation, so that trained muscular relaxation lessens anxiety, is less easy to accept; the painfully acute hallucinosis and ideation of severe anxiety cannot be relieved in this way. But a vicious circle may exist; psychoneurotic fatigue may be due to prolonged hypertonicity, and much self-maintained tonus is relieved by deliberate relaxation; and Ellman et al. (1942) have shown the relation of "fibrositis" and local tension in neurotic states. There is a familiar suprascapular "fibrositis" common in the depressive, with habitual elevation of the shoulders, and due to local spasm of trapezius fibres, reminiscent of the focal myalgias of the buttock typical of a prolapsed intervertebral disk. Elliott (1944) has shown electromyographically that these focal myalgias are associated with a central excitatory state of the appropriate cord segment due to root-irritation by the disk. If some analogous central (psychic) excitatory state were shown to maintain spasm similarly in voluntary muscle, it would largely solve the problem of myalgia and fibrositis.

Jacobson (1930) made this advance sixteen years ago, though his work has escaped attention. Investigating the effects of an *imagined* contraction, he measured the action currents in the muscle with skin electrodes and a string galvanometer, and obtained unequivocal results. The deliberate mental conception of such an action as clenching the fist invariably produced action currents in the forearm flexors, whereas no currents were noted without the idea of the movement being in the mind. It is unnecessary to speculate on the reason for some fibres undergoing isometric contraction; the practical point emerging is *the impossibility of conceiving an activity without causing fine contractions in all those muscles which produce that activity in reality.* Quantitatively, the "imagined" action currents are much smaller than the actual, and those accompanying recollected activities are smaller still; when the imagined act is rhythmic, the electrical record is rhythmic also.

This concept of a movement is what Keller (1921) calls its kinæsthetic equivalent, the remembered experience of using these muscles which is an indispensable preliminary to the movement in reality. Thus it is that in paralysis in small children their small store of past experience exposes them to avoidable crippling from disuse, especially if they cannot see the affected part, without energetic play therapy.

These results, incidentally confirmed in electromyographic work during the late war, open a bridge between mental and physical activity and make disease due to muscular disturbance amenable to psychological interpretation based on the symbolic value of the actions concerned. Thus tennis-elbow is a chronic strain of the forearm extensors of indefinite pathology and notoriously unresponsive to treatment. It is as useful an approach as any to regard it as a long-continued spasm associated with the mental concept of clenching the fist, with which there is synergist extensor action in reality. And, if we are *in fact dealing* with the *finer order* of response measured by Jacobson, we must discover why the patient's mind is occupied by this image, what it means to her, and against whom she feels compelled to struggle.

The scope of such a hypothesis is immense. Certain orthopædic complaints must be explicable on the same basis, such as spasmodic flat-foot in children, which is analogous to hysterical torticollis and equally resistant to physical treatment. Krout (1931) suggests that postural tonus is the end-result of the individual's struggle with repressed emotion—i.e., his conflict with society—hence normal erect posture may be symbolically modified. Stooping and submissive postures are derived from feelings of abasement and abandonment associated with infantile regression; and other postures may resemble gestures of defence and defiance. The leading symptom in neurosis is so often locomotor: a shoulder-shrugging tic, the neurosis of the ocular muscles which is miners' nystagmus, or some mimetic response. Though the facial and branchial musculature are pre-eminently involved, the whole body may be regarded as an organ of expression which can be deformed by the inner current of emotion, as a tree is distorted by the prevailing wind. So many postural disorders begin in adolescence that there must be a relation to the mental stress of this time, when the individual has to face away from home to the outer world. A scoliosis may represent an inability to shoulder the burden of adult responsibility; a kyphosis may symbolise a cringing before parental and social authority.

RHEUMATISM

It is convenient to discuss here this problem which, as Halliday (1945) says, is largely a problem of psychoneurosis. At least three-quarters of rheumatic disease is non-articular, producing aches and pains many of which are psychogenic. Fibrositis as an explanation for these has no pathological basis and is discredited as a clinical entity. But I have mentioned focal muscular spasm as a possible cause, maintained by psychic activity in chronic anxiety, and such foci are traditionally sensitive to cold and wet and temporarily dispelled by the relaxation of general anæsthesia.

Rheumatic symptoms are generally advantageous, relieving the sufferer of responsibilities and exciting sympathy, and are also a manifestation of inner tension; soreness and stiffness express a resentment against circumstance. Unfortunately these patients enjoy physiotherapy, but we need not deny them this passive agent, used precisely for its suggestive value. Backache is a good example to elaborate, and is much commoner in industrial practice. A labourer with back muscles sore from hard work, troubled by insecurity and an unhappy home life, accumulates resentment a society and employer that will crystallise round injury to his back which he uses to gain sympathy (Fetterman 1940). This is as effective in escaping an intolerable situation as is a gastric neurosis, the other major partner in the subjective illnesses of those subject to frustration in industrial and military organisations. "I can't carry on, my load is too back-breaking" is equivalent in its symbolism to the "I can't stomach this situation" of the dyspeptic (Alvarez 1920).

It is less easy to fit rheumatoid polyarthritis into the psychosomatic pattern. In general, the disease seems to fit certain personality situations, notably in some cases of ankylosing spondylitis, and the time of onset and recurrences is often related to stress or frustration in daily life. There is a common type, the person whose dammed-up emotions leave a placid exterior, with strong feelings of duty and obsessional tendencies. The crippling here may be the price paid for the mastery of violent aggression; and the frequency of the disease in certain families, as distinct from its rarity in the general population, may be due to tensions within the family unit, apart from any physical diathesis. *Perhaps a physical* predisposition is set off by some failure to externalise emotion, and the predominance of women sufferers may be due to their smaller opportunities for externalising aggression in work. Dunbar (1944) has shown the value of psychotherapy in preventing relapses in cases with a subacute course.

OSSEOUS NEUROSIS

Everyone recognises the concept of visceral neurosis; emotional influences upset the autonomic regulation of plain muscle and glandular secretion, an *initially* reversible disturbance of function leading *to eventual* structural change. There are the pre-ulcerative nervous dyspepsias, the neuroses of colon and bladder, asthmatic bronchial spasm, some dysmenorrhœas, angina, and coronary disease. And there are the vasospasms of the skin, and the numerous dermatoses which have led Rees (1945) to bracket dermatology with orthopædics as prime instances where emotional factors play an obvious part in the causation of disease.

If a similar concept has not been applied to bone, plastic as we know it to be in the long view, this may be because its rigidity is opposed in our minds to the softer labile viscera. But the blood-vessels of bone cannot be immune from the influences affecting vessels elsewhere, and there is no reason to deny an osseous neurosis in which functional ischæmia and hyperæmia are reflected, as always, in sclerosis or rarefaction. Such a concept is valuable in explaining the many ill-defined and so far meaningless syndromes of osteoporosis and sclerosis occurring in the skeleton. On this view the osseous neurosis differs from the visceral neuroses only, and precisely, in virtue of the tissues involved. In the labile viscera physiological upset is soon clinically reflected in disordered function; and, because of this very lability, structural change is late. In the silent rigid framework of bone the early phase of vascular dysfunction must be occult, and only the final fixed changes symptomatic, if clinical features appear at all.

Thus, heretical as it may be to apply these views to Paget's disease, they are as reasonable as the older ideas on ætiology. For osteitis deformans begins as an acute transitory rarefaction followed by sclerosis, changes due to hyperæmia and ischæmia and possibly reversible until fixed by reactive fibrosis, with permanent strangling of vessels and sclerosis in the classic pathology. And can it be that the modern delay in fracture union is due to the anxious economic consequences of injury in our time, an anxiety causing a vasospasm which limits the blood-supply to the bone ends and delays repair?

One final word on the inclusion here of those systemic skeletal changes produced by changes in parathyroid tivity. Graves's disease is often clearly psychogenic; ter some stress the autonomic control of the thyroid is odified to produce the most glaring demonstration of e physical effects of fear and alarm. If the parayroids were subject to similar influences the whole eleton would be open to changes of emotional origin. erhaps it is a pointer in this direction that Shannon 1929) has shown the relation of neurosis and psychosis n children to parathyroid hypofunction, and the benecial effects of parathormone in these cases; and that ases of minor behaviour disorder are often associated ith tetany or subtetanic irritability.

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RESIDUAL DEFECTS AFTER SPRUE

A REVIEW OF 26 CASES

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THE clinical, biochemical, and radiological aspects of acute sprue are well known, but it is important to know which of them persist, and how to detect cases likely to relapse.

In the investigation reported here the patients were convalescent. We tried to find out whether radiological and biochemical abnormalities persisted and, if so, their relation to the degree of clinical activity of sprue. As previous biochemical estimations of absorptive powers of the bowel in sprue lacked radiological control they are of doubtful value, since it is uncertain whether the test-meals reached the absorbing surfaces of the small intestine or were held up in the stomach by abnormal gastric delay, which is a feature of sprue. For these reasons we have largely used radiologically controlled intestinal intubation for giving test-meals to estimate the absorptive power of the bowel. This method has also proved of great value in studying radiologically the pattern and motility of the bowel. The clinical condition of each patient was assessed and compared with biochemical and radiographic findings.

The work has thus consisted of a combined clinical, radiological, and biochemical examination of convalescent patients, with healthy volunteers as controls.

Clinical Observations

The generally accepted difficulty of diagnosing sprue with certainty made it imperative that special care should be taken in the selection of patients. From a large number of convalescents available 26 men were chosen whose early hospital records conformed to classical sprue (Fairley 1936, Manson-Bahr 1943) with characteristic fatty diarrhœa, meteorism, sore tongue, and progressive emaciation; 25 of these had lately returned from South-East India and 1 from North Africa (an unusual sprue area). In 2 patients symptoms developed only after their return to the United Kingdom, but in the other 24 sprue developed abroad. As regards previous illnesses, 8 gave a history of amœbiasis, 2 of bacillary dysentery, 6 of malaria, 1 of roundworm, 1 of hookworm, and 1 of pellagra; but no evidence of any of these diseases was found in this investigation.

As soon as the original diagnosis of sprue was made, all but case 23 were treated with sprue diet and parenteral liver injections. At this stage all showed a high total fæcal fat-content, and in 12 blood examination revealed a mild anæmia. Table I shows the clinical evidence of sprue at the time of this study. The body-weight, anæmia, and appearance of the tongue, together with the number and fat-content of the stools, formed the basis for assessing the activity of the disease.

On these criteria 12 patients were considered to have completely recovered, and 9 showed mild, 4 moderate, and 1 severe signs of sprue (table I). The results of clinical, radiological, and biochemical assessment are shown in table II.

Biochemical Observations

METHODS

Administration of Test-meals.—Fluid meals containing butter-fat, glucose, and barium sulphate were fed by Miller-Abbott tube into the small intestine of the fasting subject.* The position of the meal and its progress in the bowel were checked by radiography. Before the meal was injected, the site of the tube in the bowel was determined by careful screening, and the desired position was obtained by retraction or further swallowing of the tube. This technique permitted delivery of the meal to any required portion of the small intestine and ensured that lack of absorption was not the result of delay in gastric motility or of inefficient pyloric relaxation. Such gastric delay, which is especially likely with fatty meals, may explain lack of absorption of fatty meals given by mouth under certain conditions. In a few cases meals were given by mouth, but these were usually followed by a second meal containing radio-opaque material to ascertain when the contents of the stomach passed into the duodenum.

Nature of Test-meals.—Three types of meal were used:

Meal 1: butter 75 g., glucose 50 g., barium sulphate 100 g., and water 150 ml. The ingredients were made into an emulsion and warmed to body temperature. This meal was generally given by intestinal tube.

Meal 2: butter 31 g., toast 2 oz., milk 2 oz., and a cup of tea. This meal (as used by Frazer and Stewart 1939) was given by mouth and was followed in four hours by meal 3.

Meal 3: glucose 50 g., glycine 25 g., barium sulphate 50 g., and water 100 ml., given by mouth four hours after meal 2.

Meal 1 was given to most patients investigated. It allowed the rate of absorption of fat and carbohydrate to be studied. The high fat-content of meal 1, together with its unpalatable nature, would cause long gastric delay if fed by mouth; so meal 2 was used when the meals were given by mouth. Meal 3 allowed the rate of absorption of glucose and amino-acid to be studied in patients who had been already examined with meal 2. The composition of other meals used on rare occasions is described below.

Blood Samples Examined.—The test-meals were given after an overnight fast. On the morning of the meal samples of both venous and capillary blood were taken; the meal was then given. Venous samples were then taken at two and three hours after the meal as a routine and occasionally at one and four hours. Capillary samples were taken at half-hourly intervals up to four hours after the meal.† Serum, separated from the various the actual, and those accompanying recollected activities are smaller still; when the imagined act is rhythmic, the electrical record is rhythmic also.

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* Meals containing glycine also were given by mouth (see below).

† In cases where meals 2 and 3 were given, samples were taken up to six hours.

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Everyone recognises the concept of visceral neurosis; emotional influences upset the autonomic regulation of plain muscle and glandular secretion, an initially reversible disturbance of function leading to eventual structural change. There are the pre-ulcerative nervous dyspepsias, the neuroses of colon and bladder, asthmatic bronchial spasm, some dysmenorrhœas, angina, and coronary disease. And there are the vasospasms of the skin, and the numerous dermatoses which have led Rees (1945) to bracket dermatology with orthopædics as prime instances where emotional factors play an obvious part in the causation of disease.

If a similar concept has not been applied to bone, plastic as we know it to be in the long view, this may be because its rigidity is opposed in our minds to the softer labile viscera. But the blood-vessels of bone cannot be immune from the influences affecting vessels elsewhere, and there is no reason to deny an osseous neurosis i which functional ischæmia and hyperæmia are reflected, as always, in sclerosis or rarefaction. Such a concept i valuable in explaining the many ill-defined and so far meaningless syndromes of osteoporosis and sclerosis occurring in the skeleton. On this view the osseous neurosis differs from the visceral neuroses only, and precisely, in virtue of the tissues involved. In the labile viscera physiological upset is soon clinically reflected in *disordered function; and, because of this very lability*, structural change is late. In the silent rigid framework of bone the early phase of vascular dysfunction must be occult, and only the final fixed changes symptomatic, if clinical features appear at all.

Thus, heretical as it may be to apply these views to Paget's disease, they are as reasonable as the older ideas on ætiology. For osteitis deformans begins as an acute transitory rarefaction followed by sclerosis, changes due to hyperæmia and ischæmia and possibly reversible until fixed by reactive fibrosis, with permanent strangling of vessels and sclerosis in the classic pathology. And can it be that the modern delay in fracture union is due to the anxious economic consequences of injury in our time, an anxiety causing a vasospasm which limits the blood-supply to the bone ends and delays repair?

One final word on the inclusion here of those systemic skeletal changes produced by changes in parathyroid ivity. Graves's disease is often clearly psychogenic ; er some stress the autonomic control of the thyroid is dified to produce the most glaring demonstration of , physical effects of fear and alarm. If the para- yroids were subject to similar influences the whole leton would be open to changes of emotional origin. rhaps it is a pointer in this direction that Shannon 929) has shown the relation of neurosis and psychosis children to parathyroid hypofunction, and the bene- ial effects of parathormone in these cases ; and that ses of minor behaviour disorder are often associated th tetany or subtetanic irritability.

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RESIDUAL DEFECTS AFTER SPRUE

A REVIEW OF 26 CASES

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THE clinical, biochemical, and radiological aspects of acute sprue are well known, but it is important to know which of them persist, and how to detect cases likely to relapse.

In the investigation reported here the patients were convalescent. We tried to find out whether radiological and biochemical abnormalities persisted and, if so, their relation to the degree of clinical activity of sprue. As previous biochemical estimations of absorptive powers of the bowel in sprue lacked radiological control they are of doubtful value, since it is uncertain whether the test-meals reached the absorbing surfaces of the small intestine or were held up in the stomach by abnormal gastric delay, which is a feature of sprue For these reasons we have largely used radiologically controlled intestinal intubation for giving test-meals to estimate the absorptive power of the bowel. This method has also proved of great value in studying radiologically the pattern and motility of the bowel. The clinical condition of each patient was assessed and compared with biochemical and radiographic findings.

The work has thus consisted of a combined clinical, radiological, and biochemical examination of convalescent patients, with healthy volunteers as controls.

Clinical Observations

The generally accepted difficulty of diagnosing sprue with certainty made it imperative that special care should be taken in the selection of patients. From a large number of convalescents available 26 men were chosen whose early hospital records conformed to classical sprue (Fairley 1936, Manson-Bahr 1943) with characteristic fatty diarrhœa, meteorism, sore tongue, and progressive emaciation ; 25 of these had lately returned from South-East India and 1 from North Africa (an unusual sprue area). In 2 patients symptoms developed only after their return to the United Kingdom, but in the other 24 sprue developed abroad. As regards previous illnesses, 8 gave a history of amœbiasis, 2 of bacillary dysentery, 6 of malaria, 1 of roundworm, 1 of hookworm, and 1 of pellagra ; but no evidence of any of these diseases was found in this investigation.

As soon as the original diagnosis of sprue was made, all but case 23 were treated with sprue diet and parenteral liver injections. At this stage all showed a high total fæcal fat-content, and in 12 blood examination revealed a mild anæmia. Table I shows the clinical evidence of sprue at the time of this study. The body-weight, anæmia, and appearance of the tongue, together with the number and fat-content of the stools, formed the basis for assessing the activity of the disease.

On these criteria 12 patients were considered to have completely recovered, and 9 showed mild, 4 moderate, and 1 severe signs of sprue (table I). The results of clinical, radiological, and biochemical assessment are shown in table II.

Biochemical Observations

METHODS

Administration of Test-meals.—Fluid meals containing butter-fat, glucose, and barium sulphate were fed by Miller-Abbott tube into the small intestine of the fasting subject.* The position of the meal and its progress in the bowel were checked by radiography. Before the meal was injected, the site of the tube in the bowel was determined by careful screening, and the desired position was obtained by retraction or further swallowing of the tube. This technique permitted delivery of the meal to any required portion of the small intestine and ensured that lack of absorption was not the result of delay in gastric motility or of inefficient pyloric relaxation. Such gastric delay, which is especially likely with fatty meals, may explain lack of absorption of fatty meals given by mouth under certain conditions. In a few cases meals were given by mouth, but these were usually followed by a second meal containing radio-opaque material to ascertain when the contents of the stomach passed into the duodenum.

Nature of Test meals—Three types of meal were used :

Meal 1 : butter 75 g , glucose 50 g., barium sulphate 100 g., and water 150 ml. The ingredients were made into an emulsion and warmed to body temperature. This meal was generally given by intestinal tube.

Meal 2 : butter 31 g., toast 2 oz., milk 2 oz., and a cup of tea. This meal (as used by Frazer and Stewart 1939) was given by mouth and was followed in four hours by meal 3.

Meal 3 : glucose 50 g , glycine 25 g., barium sulphate 50 g., and water 100 ml., given by mouth four hours after meal 2.

Meal 1 was given to most patients investigated. It allowed the rate of absorption of fat and carbohydrate to be studied. The high fat-content of meal 1, together with its unpalatable nature, would cause long gastric delay if fed by mouth ; so meal 2 was used when the meals were given by mouth. Meal 3 allowed the rate of absorption of glucose and amino-acid to be studied in patients who had been already examined with meal 2. The composition of other meals used on rare occasions is described below.

Blood Samples Examined.—The test-meals were given after an overnight fast. On the morning of the meal samples of both venous and capillary blood were taken ; the meal was then given. Venous samples were then taken at two and three hours after the meal as a routine and occasionally at one and four hours. Capillary samples were taken at half-hourly intervals up to four hours after the meal.† Serum, separated from the various samples of blood, was used for estimation of lipid and chylomicron count, and oxalated blood was used for determinations of glucose and amino-acid.

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* Meals containing glycine also were given by mouth (see below).

† In cases where meals 2 and 3 were given, samples were taken up to six hours.

Biochemical Estimations.—Special attention was given to correlation between the serum-lipid fractions (estimated chemically) and the number of particles (chylomicra) seen with dark-ground illumination. The degree of opalescence of the serum was also recorded qualitatively. Increase in serum opalescence was of equal value to the chylomicron count as a criterion of lipid absorption. Glucose and amino-acid nitrogen were also estimated. The estimations made and the method of expressing the results are enumerated below:

(1) *Total fatty acid* was determined after saponification of an alcohol-ether extract of serum by a titrimetric method developed in the laboratory with the helpful collaboration of Sergeant S. J. Weiner, R.A.M.C., who carried out these estimations. Serum 2 ml. was extracted with 25 ml. of alcohol-ether mixture (3 : 1) under reflux for 30 min. The extract was made up to 50 ml. with more alcohol-ether. An aliquot part (generally 30 ml.) of this extract was used for the estimation of total fatty acid. After saponification and acidification to pH 1 the fatty acids were extracted with petroleum ether. The extract was then washed free of water-soluble acid and evaporated to dryness. The residue was dissolved in alcohol and titrated with N/50 CO_2-free soda in a stream of nitrogen. The results are expressed in milli-equivalents of fatty acid per litre of serum. This method gives reproducible results and quantitative recovery. For the sake of brevity protocols have been omitted. Serum 2 ml. was sufficient for estimation of all the lipid fractions.

(2) *Lipoid phosphorus* was estimated after incineration of a 10 ml. sample of the original alcohol-ether extract (see Man 1937). The incineration was carried out with 60% perchloric acid 1 ml., as kindly suggested by Prof. E. J. King, and the inorganic phosphorus was estimated by the method of Fiske and SubbaRow (1925). The results are expressed in mg. per 100 ml. of serum. To obtain phospholipoid fatty acid in milli-equivalents, this value was divided by 15·5 (31 mg. of lipoid phosphorus = 2 milli-equivalents of fatty acid).

TABLE I—CLINICAL EVIDENCE OF ACTIVITY OF SPRUE

Case	Glossitis	Daily no. of stools	Appearance of stool	Total fæcal fat (%)	Body-weight (approx.)	Anæmia	Clinical assessment
1	Absent	2	Normal	18	Normal	Absent	Recovered
2	Present	4	Normal	19	Subnormal	Absent	Mild
3	Present	3	Sprue-like	14	Subnormal	Absent	Mild
4	Present	1	Sprue-like	47	Normal	Absent	Moderate
5	Present	1	Normal	28	Normal	Absent	Mild
6	Absent	2	Normal	17	Normal	Absent	Recovered
7	Present	6	Sprue-like	17	Normal	Absent	Mild
8	Absent	3	Normal	19	Subnormal	Present	Recovered
9	Absent	1	Normal	14	Normal	Absent	Recovered
10	Absent	1	Normal	18	Normal	Absent	Recovered
11	Absent	1	Normal	14	Normal	Absent	Recovered
12	Absent	1	Normal	24	Normal	Absent	Recovered
13	Absent	2	Normal	10	Normal	Absent	Recovered
14	Absent	2	Normal	12	Normal	Absent	Recovered
15	Absent	1	Normal	12	Normal	Absent	Recovered
16	Present	3	Normal	22	Subnormal	Absent	Mild
17	Absent	2	Normal	33	Normal	Present	Recovered
18	Absent	2	Normal	20	Normal	Absent	Recovered
19	Present	2	Normal	21	Subnormal	Absent	Mild
20	Present	2	Normal	31	Subnormal	Present	Mild
21	Present	4	Normal	10	Subnormal	Absent	Mild
22	Present	1	Sprue-like	24	Subnormal	Present	Moderate
23	Present	4	Sprue-like	34	Subnormal	Present	Severe
24	Present	8	Sprue-like	34	Subnormal	Present	Moderate
25	Present	3	Sprue-like	38	Subnormal	Absent	Moderate
26	Present	2	Normal	18	Subnormal	Absent	Mild

TABLE II—CLINICAL, RADIOLOGICAL, AND BIOCHEMICAL ASSESSMENT

Case	Clinical assessment	Radiological assessment	Biochemical findings		
			Fat-absorption*	Lipæmia	Chylomicron count
1	Recovered	Mild changes	..	..	..
2	Mild	Normal	..	..	..
3	Mild	Mild changes	..	..	..
4	Moderate	Severe changes	..	..	..
5	Mild	Mild changes	..	..	..
6	Recovered	Normal	..	..	..
7	Mild	Normal	..	..	..
8	Recovered	Normal	..	..	..
9	Recovered	Normal	..	..	..
10	Recovered	Normal	..	..	..
11	Recovered	Normal	..	..	..
12	Recovered	Normal	..	..	..
13	Recovered	Normal	+	+	+
14	Recovered	Normal	+	±	±
15	Recovered	Normal	+	..	+
16	Mild	Normal	+	±	+
17	Recovered	Normal	+	+	±
18	Recovered	Mild changes	+	+	+
19	Mild	Mild changes	±	+	+
20	Mild	Moderate changes	+	+	+
21	Mild	Mild changes	+	+	+
22	Moderate	Moderate changes	±	+	+
23	Severe	Severe changes	–	–	–
24	Moderate	Moderate changes	+	+	±
25	Moderate	Moderate changes	–	–	–
26	Mild	Mild changes	+	+	+

+ = significant increase. – = no increase.
± = increase within experimental error. * Measured chemically

(3) *Non-phospholipoid fatty acid* was obtained by subtracting the phospholipoid fatty acid in milli-equivalents from the sum of the total fatty acid added to 18% of the phospholipoid in milli-equivalents (Man and Gildea 1932). This procedure allows for the fact that only 82% of the phospholipoid fatty acids appear to be estimated by microtitration following saponification. The main amount of non-phospholipoid fatty acid is present as neutral fat, and we have calculated the neutral fat from this figure. Man and Gildea used non-phospholipoid fatty acid as a means of assessing fat-content of serum. Peters and Man (1943) have computed the fatty acid of the neutral fat in a different way, assuming a certain proportion of free cholesterol in the total cholesterol. We have not adopted this procedure but realise that our "neutral fat"-values may be slightly high, including a small amount of cholesterol ester.

(4) *Neutral fat* was evaluated as glyceryl trioleate corresponding to the non-phospholipoid fatty acid. Results were expressed in mg. per 100 ml. of serum.

(5) *Total cholesterol* was determined colorimetrically on an aliquot of the original alcohol-ether extract after evaporation to dryness and dissolving the residue in chloroform. Results are expressed in mg. per 100 ml.

(6) *Particle counts* were made with dark-ground examination of both venous and capillary specimens of serum. The method of Frazer and Stewart (1939) was used.

(7) *Opalescence of serum* was recorded on a qualitative basis. In general the fasting serum was crystal clear (recorded below

—), whereas the serum after fatty meals was either alescent (+) or highly opalescent (++). These observans generally agreed with chylomicron counts and were a nple and rapid guide to whether fat was being absorbed.

(8) *Blood-sugar* was estimated half-hourly in capillary ecimens by the method of Folin and Wu.

(9) *Amino-acid nitrogen* was estimated only after the meals ntaining glycine. Folin's (1922) method was used.

We are very grateful to Sgts. S. J. Weiner and W. arvey, L/Cpl. L. Croton, and Pte. P. Lawrence for rforming these estimations.

ABSORPTION OF MEALS

Table III summarises preliminary results of feeding eals at various levels to normal controls. Meals d into the jejunum were followed by variable and constant absorption of fat. Glucose, however, was tisfactorily absorbed from all parts of the small testine investigated. Meals fed into the first and second arts of the duodenum gave satisfactory fat-absorption. Then meals were fed by tube at lower levels, fat-absorption appeared to depend on the extent of regurgitation to the second part of the duodenum. Accordingly, eals were in general fed into the first and second parts f the duodenum and not into the jejunum.

Meals fed by mouth were followed by fat-absorption, ut this was delayed if large amounts of fat were fed case N), and even when a light fatty meal (Frazer and Stewart 1939) was given, fat-absorption following meals y mouth was sometimes delayed. The advantages of giving fatty meals by duodenal tube to obtain early and constant fat-absorption are thus evident. Meals fed by mouth were used chiefly for studying amino-acid absorption, as satisfactory rises in amino-acid N follow such meals, and we have not studied to any great extent the absorption of amino-acids following meals given by tube.

TABLE III—RESULTS OF MEALS GIVEN AT VARIOUS LEVELS

Case	Meal	Site of meal	Extent of regurgitation into second part of duodenum	Rise in capillary chylomicron count	Rise in blood-sugar	Rise in blood-amino-acid N
A	1	D1	..	+	+	..
B	1	D2	..	+	+	..
C	1	D2	..	+	+	..
D	1	D3	Slight	–*	+	..
E	1	D3	Gross	+	+	..
F	1	J	Nil	–	..	..
G	1	J	Slight	+ late	+	..
H	1	J	Fair	+ late	+	..
I	1	J	Slight	+ late	+	..
J	1	J	Gross	+	+	..
K	1	J	Gross	+	..	..
L	Olive oil, glucose	J	Slight	–	+	..
M	Olive oil, glucose	D2	..	+	+	..
N	1 + glycine	M	..	+ late	..	+
O	2 and 3	M	..	+	+	+
P	2 and 3	M	..	+ late	+	+
Q	2	M	..	+	..	+

* A rise in total fatty acid was observed in this case.

D1, D2, D3, J, and M indicate meals fed into first, second, and third parts of duodenum, jejunum, and mouth respectively.

Extent of regurgitation into second part of duodenum is recorded when meals were fed below this level—i.e., into third part or into jejunum.

+ indicates rise in chylomicron count, glucose, or amino-acid N within 2 hours of feeding. + late, in case of chylomicron counts, indicates rise later than 2 hours.

TABLE IV—ABSORPTION OF FAT IN NORMAL CONTROLS

Case	Meal	Site of meal	Time (hrs. after meal)	Neutral fat*	Capillary serum particle count	Venous serum particle count	Opalescence of venous serum	Total fatty acid†	Phospholipoid P*	Cholesterol*	Non-phospholipoid fatty acid†
A	1	D1	0	180	16	14	–	9·7	7·1	169	6·0
			2	270	54	75	++	13·5	7·9	188	9·3
			3	320	60	65	++	14·9	7·8	188	10·8
B	1	D2	0	140	3	6	–	8·2	6·4	144	4·8
			2	140	20	23	+	8·8	7·5	154	4·9
			3	180	24	18	+	9·6	6·9	167	6·0
C	1	D2	0	130	5	5	–	8·5	7·5	209	4·5
			2	180	107	84	+	10·6	8·3	224	6·2
			3	300	99	97	++	14·9	8·5	211	10·4
N	1	M	0	..	3	..	–	8·5	..	..	..
			4	..	14	..	–	9·4	..	..	..
			6	..	47	..	++	14·8	..	..	..
O	2	M	0	190	1	1	–	11·9	10·4	308	6·4
			2	250	31	37	++	13·8	10·0	250	8·5
			4	230	16	14	+	13·3	10·4	250	7·8
P	2	M	0	80	2	1	–	6·7	7·5	246	2·7
			2	120	11	12	–	7·8	7·2	223	4·0
			4	150	17	14	±	8·6	6·6	230	5·1

D1 = first part of duodenum. D2 = second part of duodenum. M = mouth. * Mg. per 100 ml. † Milli-equivalents per l.

Accordingly the absorption of fat and glucose were mainly investigated by meals introduced into the duodenum (first and second parts). Test-meals were, however, given by mouth in the few experiments where amino-acid absorption was also studied.

ABSORPTION OF FAT

This was studied in sprue patients and in controls (normal subjects) after the introduction of test-meals into the first and second parts of the duodenum and in a few cases by mouth. Meals introduced into the jejunum or the third part of the duodenum may be followed by failure of absorption due to physiological causes and not to any pathological lesion. Hence only results with meals fed into the first and second parts of the duodenum (and a few by mouth) are considered below.

Table IV shows the changes in serum-fat, particle counts, serum opalescence, and the changes in the various lipid fractions of the serum, following fatty test-meals given both by duodenal tube and by mouth to normal subjects.

These meals fed into the duodenum (first and second parts) and by mouth to normal subjects were followed (table IV) by increase in neutral fat, particle counts, and opalescence of the serum. The figures for neutral fat given in table IV are calculated from the values for non-phospholipoid fatty acid. It is evident that this is the only serum-lipid fraction which shows consistent increase accompanying fat-absorption, and that the increase observed in total titratable fatty acid is due to the increase in this fraction. No significant alterations in the other fractions (lipoid phosphorus and cholesterol) were observed. Increases in particle count and opalescence of serum thus accompany increase in neutral fat and are convenient indications of fat-absorption. The opalescence of serum is a particularly useful clinical guide.

Table V records results obtained in 14 cases of sprue. Cases 23 and 25 show no increase in fat, particle count, or serum opalescence. Cases 19 and 22 show no significant increase in fat but do show increased particle count and opalescence. Cases 14, 16, and 24 show no significant increase in particle count or opalescence, but do show increase in fat. The remaining 7 cases show increases in fat, particle count, and opalescence ‡ after the fatty meals.

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‡ In case 15 opalescence was not recorded.

TABLE V—ABSORPTION OF FAT IN 14 SPRUE CASES

Case	Meal	Site of meal	Time (hrs. after meal)	Neutral fat*	Capillary serum particle count	Venous serum particle count	Opalescence of venous serum	Total fatty acid†	Phospho-lipoid P*	Cholesterol*	Non-phospho-lipoid fatty acid†
25	1	D2	0 2 3	290 270 290	6 4 3	2 4 3	– – –	13·5 12 6 12·8	6·8 6·2 5 8	156 143 145	9·9 9·3 9 8
23	1	D2	0 2 3	190 190 180	6 4 12	2 3 5	– – –	9 5 9·7 9·5	5·8 6·4 6·6	94 103 112	6·5 6·3 6 0
22	1	D2	0 2 3	300 300 320	6 6 20	3 2 30	– – +	14·5 14·2 15·6	8·4 7·8 9 0	.. .. ..	10·1 10·1 10·8
16	1	D2	0 2 4	130 120 170	4 .. 16	.. .. ..	– – ±	8 6 8·6 9 6	8·1 8·3 7·4	186 183 173	4·3 4·2 5·7
24	1	D2	0 2 3	120 130 190	19 22 20	12 28 28	– – +	7·2 7·4 9·2	5 6 5 7 5·4	100 103 111	4·2 4·4 6·3
17	1	D2	0 2 3	180 240 220	15 26 18	5 23 20	– + +	10·4 11·8 12·1	8·2 7·2 8·5	164 161 175	6·1 8·0 7·6
26	1	D2	0 2 3	20 140 40	2 27 31	2 25 32	– + ++	4·4 8 8 5·1	7 0 7·5 7 2	175 181 175	0·7 4·9 1·3
18	1	D1	0 2 3	140 180 210	6 57 62	3 67 84	– ++ ++	8·8 9·9 10·9	7·4 7·3 7·1	178 172 173	4·9 6·0 7·1
20	1	D2	0 2 3	190 190 230	17 85 76	18 76 80	– + ++	10·0 10·0 11·8	6·5 6·9 7·7	164 154 152	6 6 6·3 7·7
19	1	D2	0 2 3	350 350 370	13 90 76	19 82 89	– + ++	17·3 17·3 18·2	10·5 10·1 10·9	208 211 223	11·7 12·0 12·5
21	1	D2	0 2 3	180 250 290	10 32 46	7 39 39	– ++ ++	10·6 13·2 15·3	8·3 8·6 9·6	218 196 231	6·2 8·6 9·7
21	2	M	0 2 4	180 230 240	1 27 31	2 25 28	– ++ ++	10·4 12·3 13·3	8 3 8·4 8·9	163 193 184	6·0 7·8 8·3
14	2	M	0 2 4	110 120 150	1 2 8	1 4 12	– – ±	7·5 7·9 8·9	7·5 7·2 7·0	104 102 113	3·6 4·1 5·2
13	2	M	0 2 4	140 180 200	6 15 27	5 20 19	– + ++	7·3 8·7 9·3	4·7 4·7 5·0	120 117 122	4·8 6·2 6·7
15	2	M	0 2 4	230 320 240	5 34 21	4 32 17	.. .. ..	11·0 14 0 11 3	6·2 5·6 5·8	164 156 156	7·7 11·0 8·3

D1, D2, and M have same connotation as in table IV.
* Mg. per 100 ml. † Milli-equivalents per l.

The findings on fat-absorption in the sprue patients may be summarised as follows:

(1) 10 of the 14 sprue cases investigated (5 judged clinically and radiologically to be convalescent, and 9 showing various degrees of activity) showed significant increases in blood-fat content after fatty test-meals. In 7 of these, significant increases in chylomicron count were simultaneously observed.

(2) In the 4 remaining patients no significant rise in blood-fat was observed, and in 2 of these neither visible lipæmia nor increase in chylomicron count was observed. In these 2 patients, at any rate, fat-absorption was deranged. The *fæcal fat-content in these 2 cases was* 34% and 39% of dry weight.

(3) Thus deficiency of fat-absorption was not detected in most of the patients investigated. However, in 2 clinically and radiologically severe cases fat-absorption was defective, and in 2 others (judged to be active) no increase in blood-fat was observed after test-meals, though increases in particle count and lipæmia were observed.

ABSORPTION OF GLUCOSE

Glucose 50 g. was included in the aqueous phase of the emulsions of butter-fat, water, and barium sulphate given by intestinal tube. Specimens of capillary blood were taken at half-hourly intervals after the meal, and the glucose content of these specimens was measured by the method of Folin and Wu. Table VI shows the result obtained with normal subjects, and table VII with patients with, or convalescent from, sprue.

The findings recorded in tables VI and VII may b summarised as follows:

(1) In general the blood sugar level rose abruptly after th meals given by intestinal tube. This rise was followed by sharp fall. Absorption was rapid, and (unlike fat) w seen to follow equally meals fed into the duodenum and in the jejunum.

(2) Occasionally (3 out of 10 cases) a flattened type of bloo sugar curve was obtained, even in normal subjects.

(3) Most of the sprue patients (9 out of 13 cases) show similar rapid absorption of glucose. In 4 cases only we flattened curves observed.

(4) Since a few of the normal controls also showed flatten of blood-sugar curve with this technique, we cannot conclu that the occasional flattening seen in the sprue patients w due to any abnormality.

ABSORPTION OF AMINO-ACIDS

Glycine was included in a few cases in the test-mea fed to normal subjects and sprue patients. The amin acid nitrogen in the venous blood was estimated befo the meal and at one hour and two hours after the mea by the method of Folin (1922). The glycine was generall given as a separate test-meal by mouth (meal 3) fou hours after the small fatty test-meal (meal 2) also give by mouth. This technique was adopted so that th large quantities of glycine fed (25 g.) could not interfe with the absorption of the fat, which was fed first.

Tables VIII and IX show the results obtained on amino acid absorption after these glycine test-meals fed t

TABLE VI—ABSORPTION OF GLUCOSE IN NORMAL SUBJECTS

Case	Meal	Site of meal	Blood-glucose (mg. per 100 ml.) at various times after meal (hrs.)				
			0	½	1	1½	2
A	1	D1	100	120	125	90	100
B	1	D2	100	175	90	75	95
D	1	D3	105	175	110	85	100
E	1	D3	105	160	100	80	100
J	1	J	120	155	80	90	110
R	1	J	110	135	120	110	110
I	1	J	95	165	85	95	100
H	1	J	100	210	180	160	90
G	1	J	105	160	115	95	100
C	1	D2	130	160	140	125	135

TABLE VII—ABSORPTION OF GLUCOSE IN SPRUE CASES

17	1	D1	105	145	120	135	135
16	1	D2	120	215	125	110	115
26	1	D2	100	85	85	100	95
24	1	D3	115	125	135	145	110
18	1	D2	100	135	105	95	105
22	1	D2	110	125	95	100	100
20	1	D2–3	115	145	125	105	110
23	1	D2	100	115	115	110	105
21	1	D2	110	130	90	95	110
1	1	J	95	140	115	100	110
4	1	J	110	155	130	105	110
12	1	J	95	190	155	105	100
25	1	D2	120	195	210	105	115

D1, D2, D3, J, indicate meals fed into first, second, and third parts of duodenum and jejunum respectively.

TABLE VIII—ABSORPTION OF AMINO-ACIDS IN NORMAL SUBJECTS

Case	Nature of meal	Site of meal	Amino-acid N (mg. per 100 ml.) at various times (hrs.) after meal		
			0	1	2
L	Meal 3, four hours after meal 2	M	6·8	7·0	7·3
P	Meal 3, four hours after meal 2	M	6·5	8·4	9·1
O	Meal 3, four hours after meal 2	M	6·4	8·2	7·6
N	25 g. glycine, 50 g. glucose, 75 g. butter, 50 g. Ba.SO$_4$, 100 ml. water	M	4·8	..	6·9
S	25 g. glycine, 50 g. glucose, 20 g. butter, 50 g. Ba.SO$_4$, 100 ml. water	J	5·4	7·0	5·9

TABLE IX—ABSORPTION OF AMINO-ACIDS IN SPRUE CASES

Case	Nature of meal	Site of meal	0	1	2
13	Meal 3, four hours after meal 2	M	7·1	8·8	8·8
14	Meal 3, four hours after meal 2	M	6·6	7·4	8·0
21	Meal 3, four hours after meal 2	M	7·0	8·6	8·6
15	Meal 3, four hours after meal 2	M	7·0	7·9	..
15	25 g. glycine, 100 ml. water	M	8·2	10·5	10·3

M = by mouth. J = by jejunal tube.

normal subjects and to sprue patients. In all the 4 sprue patients investigated, satisfactory absorption of amino-acids was observed, as in the normal controls. These patients were, however, convalescent, and only 1 of them still showed radiological lesions.

Radiological Appearances

TECHNIQUE

The technical difficulties of passing a Miller-Abbott tube may be considerable in a normal subject and are certainly even greater in a patient with sprue. It was, however, found that 1–2 c.cm. of metallic mercury introduced into the balloon of the tube with the subject lying on his right side considerably assisted the tube in its negotiation of the pylorus. One of the types of meal described above was then introduced through the tube (fig. 1).

FINDINGS

The following unexpected findings were noted:

(1) A large fatty meal directly introduced into the normal small bowel did not produce radiological appearances similar to those seen in sprue. This finding appears to invalidate the hypothesis put forward by Kantor (1939) and Stannus (1942) that the radiological changes in sprue are secondary to the abnormal fatty contents of the small bowel.

(2) A large fatty meal introduced directly into the small bowel did not lead to a slow sluggish passage as seen in established sprue, but rather the rate of transit of such a meal tended to be increased. The mucosal pattern in the jejunum was coarser than normal, the changes being probably secondary to the hypertonicity of the muscularis mucosæ. This finding is akin to the changes seen in the jejunum in early cases of sprue and suggests that these changes are probably secondary to reflex stimulation.

The radiological appearances in the small bowel in sprue have received considerable attention in the last decade (Golden 1941, Feldman 1941, Rhoads and Miller 1934, Mackie et al. 1935, Snell and Camp 1934, Kantor 1939, and Brailsford 1943). It has been conclusively proved by Golden that the appearances, though characteristic, are not specific for sprue. He has described similar appearances in such widely divergent conditions as chronic nephritis, post-irradiation enteritis, and worm infestation. It has been maintained by Stannus (1942) that these appearances produced by sprue are secondary to a large fatty meal in the bowel. We have proved that this is not so, as the administration of a large fatty meal to normal subjects did not produce a "deficiency pattern." Golden (1941) is of the opinion that the radiological appearances are due to a deficiency factor causing an atrophy of the autonomic nervous plexus in the wall of the small bowel; such changes have been noted in vitamin-B deficiency.

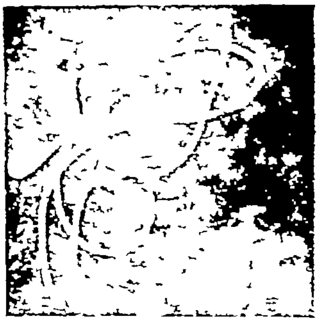
Fig. 1—Radiogram showing Miller-Abbott tube in position for investigating mucosal pattern. Before test-meal was administered, tube was withdrawn to 2nd part of duodenum.

Examination of the small bowel by the fractional barium meal described by Pansdorf (1937) is not entirely satisfactory, as the sphincteric action of the pylorus prevents adequate filling of the small bowel. With such incomplete filling it is extremely difficult to assess minor changes in the small bowel. This fractional barium meal is certainly not sufficiently critical to investigate the return to normal after sprue. For this reason, and for the reasons described in the biochemical section, contrast media delivered by intestinal intubation through a Miller-Abbott tube were used for radiological assessment.

The radiological changes in sprue are of four types: (1) changes in motility; (2) changes in tonicity; (3) changes in mucosa; and (4) changes in colon.

(1) *Changes in Motility.*—In the early stages the meal passes through the small bowel more quickly, but

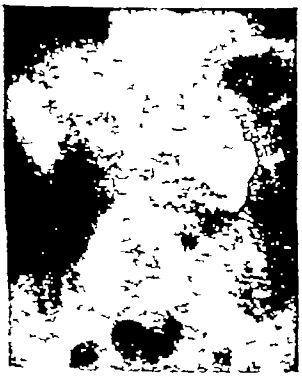
Fig 2—Case 24, a long-standing case of sprue with several relapses. On examination patient had no symptoms, but radiography 40 min. after meal shows dilatation of middle third of small bowel, with hypotonic segments.

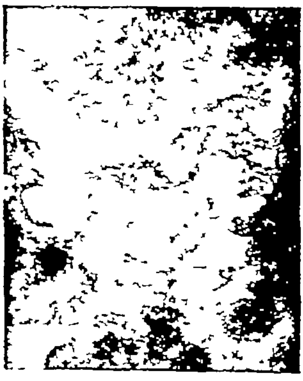
Fig. 3—Case 4, active sprue. Radiography at 10 min. after meal shows coarsening of mucosal pattern in jejunum, with widening and exaggeration of rugæ, and segmentation in bowel.

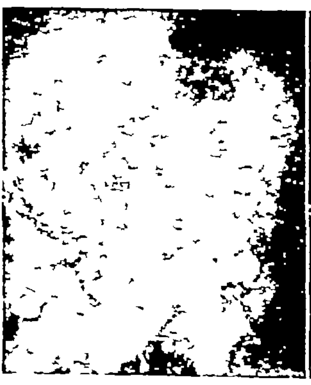
Fig. 4—Case 4, at 30 min. after meal, showing changes in midpart of small bowel, with segmentation (areas of hypomotility alternating with areas of hypertonicity).

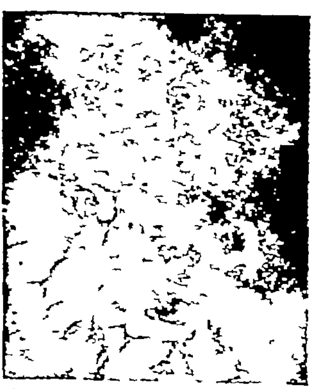
Fig. 5—Case 4, at 60 min., showing tendency to segmentation in middle third of jejunum.

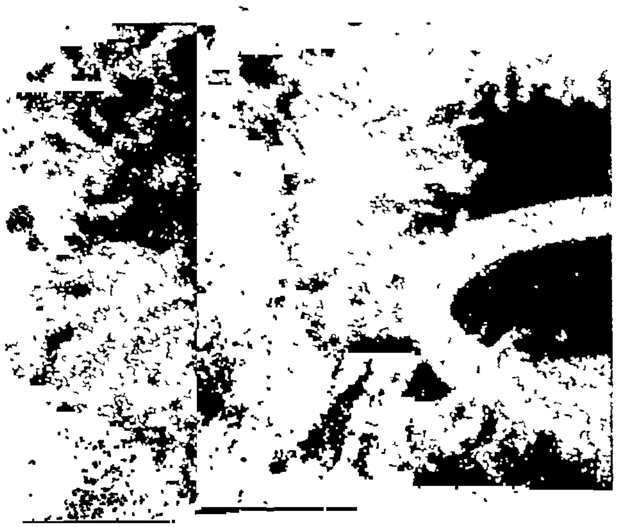

Fig. 6—Case 3, recovered from sprue. Radiography shows restitution of normal feathery mucosal pattern in upper ileum.

in a well-developed case delay is the outstanding feature. If the meal is given by mouth, there is gastric retention. The appearance of the meal in the small bowel is so unchanging that films taken at intervals give the impression that the meal has been cast in wax, and the term "moulage pattern" has been applied to this unchanging radiological picture (fig. 2).

(2) *Changes in Tonicity.*—Areas of hypertonicity (segmentation) alternate with areas of hypotonicity (dilatation). These changes are most obvious in the middle third of the ileum. The terminal ileum is generally not involved to the same degree, and the jejunum as a rule does not show well-marked changes.

The tonicity of the muscularis mucosæ is greater in the early stages of sprue and may be responsible for the exaggeration of the jejunal mucosal pattern seen then (figs. 3, 4, and 5). Later, hypotonicity of this structure is probably partly responsible for the flattening, thinning, and loss of the haustral markings.

(3) *Pattern Changes in Mucosa.*—These are most clearly seen in the mid-third of the small bowel and are best demonstrated by spot mucosal-relief pictures after simple barium-sulphate solution has been delivered through a Miller-Abbott tube (fig. 6):

(*a*) *Coarsening of Folds.*—The normal feathery mucosal pattern is replaced by a coarse irregular pattern. The valvulæ conniventes are widened, coarser, further apart, and consequently few. These changes are most marked in the upper jejunum (fig. 7).

(*b*) *Irregularities of Folds.*—The valvulæ conniventes cease to have the fine delicate appearance and are very irregular in outline and widely spaced.

(*c*) *Flocculation of Meal.*—The barium meal loses its smooth uniform consistence and becomes aggregated into floccules. The barium may also have a granular appearance (figs. 8 and 9).

(*d*) *Obliteration of Folds.*—The mucosal folds of the bowel ultimately become obliterated in the terminal phases (fig. 2).

(4) *Changes in Colon.*—Some enlargement of the colon (fig. 10) was seen in most of the cases investigated. The dilatation appears to be secondary to the large bulk of the fæces. Barium enemata were not performed to gauge the dilatation accurately, but it appears to be only moderate.

It is doubtful if the presence of megacolon can be used, as has been suggested, to differentiate between sprue and cœliac disease. A moderate degree of dilatation appears to be often present in sprue.

The radiological findings in 26 cases of sprue are compared with the clinical and biochemical findings in table II.

SUMMARY

A group of 26 patients with sprue, who had been invalided to this country, were investigated by clinical, radiological, and biochemical means.

Of these, 12 were clinically well, 9 showed mild, 4 moderate, and 1 severe signs of sprue.

Radiologically 13 showed no abnormality, 7 showed mild, 4 moderate, and 2 severe changes in the bowel pattern.

Of the 14 patients investigated biochemically, only 2 showed definitely deficient fat-absorption.

In the small series investigated, clinical and radiological estimations persisted for the same length of time and were of equal value in assessing degree of recovery.

Deficiency in fat-absorption was detectable only in patients showing little recovery.

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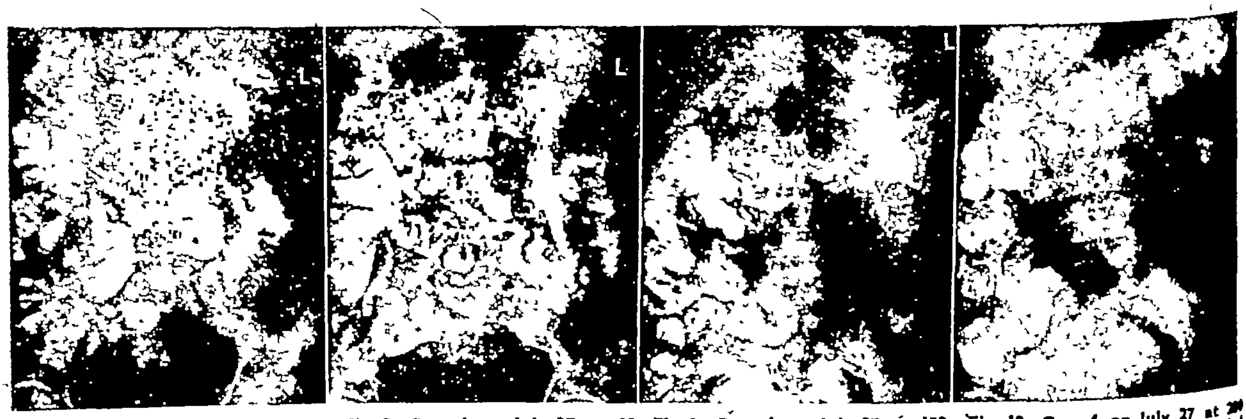

Fig. 7—Case 4, on July 27, three weeks later than figs. 3, 4, and 5. Radiography at 15 min. shows meal in upper jejunum, with coarsening and exaggeration of mucosal pattern.

Fig. 8—Case 4, on July 27, at 90 min., showing segmentation in middle third of ileum and flocculation of meal.

Fig. 9—Case 4, on July 27, at 150 min., showing segmentation and dilatation of colon with fatty contents.

Fig. 10—Case 4, on July 27 at 2[illegible] min., showing colon distended with large fæcal barium-filled stools.

Figs. 7, 8, 9, and 10 show typical deficiency pattern of sprue.

THE USE OF CALCIFEROL IN TUBERCULOUS CONDITIONS*

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THE calciferol treatment of lupus vulgaris (Charpy 1943, 1944a and b, Dowling and Thomas 1945, 1946, Dowling et al. 1946, Dowling 1946) is an outstanding advance in the treatment of tuberculosis, and should do a great deal towards the elimination of perhaps the most pathetic class of tuberculous patients. Our main work so far with calciferol has been in the treatment of this condition, but I propose also to discuss the results we have so far obtained with other types of surgical tuberculosis.

In March, 1946, there were at Morland Clinics 20 cases of lupus vulgaris, probably some of the worst in the country, since they were not sent for institutional treatment until various methods of local therapy had been tried elsewhere without success. This is shown by the facts that the average age of the patients was 38, and the average number of years they had had the disease before coming to Morland Clinics for treatment was 19.

To give calciferol a fair and thorough trial all other methods of treatment were abolished for the first four months, and all the patients had regular pathological investigations, quantitative fortnightly tuberculin skin tests, records of weights and blood-pressures, biopsies, abdominal radiography, and constant medical supervision. Calciferol was dealt out each morning by a sister and its consumption noted on a chart, to prevent patients from omitting to take it because of its unpleasant effects.

The preparation used was 'Ostelin,' kindly supplied by Glaxo Laboratories Ltd., and I first divided the original cases into three groups, 7 patients being given intramuscular injections of an oily solution and receiving 600,000 units twice weekly, 7 an oily solution in capsules, and 6 an emulsion, both latter groups having 150,000 units a day by mouth.

PROGRESS

Under calciferol treatment progress has been by no means straightforward. The intense gloom and despondency among all the lupus patients during the first two or three weeks bore out very strongly the fact that practically every one of them looked decidedly worse. The patches of lupus looked more angry and swollen, the isolated nodules more scarlet, and spontaneous ulcers developed in some.

Improvement began after three weeks in most cases, but in some of the worst not until after five or six weeks, by which time improvement was noted in every patient. Gradually the redness faded, the lupus became flatter, and the patients volunteered the information that the lesion felt easier: "the skin did not appear so tight": "the lip was not so swollen"; "the mouth could be moved more easily," &c. White patches appeared in what had previously been uniformly red, and the isolated nodules appeared paler.

During this more acute phase pathological and other investigations gave some idea of what was going on. For example, the average initial diameter of redness produced by 1/1000 tuberculin in three days was 16·4 mm., and in two weeks it had risen to 19·5 mm., after which it gradually fell to slightly below its original level and remained there.

At the same time the sedimentation-rate rose in almost every case. The average initial figure was 8·4 mm. in the first hour. This rose to 16 mm. at the end of a month, and 18 mm. at the end of two months; then it gradually fell to normal, except in patients showing toxic or other ill effects.

The differential blood-count was also interesting: the initial polymorph percentage averaged 61, rose to 67 in five or six weeks, and then gradually returned to its previous level at the end of thirteen weeks. Similarly, the lymphocyte count fell from 32·2% to 28% and then rose again. These figures may not be striking, but experimental error can surely be excluded when practically every case followed the same pattern, including those added to the series at a later date.

The blood-calcium levels showed nothing of importance. The average level was high at the beginning, 11 mg. per 100 c.cm., probably owing to previous general treatment; after four months it was 11·1 mg. per 100 c.cm. Though a trivial increase was found in a few cases, on the whole the figures were unchanged, and, if anything, patients receiving their ostelin by injection showed a decrease. One patient only showed a figure of 15 mg. per 100 c.cm. but felt well. It was strange that most of the patients with high initial sedimentation-rates had on the whole the lower blood-calcium levels.

LOCAL REACTIONS

One can assume from these facts, both clinical and pathological, that calciferol acts by promoting a more acute reaction in the lupus tissue, increasing the vascularity of the part, producing a slight polymorph response to the infection, and liberating more toxins into the system, as shown by the increased tuberculin reaction and raised sedimentation-rate; they also point to some of the possible dangers of calciferol.

The initial reaction is followed by fibrosis in the lupus tissue, literally squeezing it to death and causing pallor and shrinkage of the lesion, while the various blood and other figures gradually return to more or less their previous levels. The different responses of different types of lupus bear this out. I arbitrarily graded the cases into six separate but often overlapping categories:

(1) Profuse soft granulations, easily removed by scraping, responded very poorly in the absence of local treatment, suggesting that the lesion was too superficial, and that the secondarily infected granulations were not affected by the calciferol in the same way.

(2) Raised firm plaques of lupus, not easily removed by scraping, and difficult to treat by old methods, fared extremely well, the patch of lupus shrinking and in many cases disappearing altogether.

(3) More deep-seated lesions responded well, as one would imagine from the theory of calciferol action.

(4) Isolated nodules fared badly. Already, in many cases, caught up in fibrous tissue as a result of old disease, they mostly showed very little alteration even after long treatment, perhaps because their blood-supply was poor and the essential reaction was therefore not produced. Nodules that *became bright scarlet* in the first few weeks of treatment and those of recent origin in a more normal area of skin gave the best results.

(5) Lesions of mouth, nose, and larynx at first seemed to give excellent results, but some were disappointing, though in 3 cases they completely disappeared. In 2 cases there was no response, and in another case there was also a tuberculous conjunctivitis which showed practically no alteration after six months' treatment.

(6) Multiple lesions in various parts of the body responded more or less according to their extent, those cases with the largest areas of skin affected being the slowest to respond.

In no case of lupus was there any evidence of calcification in the diseased area. calcium deposits were not found on biopsy, and calcium metabolism appeared to be in no way responsible for the results.

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* Abridged from a paper read to the Tuberculosis Association on Sept. 20, 1946.

LOCAL TREATMENT

After four months' experience of calciferol alone I began to combine it with local therapy, and have been much impressed by the improved results. Though many cases progressed extremely well on calciferol alone, the addition of local measures greatly hastened the progress. I have used mainly a combination of Kromayer and brass paste, and with these the soreness and breaking down of the lupus was not nearly so severe as it used to be, and the resulting ulcers healed much more quickly. A thorough scraping away of any loose granulations, after calciferol has been administered for a while, also seems of great importance; in 3 cases this was followed by sensational results.

In some patients treated with calciferol much pigment was deposited in the lupus site, making the patients unsightly. Local therapy in many cases breaks down the pigment, giving the skin a much better appearance. Acid nitrate of mercury or Finsen light should be used to get rid of the non-reacting and potentially dangerous nodule.

OTHER CONDITIONS TREATED

At the end of April I started using calciferol on other cases of surgical tuberculosis and allied conditions. So far the results, though not conclusive, are suggestive.

In 2 very obstinate cases of *cervical adenitis* the results were very pleasing. The reactions were the same as in lupus; for example, in 1 case the fortnightly tuberculin reactions measured 12, 17, 16, 14, 15, and 15 mm.; the sedimentation-rates for the first hour were 5, 10, 6, 6, 3, and 3 mm., and the polymorph percentage rose from 59 to 70, and later fell to 67.

A word of caution is necessary, because there was a more acute flare-up in the first month, with the formation of pus in one case and a more profuse discharge in the other. It is more than probable that calciferol may cause softening and pus formation in some glands which might otherwise resolve under conservative treatment. This flare-up later subsided, and I was much struck with the way the matting and swelling decreased, leaving mobile small glands which may not need surgical intervention or at any rate should make this procedure much easier.

Two cases of *tuberculous tenosynovitis* were treated with calciferol. One of these was active, and the sedimentation-rate rose from 6 to 50 mm. in 6 weeks, coming down to 2 mm. at the end of three months, and there is now no activity apparent. The other appeared to be quiescent, and calciferol produced no increase in the tuberculin skin reaction and no rise in sedimentation-rate.

In 2 cases of *Bazin's disease* treated ulcers appeared after a week or so, followed by improvement, but one patient then suddenly died of hæmoptysis and the other became so toxæmic that treatment had to be stopped.

The only cases of *tuberculosis of bone* so far tested were a case of bilateral advanced tuberculosis of wrists and a case of multiple tuberculous dactylitis. The first patient had seven sinuses on both wrists on admission, and her condition improved more on calciferol than one would have expected in view of the severity of the condition. Calciferol in this case has been used for only three months, but already there is radiographic evidence of recalcification, and the clinical progress is satisfactory. The patient with multiple dactylitis also had advanced lupus of the face, and in addition to very great improvement in the face, the hands have progressed more quickly than one expected. She has also had calciferol for three months, and the amount of recalcification so far in one phalanx is especially pronounced.

Other cases treated with calciferol were 1 of *tuberculous peritonitis* and 1 of *tuberculous cystitis*. These patients were admitted only a month ago, so nothing definite can be said yet, but both have improved, and in the latter the frequency has decreased.

In a case of *lupus erythematosus* treated with calciferol the patient says the condition feels much easier and looks better, but there is so far, after nearly three months, no noticeable change.

These cases of surgical tuberculosis also had all other forms of treatment possible, in the way of splintage, rest, &c., which are expected to lead to improvement. All we can say is that in many of them the improvement was more satisfactory than in the average case of the sort.

ADVANTAGES

The advantages of calciferol are great. Every one of our lupus patients improved. Even though local treatment in addition to calciferol still makes them unsightly, their treatment is not so painful as before, and the time taken is much shorter. Plastic surgery, if needed, is possible at an earlier date, and we hope to avoid that most difficult of all old tasks, the treatment of active lupus in a skin-graft. One of our patients, with proliferative lupus, started calciferol treatment in March and became steadily worse until the end of April, when local treatment was instituted, particularly scraping and brass. His progress was then so spectacular that in three months there was no evidence of active disease, and a plastic operation was performed in August.

Of our first 20 patients, 14 were discharged clear of active lupus, but in 1 of these some nodules were still visible, which must be regarded as potentially dangerous. Three other patients are practically ready for discharge.

DISADVANTAGES

These include nausea, epigastric discomfort, depression, and weakness, and can be serious. Of the 30 lupus patients treated under constant observation 15 at some time mentioned some of these ill effects, but none of those on injection therapy did so. Nearly half of the surgical tuberculosis cases had similar trouble, but for the most part symptoms were mild and later passed off, even when treatment was continued. In 7 lupus patients treatment had to be stopped, and 2 very nearly died, both with almost identical symptoms. These 2 patients started with running of the eyes and nose, headache, abdominal discomfort, anorexia, and constipation. Treatment was stopped, but they went downhill for the next fortnight, becoming drowsy and eventually comatose, with peripheral neuritis and optic atrophy, a low systolic blood-pressure, and in one case even Cheyne-Stokes respiration. Both, however, recovered, with the help of intravenous therapy in the worst case, but during this very toxic phase the lupus disappeared. Often, but not invariably, the greatest improvement in the lupus took place while the patients were feeling at their worst.

The flare-up in the early stages of treatment might lead to dissemination of lupus. This happened in one of our patients, and I saw, at the annual meeting of the British Association of Dermatology, a man who had developed multiple lupus patches all over his trunk during a course of calciferol treatment for a small area of long-standing lupus on the face.

It is also possible that calciferol may light up some other site of quiescent disease. One of our patients died of a sudden hæmoptysis; there was previously no clinical evidence of lung disease, but necropsy showed three cavities, each the size of a pea, in the right lung. Another patient developed signs of active disease in the right lung, with an evening rise of temperature, a slight cough, and a sedimentation-rate of 98 mm. in 1 hr. After cessation of treatment all symptoms and signs subsided.

Published reports have emphasised the danger to the kidneys, with the possibility of renal calculi and renal damage, and hypervitaminosis. No evidence of renal damage was found in our patients, even in their most toxic states, and abdominal radiography showed no calcification; but it is always a possibility, and I feel that it is most unwise to use calciferol in such doses on completely recumbent patients. I would also hesitate to use it in cases of active lung disease.

One suggestion is that the toxic symptoms may be due to mobilisation of lead from the bones by vitamin D, it having been stored there during life through the domestic hazards of soft water, lead pipes, &c. This would account for most of the symptoms found in our cases, and the peripheral neuritis, optic atrophy, &c., reported in the more severe ones.

The patient who is consuming large doses of vitamin D rarely feels fit. Every one of our patients lost weight, ranging from about 3 lb. to a stone in two or three months.

DISCUSSION

Lupus vulgaris is best treated institutionally, and patients receiving calciferol should be kept under very strict observation, particularly if they are elderly and if local treatment can be administered at the same time. The sedimentation-rate should be measured at least once a month, and treatment stopped if an unusual rise is found. Our cases giving difficulty gave sedimentation-rates between 60 and 98 mm., and no serious symptoms were ever found in a patient with a normal figure. The blood-calcium level should also be estimated, and patients with a very high level should be given a rest, but there is no relation whatever between this figure and progress. A raised blood-calcium level must be regarded as a coincidence, if a dangerous one.

I have found no difference in the results obtained by different methods of administration. Charpy and other French workers have at times attributed no effective action to an oily solution of calciferol, but in my experience, apart from one or two clinical differences, the progress of the lupus has been the same with all methods.

SUMMARY

Calciferol is of the greatest value in the treatment of lupus vulgaris.

Local treatment still has a place, both in speeding cure and for cases responding poorly or not at all to calciferol.

Calciferol has so far given promising results in other forms of surgical tuberculosis.

Toxicity is present to some extent in 50% of cases and, though usually mild, can cause anxiety.

Other disadvantages include the occasional dissemination of tuberculosis and flaring up of a quiescent site elsewhere.

Constant supervision is necessary, particularly in the elderly.

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"... There are occasions on which doctors, as doctors, have the duty to make medical opinion plain to politicians and on which it is an advantage to have medical spokesmen in a legislative assembly. The rôle of the expert is not to stand aside and watch society fall into pits which he has foreseen, only coming to its aid when he is invited after the catastrophe, but to make his warnings heard before any harm is done. But to cry out in warning is a very different thing from leaping in to give well-intentioned but fruitless aid. Politics has its own specialised technique and the outsider who attempts to halt the political machine to avoid an obstacle may accidentally tread upon the accelerator as easily as upon the brake. . . ."—Dr. J. D. KERSHAW, in *An Approach to Social Medicine*, London, 1946, p. 318.

ASCITES FOLLOWING INFECTIVE HEPATITIS

A CASE TREATED WITH CONCENTRATED PLASMA

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HEPATIC cirrhosis is recognised as an occasional sequela of infective hepatitis and homologous serum jaundice.

Dible et al. (1943) found by hepatic puncture 2 cases of cirrhosis, one in a patient with arsphenamine hepatitis, the other in an elderly woman with epidemic hepatitis. In 9 other instances mild residual fibrosis with little periportal scarring was noted 21–51 days from the onset of the jaundice.

Droller (1945) mentions 4 cases of cirrhosis following an outbreak of hepatitis in a diabetic clinic. Of these 1 was confirmed at laparotomy and 1 at necropsy; 2 of these patients died, 300 and 110 days after the onset of the jaundice.

Cullinan (1936) described 20 cases of subacute hepatic necrosis; post mortem the livers showed multiple nodular hyperplasia. The condition was characterised by attacks of jaundice lasting for weeks or months. If the attack was not fatal it was often followed by a period of good health, lasting from a few weeks to many years, before the jaundice recurred. Ascites could develop in cases of long standing. About the ætiology of the condition he came to no definite conclusion, but mentioned catarrhal jaundice as a predisposing factor or even a cause.

In the following case the liver showed a multiple nodular hyperplasia similar to that of Cullinan's cases of subacute necrosis, though clinical findings and course were those of portal cirrhosis.

CASE-RECORD

A private, aged 21, was admitted to an Army hospital on Sept. 14, 1944, with a year's history of swelling of his abdomen. When aged 16 he had an attack of jaundice lasting five weeks and diagnosed as "catarrhal jaundice." As his doctor had told him that there were several cases in the neighbourhood, it may be assumed that the condition was infective hepatitis. The jaundice subsided completely, and the patient enjoyed excellent health for the next four years, being accepted A1 for the Army in 1943.

For a year before reporting sick he noticed a gradual increase in the size of his abdomen, which he attributed to fat; during the three weeks before admission his abdomen enlarged rapidly, and he began to have dyspnœa. On admission he had gross ascites and slight icterus of his scleræ. The urine contained bile and a trace of albumin. On the 18th paracentesis abdominis, yielding 14 pints of straw-coloured fluid, gave him considerable relief; but eight days later he was again fully distended, and a further tapping produced 22 pints. On the 22nd he was transferred to this hospital.

On Examination.—Ill-looking, well built, quiet, and apathetic. Temperature 99° F, pulse-rate 72 respirations 20 per min. Complexion clear. Definite icterus of scleræ. No abnormality in cardiovascular system. Blood-pressure 122/70. Dullness at bases of both lungs due to high position of diaphragm. Slight œdema of ankles. Abdomen grossly distended with fluid, with eversion of umbilicus and devarication of recti.

Investigations.—Urine: albumin +, bile present, no casts. Blood-count: red cells 4,440,000 per c.mm., Hb 90%, white cells 5050 (polymorphs 58%, lymphocytes 36%, mononuclears 4%, eosinophils 2%). Icteric index 19. Van den Bergh: direct delayed reaction. Hippuric acid synthesis: 100%. Blood Wassermann reaction negative. Blood-urea 28 mg. per 100 c.cm. Serum proteins (total) 5·9 g. per 100 c.cm. Radiography of chest: normal, except for high diaphragm. Paracentesis on Oct. 2: 27 pints of straw-coloured fluid (occasional lymphocytes, protein 900 mg. per 100 c.cm.). After paracentesis a hard irregular liver was palpable in the epigastrium.

RESPONSE TO TREATMENT

A diet was given containing 200 g. of protein, yeast, and a synthetic vitamin-B compound, fluid being restricted to two pints. Intramuscular injections of 'Hepatex T' 4 c.cm. were given twice weekly. Mercurial diuretics were ineffective and were discontinued. On Oct. 4 he again required tapping, and 24 pints was withdrawn. Up to this point it had been necessary to take off fluid four times in three weeks (87 pints in all). His general condition was deteriorating rapidly, and his urinary output was 16–20 oz. a day. Although the serum proteins (5·9%) were not below the critical level, it was decided to try concentrated plasma as a diuretic. On the 8th a pint of twice-concentrated plasma was given intravenously without incident or reaction. After this his urinary output rose to 40–50 oz., at which level it remained for a week. On the day after the transfusion the serum proteins were 6·3 g. per 100 c.cm. (albumin 4·3, globulin 2·0).

This response being encouraging, he was given a pint of twice-concentrated plasma weekly until Jan. 17, 1945. During this time his general condition, appearance, and appetite improved considerably; his urinary output was 40–60 oz. a day, and the intervals between tappings became longer (1 week, 5 weeks, and 8 weeks). After the 17th he was given two pints of twice-concentrated plasma once a fortnight for four weeks, and then two pints once a month. The ascites was almost entirely absorbed, paracentesis being performed only once during the ensuing months (Feb. 14), when 6½ pints was removed. Repeated estimations of the serum proteins gave figures of 6·9–7·0 g. per 100 c.cm.

In March, 1945, the patient being up and about, his monthly plasma was discontinued. After three weeks—i.e., seven weeks since the last infusion—his urinary output fell, and his weight and abdominal girth began to increase. On examination there was obviously an increase in the ascites, a fluid thrill being obtainable. Two estimations of his serum proteins were made, both giving 7 g. per 100 c.cm. He was given two pints of plasma, and his urinary output went up. The day after the infusion the serum proteins were still 7 g. per 100 c.cm. A week later a further two pints of plasma was given, and by this time no fluid thrill was obtainable.

In May, 1945, he was up and about all day, feeling perfectly fit and capable of walking several miles without fatigue. He looked extremely well, apart from a faint scleral icterus, an abdominal wall lax from its previous stretching, and two herniæ controlled by an abdominal belt. No fluid thrill was obtainable, but slight shifting dullness indicated a few pints of fluid in the abdomen.

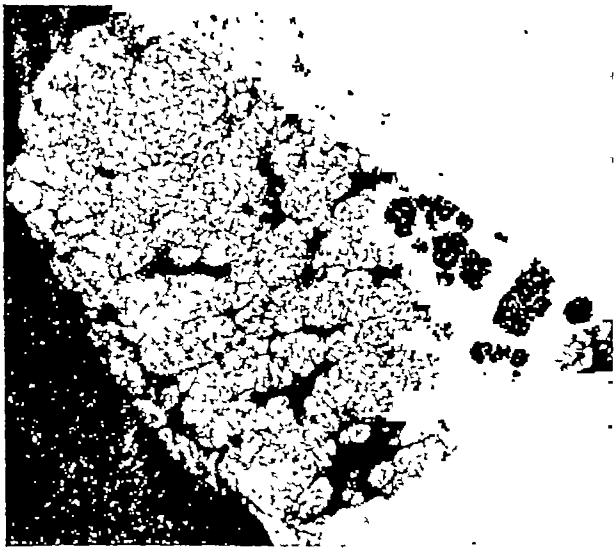

Fig. 1—Section of liver showing adenomatous areas of regeneration.

He was discharged home on a high-protein diet, with instructions to keep a weight record and to report once a month for plasma. All went well until May 26, when he was readmitted, having noticed an increase in the size of his abdomen during the preceding three days.

Final Admission.—Abdomen: moderate ascites, fluid thrill. Scleræ more icteric than on discharge. On May 28 his serum proteins were 6·8%. On June 4 he had some abdominal discomfort, with melæna, and in the evening two large hæmatemeses. A slow drip transfusion was put up. Hæmatemesis continued, and the patient became deeply jaundiced, dying in terminal cholæmia on the 6th.

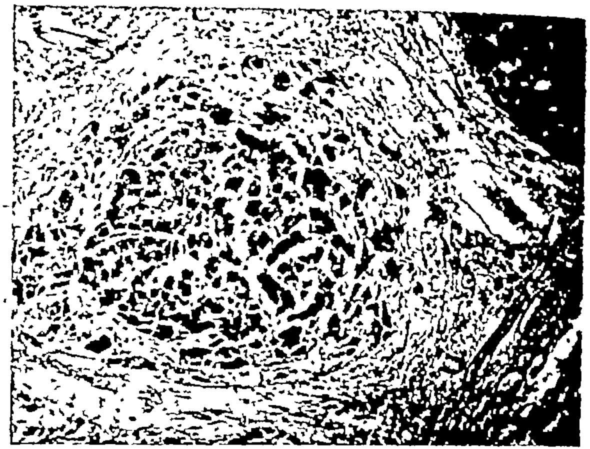

Fig. 2—Section of liver showing degeneration and necrosis of liver-cells. (× 450.)

POST-MORTEM FINDINGS

(DR. D. C. L. DERRY)

Necropsy.—Skin deeply jaundiced. Abdomen contained about 40 pints of free fluid. Liver small, irregular, with typical subacute necrosis. Spleen enlarged. Well-marked varicosity of the œsophageal veins. Both small and large bowels were full of blood. No macroscopic change in other organs.

Histologically the liver showed adenomatous areas of regeneration (fig. 1), in which the peripheral liver-cells were in all stages of degeneration and necrosis (fig. 2). Glisson's capsule showed well-marked fibrosis, with infiltration by many small round cells and containing the remains of many bile-ducts. The spleen showed congestion and fibrosis, with hyaline degeneration of the walls of the blood-vessels and thickening of the capsule.

DISCUSSION

The liver seems to respond to noxious agents according to their intensity and duration of action, with a varying histological picture. At the beginning is a hepatitis which may clear, progress rapidly to acute necrosis, or go through all stages of chronicity to cirrhosis.

This patient's liver showed a well-marked degree of regeneration, and this may explain the remarkable improvement in his general condition after the ascites had been dealt with, in that the liver metabolically was adequate to supply his needs, the ascites resulting from portal obstruction, as did the œsophageal varices which caused his death.

The rôle of portal obstruction as a cause of ascites has been disputed, more emphasis being laid on the low plasma-protein level found in cirrhosis as a cause. It is true that this patient's serum proteins were below normal, and that reduction of the ascites coincided with plasma transfusion; but fluid accumulated rapidly when plasma transfusion was suspended, in spite of a serum-protein level of 7 g. per 100 c.cm. Further transfusion turned the ascitic tide without raising the serum-protein level above this figure, and one is forced to the conclusion that the plasma acted as an excellent diuretic over and above its replacement value.

SUMMARY

Four years after an attack of what appears to have been infective hepatitis a young man developed ascites due to portal obstruction.

The post-mortem findings were those of subacute hepatic necrosis.

The benefit derived from the therapeutic use of twice-concentrated plasma is discussed.

I wish to thank Sir Henry Tidy for his interest and helpful criticism of this paper, Dr. D. C. L. Derry for the post-mortem report, and Dr. W. J. Griffiths for the biochemical investigations.

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ALLERGIC REACTIONS DURING DESENSITISATION TO SULPHONAMIDES

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DISTINCT types of sensitivity to sulphonamides in different patients have been described. Several distinct types of sensitivity appearing simultaneously in one person are recorded here.

Reports of allergic cutaneous reactions to sulphonamides have been numerous during the last few years; and Park (1944) has reported a case of agranulocytosis due to sulphapyridine which he considers to be allergic. The patient was successfully desensitised. Schnee (1943) described a case in a patient who reacted with a membranous inflammation of the oropharynx, nose, and conjunctivæ after having received 18 g. of sulphathiazole in five days. Organisms were not obtained on culture. Rapid recovery ensued on discontinuance of the chemotherapy. It therefore appears that allergic reactions to sulphonamides are not confined to the skin.

In the present case various allergic reactions were observed in a patient who became hypersensitive to sulphonamides after topical applications of sulphapyridine to a gunshot wound and was successfully desensitised.

CASE-RECORD

An officer, aged 24, was admitted to hospital on Oct. 12, 1944, with the following history. His father was subject to slight attacks of asthma all the year round. A brother had bronchitis and asthma. The patient had had asthma, without seasonal variations, up to the age of 16, followed later by bronchitis every winter, associated sometimes with wheezing. He had also had hay-fever regularly every year in the U.K. during the hay-making season.

After leaving the U.K. he had had neither asthma nor hay-fever. Between July, 1942, and March, 1943, he had had five attacks of benign tertian malaria in India. His health otherwise had been good.

In July, 1943, in Syria, he had sustained a gunshot wound of the left hand, which had been treated locally with sulphapyridine powder once daily for three weeks. The wound had healed but an irritating rash now appeared on the neighbouring skin. Sulphapyridine powder had been continued for another two weeks, and coincidentally the rash had spread gradually all over the wounded hand and appeared later on the other hand. This had cleared in September, 1943, after treatment with different pastes and ointments.

In October, 1944, he had been admitted to hospital with gonococcal urethritis, for which internal treatment with sulphathiazole had been started but had had to be given up immediately because of the appearance of œdema and eruption of the upper limbs. After completion of treatment for the urethritis with penicillin he had been transferred to the skin department for desensitisation.

On Admission.—Considerable œdema, erythema, and vesiculation on hands and forearms. Nothing else abnormal detected. Blood-count: red cells 5,200,000 per c.mm., Hb 17·2 g. per 100 c.cm. (100%); white cells 7400 per c.mm. (polymorphs 68%, eosinophils 1%, lymphocytes 27%, monocytes 4%). Blood-pressure 130/90 mm. Hg. Urine normal.

On Oct. 13 desensitisation was started with 0·125 g. of sulphapyridine by mouth twice daily. Eleven hours later, when 0·250 g. had been taken in all, the patient had severe rhinorrhœa and pain on micturition, while simultaneously the swelling, erythema, and blistering of the upper limbs increased. His face swelled and was covered with a small vesicular eruption.

Sulphapyridine was continued, and next day there was oozing from the areas usually exposed to the sun, and the patient was much distressed by dyspnœa, cough, and a copious watery nasal discharge, lacrimation, sneezing, and sore throat. The dysuria increased.

On the 16th the patient's temperature was 100° F, his oropharynx was red but without exudate, and the conjunctivæ much injected. Coarse râles, rhonchi, and wheezing were heard in both lungs. A mixed papular and scarlatiniform rash appeared on chest and back. White cells 11,600 per c.mm. (polymorphs 66%, lymphocytes 30%, monocytes 4%).

On the 17th, under the same dosage of sulphapyridine, his temperature rose to 103° F, and his physical distress was more severe. White cells 7400 per c.mm. (polymorphs 59%, lymphocytes 32%, monocytes 7%, eosinophils 2%).

On the 18th, the sixth day of desensitisation, the white cells were 4200 per c.mm. (polymorphs 50%, lymphocytes 44%, monocytes 6%). His general state remained distressed. Pneumococci predominated in his sputum. Urine normal.

Sulphapyridine was then stopped. Next day his temperature dropped to 101·6° F, the bladder distress and sore throat disappeared, and the chest improved.

The white-cell count, taken two days after discontinuation of the drug—i.e., on the 20th—was 12,600 per c.mm. (polymorphs 75%). On this day the sore throat, dysuria, dyspnœa, tightness of the chest, and hay-fever symptoms had disappeared completely, leaving only a mild cough for a few days longer.

The condition of the skin gradually improved, and the temperature returned to normal. On the 25th the patient was well enough to get up.

On the 27th sulphapyridine was resumed, but the dose was reduced to 0·0625 g. daily. White cells 7000 per c.mm. (polymorphs 56%, lymphocytes 36%, monocytes 8%).

A few hours later all the symptoms enumerated above—painful micturition, sore throat, rhinorrhœa, lacrimation, and dyspnœa—reappeared, and the skin condition flared up. His white-cell count first increased to 9000 per c.mm. (polymorphs 68%), then again decreased, and was maintained afterwards throughout the course of desensitisation between 5500 and 7800 per c.mm. (polymorphs 58–68%, eosinophils 2%).

The daily dose of sulphapyridine was gradually increased as the symptoms decreased in intensity in the following way: 0·0625 g., 0·125 g., 0·187 g., 0·250 g., and finally 0·5 g. daily. The last dose was repeated until all the allergic symptoms had disappeared and for ten days after, the final dose being given on Dec. 1, 1944.

The chest and hay-fever symptoms had been at times very alarming during the process of desensitisation, and the advice of Lieut-Colonel G. L. S. Konstam, o.c. medical division, was sought, who on Nov. 3, 1944, reported that there was no clubbing, no cardiac abnormality, but thoraco-abdominal breathing, with sibili and prolonged wheezing on expiration in both lungs. He concluded that the skin sensitivity reaction had evidently produced a return of old manifestations—bronchitic asthma and hay-fever—and suggested treatment with ephedrine gr. 1 and the use of a backrest.

Ephedrine, however, was of little benefit so long as the patient remained sensitive to the antigen. The allergic symptoms gradually disappeared in the following order: (1) the tendency to progressive agranulocytosis; (2) urinary symptoms on Nov. 1; (3) the inflammation of the mucosa of the oropharynx on Nov. 5; (4) the asthma on Nov. 15; and (5) the rhinorrhœa on Nov. 22.

A few days before completion of treatment, the patient being symptomless on a daily dose of 0·5 g. of sulphapyridine, he was again seen, with a special inquiry concerning his category as a soldier, by Lieut-Colonel Konstam, who reported: "Few sibili only were heard over the lung bases. From the chest point of view he should be fit for category A, after suitable convalescence—suggest 3 weeks."

As a final test, sulphapyridine 1·5 g. was given at the end of the treatment. It produced only a mild transient increase of nasal secretion.

COMMENT

In the published work on hypersensitivity to sulphonamides we have not been able, working under Service conditions, to find any report of a case with so diverse allergic manifestations, which are probably due to the functional state of the patient, the so-called habitus, determined by his hereditary constitution.

In the numerous cases of skin sensitivity which we have seen up to now we have not before found a hereditary factor, either in direct or in collateral family lines. In other cases the sensitivity was limited to the skin (Tate and Klorfajn 1944a). In the present case several structures—mucosa of oropharynx, nose, and respiratory system, skin cells, and bone-marrow (allergic leucopenia)—were involved at the same time. This is in agreement with the opinion of Balyeat and Bowen (1930): that the stronger the inheritance factor the greater the tendency to multiple sensitisation, and that all human beings can be sensitised, but to a varying degree.

The low rate of eosinophilia which preceded the subsequent progressive drop in the white-cell count is noteworthy; this low eosinophil-count was present while the patient reacted explosively to the administration of the antigen.

Though it is known that eosinophilia is a frequent but not constant accompaniment of allergic states, Tate and Klorfajn (1944b) saw in all their cases of skin sensitisation to sulphonamide a pronounced eosinophilia, and in the severe cases a high eosinophilia in the course of desensitisation. A lack of eosinophils in patients reacting violently to the antigen should, we suggest, be a warning of sensitisation of the bone-marrow and impending agranulocytosis.

It is noteworthy that in the course of desensitisation the benefit of this therapy was shown over the whole range of the patient's varied allergic symptoms.

The technique of desensitisation in this case followed the principles of skin sensitisation published by Tate and Klorfajn (1944b), except that, owing to the severity of the reaction, the initial doses had to be smaller. The course of desensitisation lasted forty-two days, excluding the interval when administration of the antigen had to be stopped.

Concerning the permanency and completeness of desensitisation in the present case, we can only judge from experience in those cases of skin desensitisation which we have been able to keep under observation. For example, one patient with a high degree of skin sensitisation was desensitised by us at the end of 1943. About a year later he was admitted to the medical ward of the same hospital with a diaphragmatic pleurisy. He did not mention to his attendants his previous sensitivity to sulphonamides, and he was given sulphathiazole at the rate of 7 g. a day for nearly four days, without the slightest discomfort to him. We observed these facts when he paid the skin department a friendly call. Three months later—i.e., fifteen months after completion of desensitisation—he was admitted to the skin ward with a septic leg due to an abrasion, and was given sulphonamide tablets 3 g. daily for three days, without experiencing any discomfort and without developing any eruption.

SUMMARY

A case of multiform sensitivity reactions to sulphonamides in a patient with an inherited allergic constitution is described.

Desensitisation was achieved with accompanying severe symptoms.

In another patient, desensitised in 1943, there have been no untoward reactions to sulphonamide therapy on two subsequent occasions, a year and fifteen months after desensitisation.

We wish to thank Colonel W. B. Stevenson, A.M.S., officer commanding the hospital, for permission to publish the case, and Major A. Kirshner, pathologist of the hospital, for the many laboratory investigations.

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Medical Societies

DEVON AND EXETER MEDICO-CHIRURGICAL SOCIETY

AT a meeting on Dec. 19 Mr. PATRICK RUSSELL discussed

Trichomonas Infections

The clinical characteristics, he said, are a watery, offensive, bubbling, vaginal discharge often accompanied by œdema and congestion of the vulva. The disease is primarily one of the vaginal walls—a granular vaginitis—and the trichomonas is quite definitely a pathogen; it often coexists with chronic cervicitis, or gonococcal infection. Diagnosis depends on identification of the parasite. Smears, taken by inserting a glass pipette or 'Bakelite' spoon into the vagina, should be examined directly in a wet film; neither a speculum nor a finger should be passed into the vagina beforehand.

The parasite has been found in the prostate, the bladder, and (doubtfully) the fallopian tubes. The trichomonas recovered from the vagina is possibly identical with that harboured in the intestine, which may account for recurrences. Although the condition occurs in virgins it should be regarded as a venereal disease. The parasite may also be found in the male; in bulls it gives rise to an apparently incurable condition, so that infected animals have to be slaughtered.

Local treatment with such preparations as 'Devegan' and 'S.V.C.' tablets is fairly satisfactory; it is better, however, to swab the vagina dry and insufflate it under direct vision with the chosen medicament in powder form. Two treatments a week without intervening douching should be carried out. Œstrogens may have an adjuvant action. Virgins are best treated by irrigation with weak acriflavine solution. Great care must be taken not to insufflate under pressure because of the very real risk of fatal air-embolism. Three negative wet films in the postmenstrual phase may be regarded as proof of cure, but recurrence is common.

SOCIETY OF MEDICAL OFFICERS OF HEALTH

AT a meeting of the fever group on Dec. 13, with Dr. WILLIAM GUNN, the president, in the chair, a discussion on

Oiling of Floors and Fabrics

was opened by Dr. J. P. KENNEDY. After the first application the ward should, he said, be kept empty until the oil has been absorbed; afterwards the oil is thinly and evenly applied at intervals of 4–6 weeks. The floor is treated with commercial spindle-oil, which is spread with a coarse sprinkler and brushed in. The application of oil to fabrics tends to make them clammy and, in dirty atmospheres, dingy; but new substances under trial by the British Launderers' Research Association are reported to be free from these objections. Dermatitis from contact with impregnated materials is rare; of 200 patients, 1 had mild and short-lived erythema with irritation, while 4 had fleeting erythema.

Two other methods might be considered. One is the use of a light movable inter-bed screen, fitting flush to floor and wall; this should effectively reduce air movement about the bed. The second is the anticipation of laundry oiling by the addition during manufacture of a wash-resistant oil to the natural wool content of materials.

Mr. C. L. F. HUNTER, B.SC., of the British Launderers' Research Association, emphasised the importance of preliminary washing in soft, neutral, water; thorough rinsing is essential to remove the last traces of soap, whose persistence reduces the deposition of oil. Choice of a suitable emulsifying agent is important; but the procedure of oiling is simple and, if properly carried out, effective. The air-count of bacteria is greatly reduced, though the total number of organisms on the fabrics remains consistently high. The association is conducting a further investigation in conjunction with the North Western Hospital. A new technique, still in its infancy, employing a new cationic emulsion requiring much less of the active emulsifying agent, offers hopes of a cheaper process.

New Inventions

THE TRAP-JAW PRINCIPLE IN SURGICAL FORCEPS

FORCEPS intended to take a firm hold of tissue, whether issecting forceps, hæmostats, holding forceps of the chsner type, or gall-bladder forceps, depend for their curity on the forcible apposition of two parallel surfaces. ince the blades are hinged, the surfaces of the jaws are arallel in one position only, usually the completely shut ne, when they are not in use; when they are applied, he blades are forced apart to the extent of the tissue ompressed between them in a gap which is wedge-shaped, olding the gripped tissue firmly at the hinge end, less irmly towards the points

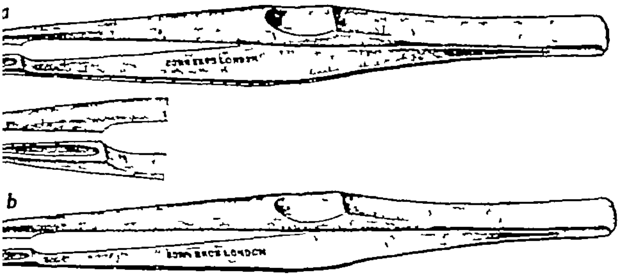

Fig. 1a and b—Dissecting forceps (¹/₂ sc.).

Many mechanical devices have been introduced to prevent slipping: the surface of the jaws are roughened, usually by a transverse ridge and furrow pattern; the blades are arched to provide a spring pressure throughout their length or in-toed to make contact at their points first; or they occlude at the tip only, as in the Joll hæmostat. All these devices fail to hold a tube, such as a large vessel, the duodenum, the appendix, the ureter, the cystic duct, or the colon, if it is cut across flush with the blades; only when a flange of uncrushed tissue is left protruding beyond them is the hold safe.

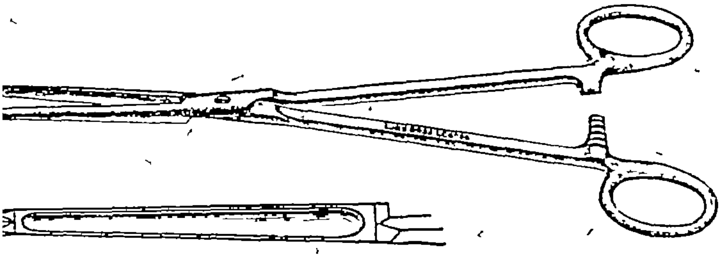

Fig. 2—Mayo-Ochsner forceps (¹/₂ sc.).

The instruments I am describing have hollow blades with a narrow rounded rim. The rim holds a strip of tissue in compression, while the hollow accommodates an uncompressed part that prevents slipping in the same way as does a projecting flange of tissue in the usual design. This pattern has four advantages over the usual compression type: the blades can be made narrower while giving equal security; the tissues held can safely be cut flush with the blade (an advantage in the case of infected portions of the alimentary canal); the hold of the tissue, even when cut flush, is more secure; and less devitalised tissue is included in a ligature.

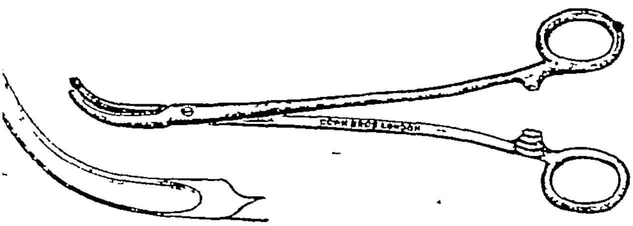

Fig. 3—Gall-bladder forceps (¹/₂ sc.).

Of the instruments illustrated, the dissecting forceps (fig. 1*a* and *b*) and the Mayo-Ochsner forceps (fig. 2) differ from their normal prototypes in the design of the jaws only.

The gall-bladder forceps (fig. 3) have been modified in three particulars: they are ¹/₂ in. longer; they are lighter; and they are narrower in the blade than the standard Moynihan pattern. I use these forceps in operations of every type when working in the depths of a wound, both for blunt dissection round a corner, as when clearing the ureter, the lateral attachments of the rectum, the biliary ducts, the left gastric artery, and the œsophagus, and for catching any deeply placed vessel previous to ligature. The added length gives better access, the narrow blades improve them as dissectors, and the hollow jaws give that security so essential in situations where a second grab at a cut vessel or duct is an experience to be avoided.

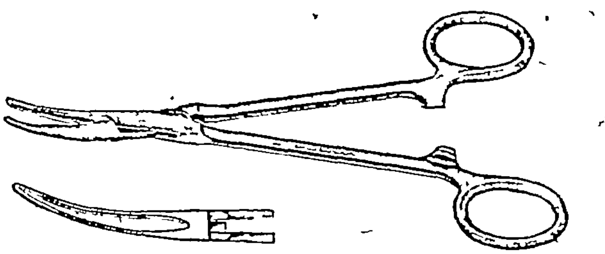

Fig. 4—Hæmostat (¹/₂ sc.).

The hæmostats (fig. 4) have hollow blades, and the narrow bite and added security these allow. They have two further advantages over any other pattern I know. First, they have a 30° curve on the blade to fit them for the two uses of a hæmostat: a picker-up of small bleeding points, or a compresser of wide oozing surfaces. The first task requires the application of the points only at right angles to a surface; the second uses the blade applied parallel to a surface. Straight hæmostats are wrong for both purposes, as illogical as any straight tool. Man naturally uses precision tools in front of his body and below his eyes—that is, at a point about 30° in front of and below his elbow. Tools meant to work in the horizontal plane, such as golf-clubs, hockey sticks, and spoons, are therefore curved to allow their working surfaces to lie horizontally; those used either horizontally or vertically, such as forks (fig. 5) or ink-erasers, are similarly sloped and used either way. The only straight tools are those driven by a hammer or by the weight of the foot, the sternum, or the shoulder. These hæmostats, like forks, are right in either plane. A second advantage is that their whole construction is flat and light, to allow up to two dozen to be stacked on one peg of any instrument rack.

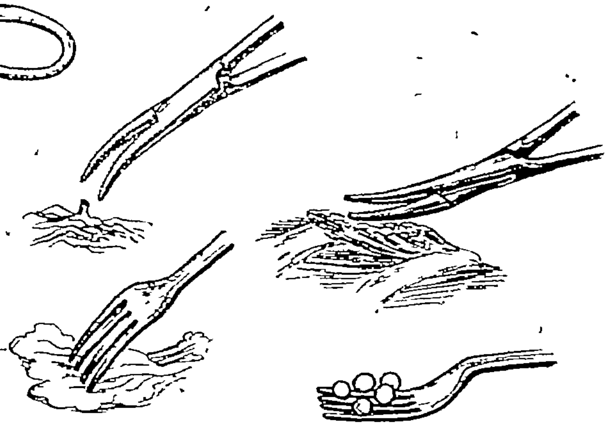

Fig. 5—A hæmostat, like a fork, should be inclined so that it can be used at right angles to a surface or parallel to it.

These instruments are made by Messrs. Down Bros. Ltd.

W. H. OGILVIE
M.CH. OXFD, F.R.C.S.

Reviews of Books

Principles and Practice of Surgery

Editor: W. WAYNE BABCOCK, M.D., emeritus professor of surgery, Temple University; acting consultant, Philadelphia General Hospital. London: H. Kimpton. Pp. 1331. 60*s*.

THE last decade has seen a great change in the student's textbook: pictures and more pictures now fill the pages, and the written word he may scan—if he cares to. This new textbook is edited by a distinguished and able American surgeon, whose previous writings and books have made their mark in this country. His field is now all surgery, and he includes "common and rare surgical conditions occurring not only in the United States, but throughout the world." But every teacher knows that the absorptive capacity of the medical student or even the doctor is limited; he must have the facts winnowed for him, for common things are somehow hard to keep in mind, and rarities cling like burs. It matters little if he fails to diagnose xiphogous twins; but it is a tragedy if he misses a carcinoma of the rectum (the symptoms of which are described in three lines) or an intestinal obstruction (five lines). In this book even appendicitis has its symptomatology relegated to small print, and in general there is, for students, too little emphasis on symptoms and on orderly methods of examination, while the vast area to be covered prevents the editor from providing the exhaustive analyses which the surgeon needs. The surgical management of hypertension for example—an important subject these days—is worth more than a page, and might well have been illustrated by pictures of the operations at present employed. Volvulus of the large bowel is dismissed with no hint as to the surgical measures indicated. In discussing the diagnosis of embolus of the peripheral vessel, pain is described, but not a word warns the student that *numbness and coldness and loss of power may be the presenting symptoms.*

The book is one which surgeons will like to possess; but it is a pity that Professor Babcock has tried to do so much: the best section—on the abdomen—shows what he might have achieved had he attempted less. Another excellent section is the bibliographic appendix.

Acetanilid

A Critical Bibliographic Review. MARTIN GROSS, M.D., research assistant (assistant professor), Laboratory of Applied Physiology, Yale University. New Haven: Hillhouse Press. Pp. 155. $3.

MEN rightly take pains to protect themselves against the ridicule of posterity, and in the practice of therapeutics as in everything else it is wise to marshal such evidence as can be found in support of our opinions. Dr. Martin Gross has done us a kindness by writing this exhaustive monograph on the literature of acetanilide. In little more than 150 pages he has written a readable survey of 763 references. In retrospect we may be astonished not so much that we abandoned acetanilide, but that it ever established itself in medical practice. Nevertheless, the information carefully sifted and set out here should be invaluable to those working on the synthesis of analgesic compounds. In the introduction, Dr. Howard W. Haggard promises us similar volumes on the salicylates, phenacetin, bromides, and antipyrin, which is welcome news.

Lehrbuch der gynäkologischen Diagnostik

W. NEUWEILER, professor of obstetrics and gynæcology, University of Berne. Berne: Hans Huber. Pp. 474. Sw. fr. 58.

THIS textbook of gynæcological diagnosis is comparable in distinction to Winter's famous book. Neuweiler has selected and emphasised the cardinal features of the subject while giving free play to his erudition. In the first section methods of interrogation and examination are described, and in the second the diseases of each part of the female generative system are considered in turn. Diseases of the vulva are well illustrated, with particularly good examples of lymphogranuloma, mycosis, and Bowen's disease. Much attention is paid to Hinselmann's technique and to his R[illegible] [illegible]ssifi[illegible] [illegible]hich is not yet well known in th[illegible]

Like most Continental and American authors, Neuweiler attaches little importance to chronic subinvolution and chronic metritis. Chronic subinvolution is not mentioned, and chronic metritis is regarded as a rare sequel of a chronic uterine infection. Anovular menstruation, too, receives scant notice, though it is regarded as the cause of one form of polymenorrhœa. He gives a good classification of the different types of uterine bleeding, quite different from that adopted by recent American authors. The section on the clinical aspect of ovarian tumours is exceptionally good, and the chapter on endometriosis is well written, mention being made of the areas sometimes found in the lungs. The chapter on sterility is, perhaps, the least satisfactory.

The book is stimulating and scholarly.

Studies on *Acarus scabiei* and Scabies

B. HEILESEN. Copenhagen: Rosenkilde and Bagger. London: H. K. Lewis. Pp. 370. 20*s*.

DURING the war interest in scabies in this country increased greatly, though the epidemic of the disease seems to have been well under way before 1939, and was largely independent of bombing, evacuation, and other suggested causes.[1] Scabies incidence was high in many countries outside Britain, and even in Scandinavia it proved a troublesome problem. This book is an account of researches which were carried out in Copenhagen and Stockholm between 1942 and 1945. The investigations in occupied Denmark were interrupted when the author, like so many scientific workers in that country, fell foul of the Gestapo; he was fortunately able to escape to Sweden and continue his research.

His account of the life-history of the sarcoptes is particularly clear and complete, and is the first satisfactory description which has been published for the human parasite. It fully agrees with an account published by Gordon, Unsworth, and Seaton[2] dealing with the related mite notoëdres, parasitic on rodents. Some experiments on possible sensitisation during infection gave indefinite results, but experiments on transmission supported the findings of K. Mellanby[3] that intimate personal contact is the normal means of infection, and that the fertilised adult female mite is the stage of the parasite usually responsible for the transference of the disease.

Modern Management in Clinical Medicine

F. KENNETH ALBRECHT, M.D., S.A. surgeon, U.S. Public Health Service, Kansas State tuberculosis consultant. London: Baillière. Pp. 1238. 55*s*.

Dr. Albrecht's claim for his book is that, laying emphasis upon therapy, he has tried to provide the practitioner with a clear picture of the rationale of therapy, combined with concise practical descriptions of how treatment should be applied. On the whole he has been successful, particularly in his efforts to incorporate into his scheme of treatment new methods of therapy. Thus in his discussion of peptic ulcers full reference is made to the possible rôle of urogastrone and enterogastrone, while his chapter on chemotherapy includes a section on streptomycin. He recommends D.D.T. for the treatment of pediculosis, but it is surprising to find so little reference to benzyl benzoate in the treatment of scabies. Although the practitioner may appreciate his efforts to make things easier by referring to drugs by their trade names, this at times is overdone. It is refreshing in these days to find stress laid upon the importance of insulin in the treatment of diabetic coma; and the note on the value of intravenous strophanthin in heart-failure is welcome. The section on the treatment of hypertension, however, is disappointing.

The general scheme of the book is sound, but it is difficult to account for the omission of any reference to vitamins E and K in the chapter on vitamin deficiencies, or to explain why obesity is included in this particular chapter. There are useful chapters on geriatrics, the care of the ambulatory patient, clinical laboratory medicine, and routine procedures, which even includes a section on "lifting and turning patients."

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1. Mellanby, K. *Med. Offr*, 1941, 66, 141.
2. Gordon, R. M., Unsworth, K., Seaton, D. R. *Ann. trop. Med. Parasit.* 1943, 37, 174.
3. Mellanby, K. *Brit. med. J.* 1941, ii, 405; *Parasitology*, 1944, 35, 197.

SEVERE BURN

(*area 162 square inches*)

A treatment using tulle gras pressure dressings and plaster fixation

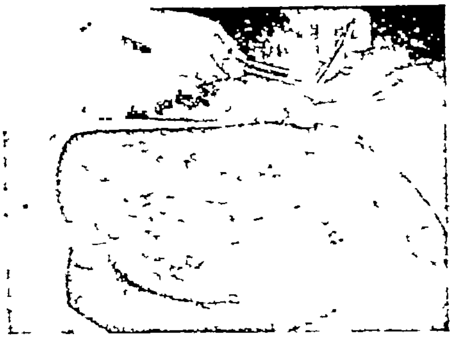

Fig. 1

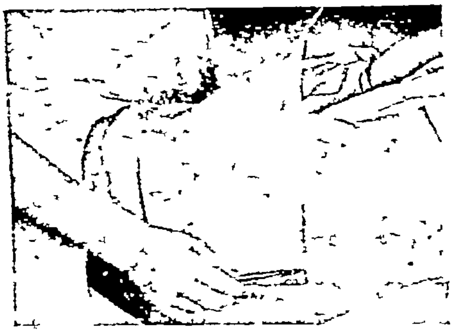

Fig 2

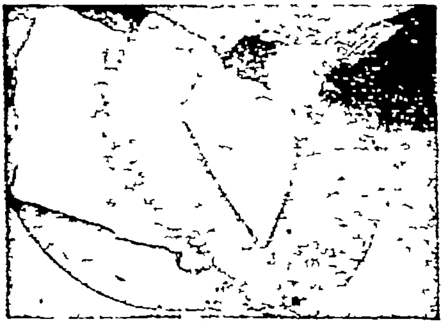

Fig. 3

CASE-HISTORY—The patient, a young man, was admitted to hospital, having been burnt by an electric blanket. The raw area measured 162 square inches. Excision of the burnt area was performed on the same day. Tulle gras (Jelonet) was applied. Fixation by Gypsona plaster of Paris bandages applied over the whole area, abdomen and thigh. The patient was given a blood transfusion.

Seven days later, the affected part was covered with thin razor grafts from both thighs and a pressure dressing of Elastocrepe applied. Fixation was again secured with Gypsona plaster of Paris.

The patient was discharged to duty 7 weeks later.

The details and illustrations above are of an actual case. T. J. Smith & Nephew Ltd., manufacturers of Elastoplast, are privileged to publish this instance, typical of many, in which their products have been used with success in the belief that such authentic records will be of general interest.

Fig. 4

ELASTOCREPE is a non-adhesive elastic cloth bandage possessing the same unique stretch and regain properties as Elastoplast. Elastocrepe bandages should be applied firmly and evenly to secure the exact degree of compression or support. They permit free ventilation and do not restrict circulation.

Bandages are supplied 2″, 2½″, 3″ and 4″ wide × 5/6 yards long when stretched—washing renews their elasticity.

JELONET (tulle gras) is an open mesh gauze thoroughly and evenly impregnated with petroleum jelly and balsam of Peru 1%. It is supplied sterilised ready for use, in tins of 8 yards continuous strip or in cut pieces. Elastocrepe, Jelonet, Elastoplast and Gypsona are products of T. J. SMITH & NEPHEW Ltd., HULL.

Vitamin Therapy—its uses and limitations

B-COMPLEX: RESIDUAL DEFICIENCIES

Recent clinical reports show that it is frequently impossible to clear up all symptoms of specific vitamin deficiency diseases by the use of a single indicated vitamin preparation, but that residual symptoms are left which require the administration of *one or more other factors of the vitamin B-complex. Such considerations are* found to apply in beri-beri, pellagra, the "burning feet" syndrome and the dermatological conditions associated with ariboflavinosis. Bearing this in mind two points should be noticed: 1—the inclusion in Befortiss B-complex of pyridoxin (vitamin B_6) and 2—the presence of *adequate* amounts of all four factors.

BEFORTISS

B-complex capsules

Each capsule contains	Aneurin hydrochloride	1 mg.
	Riboflavin	1 mg.
	Nicotinamide	15 mg.
	Pyridoxin	0.5 mg.

DIET AND DENTAL HEALTH

While the control of dental caries still lies in the future, certain nutrients will help to promote the health of teeth, gums and mucous membranes, more especially for the rising generation, but also for adults, for example:

- **Calcium** in a diet containing sufficient protein to promote absorption. Best given as milk or cheese.
- **Vitamin D** whose distribution in foods is restricted.
- **Vitamin C** to promote good dentine formation and soundness of the gums.
- **Vitamin A** for its effect on the enamel-forming organs.

For routine prophylaxis, the best all-round preparation is

COMPLEVITE

A *single* supplement for *multiple* deficiencies

The recommended adult daily dose provides:

vitamin A	4,000 i.u.	calcium	160 mg.
vitamin D	300 i.u.	iron	68 mg.
vitamin B_1	0.6 mg.	iodine manganese copper	not less than 10 p.p m each.
vitamin C	20 mg.		

References:—Shortage of space precludes list of references, but full documentation may be obtained on application to Clinical Research, Dept. 2/4 B.

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THE LANCET

LONDON: SATURDAY, JAN. 25, 1947

"The Crux"

Mr. BEVAN's reassuring reply to the presidents of the Royal Colleges has enabled the council of the British Medical Association to reconsider its opinion on negotiation with his Ministry. At their meeting next Tuesday the representative body of the association will be asked to agree with the council—

> "That the British Medical Association, having considered the final results of the plebiscite and the Minister's letter of Jan. 6, and desiring to secure for the people the best possible health service, is willing that discussions be entered into with the Minister to that end, provided that such discussions are comprehensive in their scope and that the possibility that they may lead to further legislation is not excluded, and that after the conclusion of these discussions a second plebiscite of the profession be taken on the issue of entering the service."

If this resolution is carried without substantial amendment, the B.M.A. will again occupy a strong position and can expect a careful review of the many issues on which agreement is possible. Willingness to negotiate now, however, does not denote willingness to participate in the National Health Service next year; and even if all misapprehensions were removed a large proportion of the profession would still be unhappy about the scheme as it stands. If we believe that their willing participation can be achieved, it is because we note that most of the reasonable opposition is in one particular field—namely, the conditions of general practice proposed under the Act. The specialist has grounds for satisfaction with the considerate treatment he has received: while he is to be paid, if he wishes, for his hospital and domiciliary work within the service, he can look forward to a considerable demand for his private attention for many years to come; and in any case neither principle nor experience reveals any fundamental objection to the remuneration of specialists by salary—provided the salary is large enough. The general practitioner, on the other hand, must from the first entrust the bulk of his fortunes to an unproved service. He cannot know how some future Parliament may decide to treat him; yet he is asked to begin by surrendering his familiar guarantees of personal and professional independence.

Under the Government's scheme the position of the general practitioner will be in most respects the same as it was under National Health Insurance; and, as Dr. DAIN has put it, "those of us who have been in national health insurance practice have been quite unconscious of any restriction on our freedom"[1] From the professional standpoint, the local executive council, with which the doctor makes his contract, is an improvement on the present insurance committee; the disciplinary procedure is an improvement on that in use under N.H.I., and (except that there may have to be more watchful supervision of certification) there is no reason to think that official interference with the practitioner's work will be any greater in the new service than it was in the old. There will, however, be two important background differences: (1) since the service is universal, anyone debarred from it may soon have difficulty in earning a living; and (2) the doctor becomes a tenant of his practice instead of a freeholder. These two features of the new service mean that the practitioner can no longer afford to get into serious trouble with "the Minister"; and if he is to have any sense of security he must be assured that so long as he does his duty reasonably well, according to his lights, he will run no risk of discharge. Similarly, the profession as a whole must be assured that the awkward man, the original man, the unconventional man, the reformer, and the exposer of abuses cannot possibly be penalised because his views or behaviour are inconvenient to officials. Failing such an assurance, doctors would be right in refusing to join the service; and we cannot feel that it has yet been fully provided.

Mr. BEVAN takes the line that (as under N.H.I.) the Minister responsible to Parliament must in the last resort be the person to decide whether continuance of a doctor's name on the list is "prejudicial to the efficiency of the service": this, he holds, is not a legal but a practical question, and he rejects the suggestion that it should be referred to the law-courts—though the doctor may, like any other citizen, apply to these if a contract has been broken or powers have been exceeded. Recognising that in the changed circumstances practitioners will need better safeguards than those existing under N.H.I., Mr. BEVAN has secured that in the National Health Service disciplinary cases referred by the local executive councils "or any other person" should not go straight to the Minister but should be heard by an "independent tribunal," which in medical cases will consist of a medical practitioner (drawn from a panel of six appointed by the Minister after consultation with the profession), a person appointed by the Minister after consultation with bodies representing the local executive councils, and, as chairman, an experienced barrister or solicitor appointed by the Lord Chancellor. The interposition of this tribunal represents an advance on N.H.I disciplinary machinery, with which panel practitioners have had little fault to find. But however well it would work in practice, the system does not meet the demands of abstract justice; it does not afford the doctor that certainty of impartial dealing to which he is entitled before he surrenders his private security to a Minister of State. The three presidents put part of the objection clearly when they pointed out that "if the tribunal recommend the expulsion of a practitioner from the service, his appeal is to be judged by the Minister who has appointed two of the three members of the tribunal"

In some ways, as a correspondent says this week, this question of justice for the doctor is the crux of the present situation; and those of us who wish the new service to succeed must somehow remove all colour from the idea that in that service the complaints of officials will be settled by officials for officials. Mr.

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[1] Dain, H. G. *Brit. med. J.* 1946, ii, 747.

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In spite of transient and permanent toxic effects, uncertainty regarding the development of drug-resistance by tubercle bacilli, and difficulties of purification and production of streptomycin, these early reports give great hope for the future. One fact, however, stands out clearly—chemotherapy in tuberculosis is no short cut to cure. Indeed, the need for expert pathological facilities, frequent intramuscular injections, and long-continued treatment—all these in addition to present-day forms of therapy—make it evident that our already overburdened tuberculosis hospitals and sanatoria will have to develop to meet these new requirements.

Health of the Indian Worker

THE war gave a fillip to the industrial development of India, and India already has seven or eight million industrial workers. Every realistic programme for raising the standard of living of the country anticipates a great and rapid expansion of this number. The famous Bombay "Plan of Economic Development"[1] stands or falls by its estimate that the income from industry can be increased fivefold in the next fifteen years. It is in this context that two recent reports on industrial health should be studied.[2 3]

The present situation is bad. Protective laws are inadequate and their enforcement lax. The factory inspecting staff is too small, and inspection is too often perfunctory and uninformed:

> "At one [pottery] factory I saw women scouring cups with sandpaper. There was no provision for the removal of dust, and the women blew the dust from the ware into the atmosphere. One woman had a small child aged about 2 years sitting beside her and each time the mother blew . . . her baby inhaled silica dust. . . . The factory inspector's only reaction was that the child was too young to be in a factory . . . the factory was too small to provide a creche. . . . The inspector smilingly conveyed the information to me, and he was evidently perfectly satisfied."[3]

Trade-unionism is weak. Hours of work are excessive for the subtropics, particularly for women and young persons. Welfare and canteen services have hardly made a beginning. Modern knowledge on the physiology of working conditions is rarely applied:

> "In the majority of factories . . . roofs have been of a single layer of corrugated iron. Of all the roof materials that could have been chosen this is the worst. Its thermal insulating value is practically zero. It is dirty. Its outer surface absorbs virtually all the solar radiation which strikes it . . ."[3]

The Bhore Committee accepted the principles laid down by the Royal College of Physicians[4] and recommended the establishment of industrial health services as an integral part of provincial health organisations. The committee also urged early action on other matters—for instance, reducing hours of work to 45 per week; raising the age-limit for young persons from 12 to 15 years in factories and to 13 in "plantations and public works"; prohibiting the employment of women underground in coalmines; maternity benefits for 12 weeks. It also suggested the setting up of departments of industrial medicine in certain medical schools.

BEDFORD, who spent three months in India at the invitation of the government, draws on his experience with the Industrial Health Research Board in making a series of recommendations on factory hygiene and working conditions and includes a comprehensive programme for research. He discusses frankly and helpfully the crucial problem how to raise the productivity of the Indian worker from its present level of a quarter or half that of the worker in the West to at least the two thirds which has already been achieved in a few exceptional cases. Primitive organisation and methods of work, owing to lack of capital on the one hand and the chronic ill health and poor education of the workers on the other, are mainly responsible for the low output. Many other factors are also involved, as BEDFORD shows: the high temperature of factories, insufficient lighting, overstaffing, and the high turnover of labour. The low output per man-hour, moreover, is a cause of low wages; it raises prices and lowers purchasing power, thus further depressing the health of the working population.

Both reports recognise the futility of improving factory conditions while ignoring the even more pressing needs of housing and nutrition. Present housing standards are abysmally low, and the slums of Bombay, Calcutta, Cawnpore, and other cities are a negation of all that is meant by health. The future may well lie with the new methods of building being perfected in Britain and America The beautiful plan for Jamshedpur, the Tata steel town, which was recently published,[5] contains, for example, proposals for a prefabricated, 460 sq. ft. super, 3-room bungalow, reasonably insulated and with indoor water and sanitation, costing £60 ex works, which could be let at less than 10s. a month. Such a development on a generous scale could revolutionise Indian urban life.

India's industry has made an unhappy start. There may yet be time to avoid some of the errors that accompanied industrialisation and the growth of towns in England in the 19th century. Repeated in subtropical circumstances the industrial revolution is likely to have special horrors of its own.

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[1] A Plan of Economic Development for India. London. 1944.

[2] Report of the Health Survey and Development Committee (Bhore Committee). Delhi. 1946. Vol. I, p. 71; vol. II, p. 122.

[3] Bedford, T. The Health of the Industrial Worker in India. Simla. 1946.

[4] Royal College of Physicians of London, Second Interim Report of Social and Preventive Medicine Committee, 1945.

[5] Koenigsberger, O. Jamshedpur Development Plan. Bombay. 1946. (Circulated privately.)

Bevan has already done well in declaring his readiness to discuss the procedure to be followed on appeal from the tribunal "with a view to providing any additional protection possible within the framework of the Act." In Scotland critics have proposed that the independence of the tribunal should be enhanced by appointing a judge to be its chairman; while the English presidents have suggested that the appeals might go before the General Medical Council. Whether on these or other lines, a satisfactory solution must be found. If the practitioner is to give up his private security he should be compensated by public security of the most complete kind: he should be perfectly sure of fair play as he understands it. For only in countries where men can rely on justice do they cease to make their private house a fortress.

Streptomycin in Tuberculosis

After the encouraging reports on the use of streptomycin in experimental tuberculosis clinical findings have seemed slow in coming; but it is clearly a long job to assess the value of any treatment in tuberculosis, and even now, when the first trials are gradually appearing, it is too soon to say what the final verdict will be. In the last two years Hinshaw and colleagues [1] have treated 100 cases of various forms of tuberculosis at the Mayo Clinic, the usual dosage being 1–3 g. of streptomycin, dissolved in sterile water, in the 24 hours. The solution is given intramuscularly in divided doses every 4 to 6 hours for three to six months. This has sometimes been supplemented by intrathecal injections.

The most eagerly awaited results have been in tuberculous meningitis, in which streptomycin seemed at last to offer a hope of cure. The Mayo Clinic series included 12 cases of generalised miliary tuberculosis, 9 of which showed clinical meningitis. Six of these patients have died, and 1 has been under treatment for a month only. The remaining 5 have survived for from two to ten months, and these include 4 cases of meningitis. The 4 survivors in the meningitis group were the only cases to receive intrathecal streptomycin—100–200 mg. in 1–5 c.cm. of cerebrospinal fluid every 24–48 hours for two to six weeks—in addition to intramuscular therapy. Thus no case receiving this combined therapy had died up to the time of the report. This is good news indeed, but it would be premature to speak of cure in any of these patients. The cerebrospinal fluid has returned to almost normal in only 2 cases; while in 1 patient given a six months' course the infection flared up again after an interval of a month, showing how the infection can persist in spite of striking clinical improvement. Enthusiasm must be still further tempered by the fact that of the 4 patients with arrested tuberculous meningitis, 1 is blind, 1 is deaf, and a third has a profound disturbance of cerebellar function; the remaining patient is symptom-free but is still receiving treatment after five months. Such distressing sequelæ to streptomycin therapy are not exceptional. Thus Cooke and colleagues [2] reported 2 cases of tuberculous meningitis in year-old children treated with streptomycin, both of whom were left with mental and nervous changes. Krafchik,[3] on the other hand, gave 24,000,000 units intramuscularly and 2,800,000 units intrathecally in the course of 57 days to a child of fifteen months with tuberculous meningitis, and five months later the patient seemed completely well.

The cause of these serious neurological complications is not clear. There are three possibilities. First, they may be sequelæ of the disease itself; and to tuberculous retrobulbar neuritis Hinshaw and his colleagues attribute the blindness. They are uncertain of the cause of the deafness, but the National Research Council,[4] in their report on 1000 cases of a variety of infections treated with streptomycin, maintain that the deafness noted after the treatment of tuberculous meningitis and typhoid is due to the disease process. The other possibilities are that either the pure drug or its impurities are responsible; it is clear that, in contrast to the harmlessness of penicillin, some preparations of streptomycin have proved highly toxic. Hinshaw,[4] using a preparation containing 50% of inert material, and McDermott,[4] using crystalline streptomycin sulphate, have both noted vertigo in their patients after intramuscular administration. In this country, however, Madigan and colleagues,[5] using seventeen different preparations of the drug, have lately reported in these columns an investigation in which 4 patients received streptomycin in a daily dosage of 200 mg. intrathecally and 1 g. intramuscularly with trivial toxic manifestations; they showed that streptomycin may be contaminated by a highly toxic substance whose variable presence in different batches may account for the contrasting experience of different observers: the alarming report of Cairns and his colleagues [6] at Oxford, in which 4 out of 8 patients with meningitis reacted unfavourably to the first intrathecal injection of streptomycin, illustrated the risks of injecting some batches of streptomycin into the theca. Until the reasons for this variability have been thoroughly worked out there seems to be a strong argument for the biological standardisation of individual batches.

Hinshaw and his colleagues [1] further report on 15 cases of genito-urinary tuberculosis treated with streptomycin and conclude that the drug is of palliative value in tuberculous cystitis. An apparently favourable response was noted in 4 out of 5 cases of tuberculosis of bones and joints, and 15 cases of tuberculous cutaneous fistulæ from various sources all showed temporary improvement in four to six weeks, while with further therapy 10 out of 15 remained healed for four to twelve months. In their trial of the drug in pulmonary tuberculosis they chose 32 cases in which rapid spontaneous improvement would not normally be expected, and in which collapse therapy was not indicated. Of these, 21 were far advanced and only 2 showed minimal lesions. The patients were given 1–3 g. of streptomycin daily intramuscularly. Radiological improvement was noted in 25 cases after courses ranging from two to six months. Cavity closure was noted in 12 cases, and the sputum became negative in 13. Including the cases in which there was no improve-

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1. Hinshaw, H. C., Feldman, W. H., Pfuetze, K. H. *J. Amer. med. Ass.* 1946, **132**, 778.
2. Cooke, R. E., Dunphy, D. L., Blake, F. G. *Yale J. biol. Med.* 1946, **18**, 221; quoted by Krafchik (below).
3. Krafchik, L. L. *J. Amer. med. Ass.* 1946, **132**, 375.
4. National Research Council, *Ibid*, pp. 4 and 70.
5. Madigan, D. G., Swift, P. N., Brownlee, G. *Lancet*, Jan. 4, p. 9.
6. Cairns, H., Duthie, E. S., Smith, H. V. *Ibid*, 1946, ii, 153.

ment, progression under treatment was seen in only 1 case, and here a resistant strain of *Myco. tuberculosis* was present. Reactivation of disease after cessation of streptomycin was seen in 6 cases. From such a short series no definite conclusions can be drawn, but, as HINSHAW suggests, it seems likely that streptomycin will be a valuable palliative remedy in pulmonary tuberculosis when used in conjunction with other accepted forms of therapy; there is some experimental evidence, too, that better results will be obtained with a combination of streptomycin and 'Promin.' Of 7 cases of tuberculous empyema only 1 improved, and in this case streptomycin was directly applied through a fistula in addition to intramuscular dosage. Ulcerating tuberculous lesions of the larynx, trachea, and bronchi were treated with streptomycin intramuscularly and ten aerosol inhalations a day, at hourly intervals, using 2 c.cm. of a solution containing 0·5 g. in 20 c.cm. of isotonic sodium chloride: there was rapid improvement in 5 out of 7 cases.

In spite of transient and permanent toxic effects, uncertainty regarding the development of drug-resistance by tubercle bacilli, and difficulties of purification and production of streptomycin, these early reports give great hope for the future. One fact, however, stands out clearly—chemotherapy in tuberculosis is no short cut to cure. Indeed, the need for expert pathological facilities, frequent intramuscular injections, and long-continued treatment—all these in addition to present-day forms of therapy—make it evident that our already overburdened tuberculosis hospitals and sanatoria will have to develop to meet these new requirements.

Health of the Indian Worker

THE war gave a fillip to the industrial development of India, and India already has seven or eight million industrial workers. Every realistic programme for raising the standard of living of the country anticipates a great and rapid expansion of this number. The famous Bombay "Plan of Economic Development"[1] stands or falls by its estimate that the income from industry can be increased fivefold in the next fifteen years. It is in this context that two recent reports on industrial health should be studied.[2 3]

The present situation is bad. Protective laws are inadequate and their enforcement lax. The factory inspecting staff is too small, and inspection is too often perfunctory and uninformed:

> "At one [pottery] factory I saw women scouring cups with sandpaper. There was no provision for the removal of dust, and the women blew the dust from the ware into the atmosphere. One woman had a small child aged about 2 years sitting beside her and each time the mother blew . . . her baby inhaled silica dust. . . . The factory inspector's only reaction was that the child was too young to be in a factory . . . the factory was too small to provide a creche. . . . The inspector smilingly conveyed the information to me, and he was evidently perfectly satisfied."[3]

Trade-unionism is weak. Hours of work are excessive for the subtropics, particularly for women and young persons. Welfare and canteen services have hardly made a beginning. Modern knowledge on the physiology of working conditions is rarely applied:

> "In the majority of factories . . . roofs have been of a single layer of corrugated iron. Of all the roof materials that could have been chosen this is the worst. Its thermal insulating value is practically zero. It is dirty. Its outer surface absorbs virtually all the solar radiation which strikes it . . ."[3]

The Bhore Committee accepted the principles laid down by the Royal College of Physicians[4] and recommended the establishment of industrial health services as an integral part of provincial health organisations. The committee also urged early action on other matters—for instance, reducing hours of work to 45 per week; raising the age-limit for young persons from 12 to 15 years in factories and to 13 in "plantations and public works"; prohibiting the employment of women underground in coalmines; maternity benefits for 12 weeks. It also suggested the setting up of departments of industrial medicine in certain medical schools.

BEDFORD, who spent three months in India at the invitation of the government, draws on his experience with the Industrial Health Research Board in making a series of recommendations on factory hygiene and working conditions and includes a comprehensive programme for research. He discusses frankly and helpfully the crucial problem how to raise the productivity of the Indian worker from its present level of a quarter or half that of the worker in the West to at least the two thirds which has already been achieved in a few exceptional cases. Primitive organisation and methods of work, owing to lack of capital on the one hand and the chronic ill health and poor education of the workers on the other, are mainly responsible for the low output. Many other factors are also involved, as BEDFORD shows: the high temperature of factories, insufficient lighting, overstaffing, and the high turnover of labour. The low output per man-hour, moreover, is a cause of low wages; it raises prices and lowers purchasing power, thus further depressing the health of the working population.

Both reports recognise the futility of improving factory conditions while ignoring the even more pressing needs of housing and nutrition. Present housing standards are abysmally low, and the slums of Bombay, Calcutta, Cawnpore, and other cities are a negation of all that is meant by health. The future may well lie with the new methods of building being perfected in Britain and America. The beautiful plan for Jamshedpur, the Tata steel town, which was recently published,[5] contains, for example, proposals for a prefabricated, 460 sq. ft. super, 3-room bungalow, reasonably insulated and with indoor water and sanitation, costing £60 ex works, which could be let at less than 10*s*. a month. Such a development on a generous scale could revolutionise Indian urban life.

India's industry has made an unhappy start. There may yet be time to avoid some of the errors that accompanied industrialisation and the growth of towns in England in the 19th century. Repeated in subtropical circumstances the industrial revolution is likely to have special horrors of its own.

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1. A Plan of Economic Development for India. London. 1944.
2. Report of the Health Survey and Development Committee (Bhore Committee). Delhi. 1946. Vol. I, p. 71; vol. II, p. 122.
3. Bedford, T. The Health of the Industrial Worker in India. Simla. 1946.
4. Royal College of Physicians of London, Second Interim Report of Social and Preventive Medicine Committee, 1945.
5. Koenigsberger, O. Jamshedpur Development Plan. Bombay. 1946. (Circulated privately.)

BEVAN has already done well in declaring his readiness to discuss the procedure to be followed on appeal from the tribunal "with a view to providing any additional protection possible within the framework of the Act." In Scotland critics have proposed that the independence of the tribunal should be enhanced by appointing a judge to be its chairman; while the English presidents have suggested that the appeals might go before the General Medical Council. Whether on these or other lines, a satisfactory solution must be found. If the practitioner is to give up his private security he should be compensated by public security of the most complete kind: he should be perfectly sure of fair play as he understands it. For only in countries where men can rely on justice do they cease to make their private house a fortress.

Streptomycin in Tuberculosis

AFTER the encouraging reports on the use of streptomycin in experimental tuberculosis clinical findings have seemed slow in coming; but it is clearly a long job to assess the value of any treatment in tuberculosis, and even now, when the first trials are gradually appearing, it is too soon to say what the final verdict will be. In the last two years HINSHAW and colleagues[1] have treated 100 cases of various forms of tuberculosis at the Mayo Clinic, the usual dosage being 1–3 g. of streptomycin, dissolved in sterile water, in the 24 hours. The solution is given intramuscularly in divided doses every 4 to 6 hours for three to six months. This has sometimes been supplemented by intrathecal injections.

The most eagerly awaited results have been in tuberculous meningitis, in which streptomycin seemed at last to offer a hope of cure. The Mayo Clinic series included 12 cases of generalised miliary tuberculosis, 9 of which showed clinical meningitis. Six of these patients have died, and 1 has been under treatment for a month only. The remaining 5 have survived for from two to ten months, and these include 4 cases of meningitis. The 4 survivors in the meningitis group were the only cases to receive intrathecal streptomycin—100–200 mg. in 1–5 c.cm. of cerebrospinal fluid every 24–48 hours for two to six weeks—in addition to intramuscular therapy. Thus no case receiving this combined therapy had died up to the time of the report. This is good news indeed, but it would be premature to speak of cure in any of these patients. The cerebrospinal fluid has returned to almost normal in only 2 cases; while in 1 patient given a six months' course the infection flared up again after an interval of a month, showing how the infection can persist in spite of striking clinical improvement. Enthusiasm must be still further tempered by the fact that of the 4 patients with arrested tuberculous meningitis, 1 is blind, 1 is deaf, and a third has a profound disturbance of cerebellar function; the remaining patient is symptom-free but is still receiving treatment after five months. Such distressing sequelæ to streptomycin therapy are not exceptional. Thus COOKE and colleagues[2] reported 2 cases of tuberculous meningitis in year-old children treated with streptomycin, both of whom were left with mental and nervous changes. KRAFCHIK,[3] on the other hand, gave 24,000,000 units intramuscularly and 2,800,000 units intrathecally in the course of 57 days to a child of fifteen months with tuberculous meningitis, and five months later the patient seemed completely well.

The cause of these serious neurological complications is not clear. There are three possibilities First, they may be sequelæ of the disease itself; and to tuberculous retrobulbar neuritis HINSHAW and his colleagues attribute the blindness. They are uncertain of the cause of the deafness, but the National Research Council,[4] in their report on 1000 cases of a variety of infections treated with streptomycin, maintain that the deafness noted after the treatment of tuberculous meningitis and typhoid is due to the disease process. The other possibilities are that either the pure drug or its impurities are responsible; it is clear that, in contrast to the harmlessness of penicillin, some preparations of streptomycin have proved highly toxic. HINSHAW,[4] using a preparation containing 50% of inert material, and MCDERMOTT,[4] using crystalline streptomycin sulphate, have both noted vertigo in their patients after intramuscular administration. In this country, however, MADIGAN and colleagues,[5] using seventeen different preparations of the drug, have lately reported in these columns an investigation in which 4 patients received streptomycin in a daily dosage of 200 mg. intrathecally and 1 g. intramuscularly with trivial toxic manifestations; they showed that streptomycin may be contaminated by a highly toxic substance whose variable presence in different batches may account for the contrasting experience of different observers: the alarming report of CAIRNS and his colleagues[6] at Oxford, in which 4 out of 8 patients with meningitis reacted unfavourably to the first intrathecal injection of streptomycin, illustrated the risks of injecting some batches of streptomycin into the theca. Until the reasons for this variability have been thoroughly worked out there seems to be a strong argument for the biological standardisation of individual batches.

HINSHAW and his colleagues[1] further report on 15 cases of genito-urinary tuberculosis treated with streptomycin and conclude that the drug is of palliative value in tuberculous cystitis. An apparently favourable response was noted in 4 out of 5 cases of tuberculosis of bones and joints, and 15 cases of tuberculous cutaneous fistulæ from various sources all showed temporary improvement in four to six weeks, while with further therapy 10 out of 15 remained healed for four to twelve months. In their trial of the drug in pulmonary tuberculosis they chose 32 cases in which rapid spontaneous improvement would not normally be expected, and in which collapse therapy was not indicated. Of these, 21 were far advanced and only 2 showed minimal lesions. The patients were given 1–3 g. of streptomycin daily intramuscularly. Radiological improvement was noted in 25 cases after courses ranging from two to six months. Cavity closure was noted in 12 cases, and the sputum became negative in 13. Including the cases in which there was no improve-

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1. Hinshaw, H. C., Feldman, W. H., Pfuetze, K. H. *J. Amer. med. Ass.* 1946, 132, 778.
2. Cooke, R. E., Dunphy, D. L., Blake, F. G. *Yale J. biol. Med.* 1946, 18, 221; quoted by Krafchik (below).
3. Krafchik, L. L. *J. Amer. med. Ass.* 1946, 132, 375.
4. National Research Council, *Ibid*, pp. 4 and 70.
5. Madigan, D. G., Swift, P. N., Brownlee, G. *Lancet*, Jan. 4, p. 9.
6. Cairns, H., Duthie, E. S., Smith, H. V. *Ibid*, 1946, ii, 153.

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Information on the changes in disease is scanty, but it is likely that several workers are assembling information. It will help if they use a uniform nomenclature, especially for erythroblasts.

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THE experiments of Cowan [1] two years ago showed that up to 50% of antibiotic activity may be lost during the passage of aqueous solutions of penicillin through the rubber tubing of a continuous-drip apparatus. This inactivating effect of rubber varies widely in different samples and is not confined to the synthetic products used in this country, for American workers [2] have found that 4 of 11 samples of synthetic rubber and 1 of 5 samples of natural rubber completely destroyed penicillin in solution within 24 hours. Inactivation cannot be correlated with the colour of the tubing, so the pigmenting substances cannot be held responsible. The suitability of a given type of rubber for use with penicillin can therefore be forecast only by experiment.

All materials—rubber, glass, or metal—that are to come in contact with antibiotics should clearly be tested for any inactivating effect. As a rule glass has hardly any action on penicillin, but cheap soda glass may give off enough alkali to raise the pH and reduce the stability of penicillin solutions. Rubber tubing can, and should, be tested before it is used; the simple tests described vary from one in which an inch of tubing is placed in 10 ml. of penicillin solution in a screw-capped bottle—this assumes that the glass is inert—to one in which 3-feet lengths of tubing are filled with solution; after contact for some hours the solutions are reassayed and the percentage loss in activity is determined. These tests have proved reliable with penicillin, and similar ones should be applied to materials used with other antibiotics. Preliminary tests [2] indicate that neither natural nor synthetic rubber has any deleterious effect on solutions of streptomycin.

P.L.A. IN ARTHRITIS

THE lay press [1] has lately discovered "a wonder substance which is helping thousands of helpless cripples . . . back to normal activity" and which was "first tried out on a racehorse condemned to be shot because it had broken down with arthritis." The method referred to was described by Waugh [2] in 1938 as "the treatment of certain joint-lesions by injections of lactic acid," and he has since [3] been responsible for the injection of 10,000 cases.

After investigating the reaction of the synovial fluid in cases of traumatic effusion Waugh argued that the development of acidity is a physiological response to trauma, designed to excite local leucocytosis and repair. He therefore set out to imitate this reaction in the treatment of traumatised joints which had failed to respond to ordinary therapeutic measures, using at first a solution of lactic acid alone. This, however, caused considerable pain, so a solution of procaine acidified to pH 5 with lactic acid was later adopted. This solution, known as P.L.A., is injected within the capsule of the joint, which is then moved to its full range in all directions. Orthopædic exercises are next employed, if necessary with the addition of a plaster-of-paris support and/or elastic plaster strapping and rest. This procedure was successful in 24 out of 26 cases of mixed forms of arthritis reported by Mawson, [4] but no large classified series of cases has yet been followed up and published. Active disease, in which the joint fluid is already acid, is a contra-indication. Other workers [5] have used slightly different solutions, chief among which is 1% acid potassium phosphate, a buffered salt, in isotonic saline, the object being to prolong the effect. Waugh himself has reported chiefly on injections into the larger joints, such as the hip, shoulder, knee, and wrist, but it has been claimed that nearly all joints are accessible.

Intra-articular injection, unless done in conditions of surgical asepsis, is dangerous; so this form of treatment, however promising it may be in selected cases, should not be embarked on light-heartedly.

HYPNOSIS AND TELEVISION

HYPNOSIS, though sometimes useful in psychiatry, has not proved the good servant of medicine that John Elliotson, in the last century, hoped to make it. He foresaw its use, among other things, as the perfect anæsthetic; and, since his day, reports of successful major operations on hypnotised patients have appeared from time to time. Elliotson's credulity and lack of exact method helped to bring the practice into disrepute; and it has since acqured so many frivolous connexions in fiction and vaudeville that serious inquirers are driven off.

The mechanism of the process remains obscure, and is not made much clearer by describing the hypnotic sleep as a state of increased suggestibility. In current terms, hypnosis is thought to be an artificially produced state of dissociation, akin to that found in hysteria. The hysteric accepts suggestions about the presence or absence of symptoms in much the same way as the subject under hypnosis, and hysterics are specially easy to hypnotise; but it is likely that most people willing to coöperate would respond to hypnotic suggestion. For the rest, the legend of the powerful hypnotist disastrously guiding his victim has long been threadbare; it is well known that the sleeper will not obey a command which infringes his moral principles or even offends or embarrasses him. Offered such a command, he wakes up. Spectacular hypnotic effects are uncommon—they are more often seen on the music-hall stage than in the consulting-room—and though, on request, irrational deeds will be done on waking, they are probably carried out in the same spirit as the obsessional and compulsive acts of some psychoneurotics, who realise well enough on the intellectual plane that their rituals are futile and ridiculous. The hypnotised subject is in a state of somnambulism in which his behaviour is governed by the suggestions of the hypnotist instead of by the incidents of his dream. Left alone, he wakes spontaneously when refreshed or disturbed; slothful types, however, are always ready to oversleep on any pretext and may need waking.

Recently the British Broadcasting Corporation thought of having a television programme on hypnosis, conducted by Mr. Peter Casson, a successful music-hall hypnotist; but an experiment conducted on a closed circuit in the television studios at Alexandra Palace convinced them that there was "danger of hypnotising viewers who might not have anyone at hand to wake them." In the first test about a dozen people had volunteered to be hypnotised in the studio, and five went to sleep; moreover, a person in a party watching the television screen in a darkened room across the corridor also fell asleep. In a second experiment Mr. Casson deliberately attempted to hypnotise an audience of six watching the television in another room; four fell asleep, and two of them needed waking. The B.B.C. therefore decided that a television broadcast on hypnotism would not be advisable; and they are probably wise to avoid the chance of some susceptible person taking action for

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1. Cowan, S. T. *Lancet*, 1945, i, 178.
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2. Waugh, G. *Lancet*, 1938, i, 487.
3. *Brit. med. J.* 1946, ii, 876.
4. Mawson, R. *Ibid*, p. 691.
5. Crowe, H. W. *Lancet*, 1944, i, 563.

Annotations

PILLARS OF SALT

THOSE who work on the latest vitamin, exhilarated by feeling that they are hunting the elixir of life, and accelerated by knowing that priority of a few weeks makes all the difference to a publication, may look on the study of water or salt as a slow job. Yet salt has a cultural and economic record going back to prehistoric times; Prout and O'Shaugnessy were making discoveries about the medical value of salt a hundred years before the vitamins were thought of; and the correct use of salt water in therapeutics is one of the basic medical problems of today. More babies die of dehydration every day than all the patients folic acid (for example) is likely to cure in a month.

Between the two wars great strides were made in the study of salt metabolism in America, England, and many European countries; among others, Gamble, Peters, Glatzel, Blum, Kerpel-Fronius, Mach, McCance, and Borst all made contributions to the subject. The fluid compartments of the body were recognised, the clinical and experimental effects of salt deficiency were defined and studied, and the importance of maintaining the osmotic balance of the body began to be appreciated. After the late war had begun active workers in England and America concentrated on problems of salt metabolism in infancy or turned their attention to dehydration as it affected shipwrecked mariners or desert warfare. The French clinicians were so occupied with undernutrition and with the Germans that they seem to have made few fundamental observations on salt. Men like Borst of Amsterdam were too busy in their resistance movements to continue the research which had won them their international reputation. Others, like Gomöri of Budapest, found their scientific work interrupted for other reasons and are only now seeking to make a fresh start. The Swiss, however, could continue their chosen and accustomed work, and Mach of Geneva has now published a monograph [1] on the metabolism of salt and water in health and disease—a valuable and timely review of the problems, old and new, in which papers in the English language have been fully considered.

GRADUATE TRAINING IN EDINBURGH

ONE of the most favourable developments in the medical profession is the increasing recognition of the obligation that rests on medical schools to provide organised postgraduate education both for intending specialists and for general practitioners—in brief to give what a well-known advertisement calls "Service after Sales." The Edinburgh medical school has long been in the forefront of graduate as well as undergraduate education. Arrangements there are under the general supervision of a board representing equally the University, the Royal College of Physicians, and the Royal College of Surgeons. This body is under the able chairmanship of Professor-Emeritus R. W. Johnstone. Activities were naturally in abeyance during the war, but in the first post-war year much has been done to revive and to extend graduate training facilities. Some two hundred and fifty practitioners, mostly ex-Servicemen, have attended refresher courses of a fortnight's duration; and about three hundred graduates have attended one or other of the three ten-week courses in internal medicine. The biggest numbers, however, have favoured the classes in surgery, some of which have been attended by as many as two hundred. In addition to these formal classes the board has assisted Prof. Sidney Smith, the dean, in placing over four hundred demobilised officers in appointments of the registrar and houseman type. Every effort is being made either to set aside a hospital for the teaching of graduates or at least to devote sections of hospitals to their exclusive instruction. Another high-priority project is the provision of hostels and the promotion of communal life among graduate students. To supervise the work of this important and expanding organisation the board has just appointed Major-General Sir Alexander Biggam, until recently consulting physician to the Army and himself a distinguished Edinburgh graduate, to the post of director of postgraduate studies. It is hard to imagine a more suitable occupant of this office, to which Sir Alexander brings a record of high achievement both as a soldier-physician and a clinician. The principle that a medical school, to be well balanced, must rest on the tripod of undergraduate education, research, and graduate training has been fully grasped in Edinburgh.

BONE-MARROW IN INFANTS

THERE have been few studies of the normal bone-marrow picture during infancy and early childhood. Kato [1] found that it was possible to carry out sternal puncture at a very early age, if care was taken to hit a centre of ossification; and after 8 months the centre of the manubrium could always be used. He gave normal figures, based on a few patients in each age-group, from 1 month to 11 years. There was a gradual increase in the ratio of myeloid (granular) cells to erythroblasts; lymphocytes progressively diminished; and no megaloblasts were found even in the earliest marrows. Blackfan and Diamond, in their atlas, say that immature forms are commoner in infants' marrow, but they give no figures and unfortunately use an out-of-date classification for the erythroblasts.

It is therefore interesting to find a careful investigation reported from Chile by Eberhard and colleagues,[2] who succeeded in obtaining sternal marrow from fifty subjects aged 8 hours to 2 years. Particular care was taken to ensure that the infants really were normal. They were all white, and had to conform to the following conditions: (1) no family history of tuberculosis or syphilis; (2) born at term, with normal labour, and breast-fed or artificially fed under supervision; (3) no history of illness, no rickets, Wassermann and Kahn tests negative, tuberculin test negative, chest radiogram normal; (4) weight and height normal for age; and (5) blood picture normal for age. They found that the cell-count of the marrow varied from 90,000 to 800,000 per c.mm., with an average of 400,000 per c.mm.;- this is considerably more cellular than adult marrow in which 100,000 per c.mm. is about the upper limit of normal. The predominant type of cell changed with the age. In the first week erythroblasts were the most numerous, and they were normoblasts, never megaloblasts, which corresponds to the finding of Lichtenstein and Nordenson[3] that normoblasts were specially numerous in the marrow of premature infants. In the second week granulocytes had first place. From then up to the second year lymphocytes were notably numerous, reaching a maximum of 50%, and sometimes definite lymphocytic nests were found. This lymphocytosis, which has not been previously reported, is probably connected with the known tendency of children of this age-group to develop lymphocytosis rather than granulocytosis in response to infection. One other finding is worth noting: that plasma cells—normal constituents of bone-marrow—may be more numerous than in adults and may sometimes have a relatively pale cytoplasm and indefinite outline like the "myeloma" cells seen in diffuse myelomatosis. It is clear that the marrow of infants differs from that of the adult mainly in the total cellularity and the relative distribution of the main classes of marrow cells; no special immaturity in infants' marrow cells was noted, by Kato or the Chilean workers, except that hæmoglobinisation of the normoblasts tended to be relatively incomplete.

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[1] Mach, R. S. Les troubles du metabolisme du sel et de l'eau. Lausanne: Roth et Cie. Paris: Masson et Cie. Pp. 247.

[1] Kato, K. *Amer. J. Dis. Child.* 1937, 54, 209.

[2] Eberhard, R., Etcheverry, R., Hille, A. *Rev. chil. Pediat.* 1946, 17, 439.

[3] Lichtenstein, A., Nordenson, N. G. *Folia hæmat., Lpz.* 1939, 63, 155.

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Annotations

PILLARS OF SALT

THOSE who work on the latest vitamin, exhilarated by feeling that they are hunting the elixir of life, and accelerated by knowing that priority of a few weeks makes all the difference to a publication, may look on the study of water or salt as a slow job. Yet salt has a cultural and economic record going back to prehistoric times; Prout and O'Shaugnessy were making discoveries about the medical value of salt a hundred years before the vitamins were thought of; and the correct use of salt water in therapeutics is one of the basic medical problems of today. More babies die of dehydration every day than all the patients folic acid (for example) is likely to cure in a month.

Between the two wars great strides were made in the study of salt metabolism in America, England, and many European countries; among others, Gamble, Peters, Glatzel, Blum, Kerpel-Fronius, Mach, McCance, and Borst all made contributions to the subject. The fluid compartments of the body were recognised, the clinical and experimental effects of salt deficiency were defined and studied, and the importance of maintaining the osmotic balance of the body began to be appreciated. After the late war had begun active workers in England and America concentrated on problems of salt metabolism in infancy or turned their attention to dehydration as it affected shipwrecked mariners or desert warfare. The French clinicians were so occupied with undernutrition and with the Germans that they seem to have made few fundamental observations on salt. Men like Borst of Amsterdam were too busy in their resistance movements to continue the research which had won them their international reputation. Others, like Gömöri of Budapest, found their scientific work interrupted for other reasons and are only now seeking to make a fresh start. The Swiss, however, could continue their chosen and accustomed work, and Mach of Geneva has now published a monograph[1] on the metabolism of salt and water in health and disease—a valuable and timely review of the problems, old and new, in which papers in the English language have been fully considered.

GRADUATE TRAINING IN EDINBURGH

ONE of the most favourable developments in the medical profession is the increasing recognition of the obligation that rests on medical schools to provide organised postgraduate education both for intending specialists and for general practitioners—in brief to give what a well-known advertisement calls "Service after Sales." The Edinburgh medical school has long been in the forefront of graduate as well as undergraduate education. Arrangements there are under the general supervision of a board representing equally the University, the Royal College of Physicians, and the Royal College of Surgeons. This body is under the able chairmanship of Professor-Emeritus R. W. Johnstone. Activities were naturally in abeyance during the war, but in the first post-war year much has been done to revive and to extend graduate training facilities. Some two hundred and fifty practitioners, mostly ex-Servicemen, have attended refresher courses of a fortnight's duration; and about three hundred graduates have attended one or other of the three ten-week courses in internal medicine. The biggest numbers, however, have favoured the classes in surgery, some of which have been attended by as many as two hundred. In addition to these formal classes the board has assisted Prof. Sidney Smith, the dean, in placing over four hundred demobilised officers in appointments of the registrar and houseman type. Every effort is being made either to set aside a hospital for the teaching of graduates or at least to devote sections of hospitals to their exclusive instruction. Another high-priority project is the provision of hostels and the promotion of communal life among graduate students. To supervise the work of this important and expanding organisation the board has just appointed Major-General Sir Alexander Biggam, until recently consulting physician to the Army and himself a distinguished Edinburgh graduate, to the post of director of postgraduate studies. It is hard to imagine a more suitable occupant of this office, to which Sir Alexander brings a record of high achievement both as a soldier-physician and a clinician. The principle that a medical school, to be well balanced, must rest on the tripod of undergraduate education, research, and graduate training has been fully grasped in Edinburgh.

BONE-MARROW IN INFANTS

THERE have been few studies of the normal bone-marrow picture during infancy and early childhood. Kato[1] found that it was possible to carry out sternal puncture at a very early age, if care was taken to hit a centre of ossification; and after 8 months the centre of the manubrium could always be used. He gave normal figures, based on a few patients in each age-group, from 1 month to 11 years. There was a gradual increase in the ratio of myeloid (granular) cells to erythroblasts; lymphocytes progressively diminished; and no megaloblasts were found even in the earliest marrows. Blackfan and Diamond, in their atlas, say that immature forms are commoner in infants' marrow, but they give no figures and unfortunately use an out-of-date classification for the erythroblasts.

It is therefore interesting to find a careful investigation reported from Chile by Eberhard and colleagues,[2] who succeeded in obtaining sternal marrow from fifty subjects aged 8 hours to 2 years. Particular care was taken to ensure that the infants really were normal. They were all white, and had to conform to the following conditions: (1) no family history of tuberculosis or syphilis; (2) born at term, with normal labour, and breast-fed or artificially fed under supervision; (3) no history of illness, no rickets, Wassermann and Kahn tests negative, tuberculin test negative, chest radiogram normal; (4) weight and height normal for age; and (5) blood picture normal for age. They found that the cell-count of the marrow varied from 90,000 to 800,000 per c.mm., with an average of 400,000 per c.mm.; this is considerably more cellular than adult marrow in which 100,000 per c.mm. is about the upper limit of normal. The predominant type of cell changed with the age. In the first week erythroblasts were the most numerous, and they were normoblasts, never megaloblasts, which corresponds to the finding of Lichtenstein and Nordenson[3] that normoblasts were specially numerous in the marrow of premature infants. In the second week granulocytes had first place. From then up to the second year lymphocytes were notably numerous, reaching a maximum of 50%, and sometimes definite lymphocytic nests were found. This lymphocytosis, which has not been previously reported, is probably connected with the known tendency of children of this age-group to develop lymphocytosis rather than granulocytosis in response to infection. One other finding is worth noting: that plasma cells—normal constituents of bone-marrow—may be more numerous than in adults and may sometimes have a relatively pale cytoplasm and indefinite outline like the "myeloma" cells seen in diffuse myelomatosis. It is clear that the marrow of infants differs from that of the adult mainly in the total cellularity and the relative distribution of the main classes of marrow cells; no

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[1] Mach, R. S. Les troubles du metabolisme du sel et de l'eau. Lausanne: Roth et Cie. Paris: Masson et Cie. Pp. 247.

[1] Kato, K. *Amer. J. Dis. Child.* 1937, 54, 209.
[2] Eberhard, R., Etcheverry, R., Hille, A. *Rev. chil. Pediat.* 1946, 17, 439.
[3] Lichtenstein, A., Nordenson, N. G. *Folia hæmat., Lpz.* 1939, 63, 155.

Special Articles

ANTIBODIES *

THEIR NATURE AND FORMATION

FELIX HAUROWITZ
M.D., D.Sc. Prague
ROFESSOR OF MEDICAL CHEMISTRY, UNIVERSITY OF ISTANBUL

ANTIGENS have been defined as "substances which, n introduction into the tissue of an animal, give rise o the development of antibodies," and antibodies as substances developed in the living body in response to he presence of antigens" (Browning 1931). It is bvious that these definitions are far from satisfactory.

The first attempt to explain the nature of antibodies as made by Ehrlich in his well-known side-chain theory. he main point of Ehrlich's theory, the complementary tructure of antigen and antibody, has been confirmed by ecent investigations. But the assumption that antiodies are formed by the regeneration of receptors preormed in the living organism cannot be reconciled with ur present knowledge. This assumption was reasonable o long as only natural antigens, such as bacteria, blood orpuscles, toxins, and proteins, were known. Later, andsteiner and his co-workers demonstrated that the pecificity of natural antigens was altered by the introluction of certain chemical groups into the antigen nolecule. These groups have been called "determinant roups" (Doerr), because they determine the specificity f the antigen and the corresponding antibody. Landsteiner provoked the formation of antibodies against nitro groups, arsonic groups, and other synthetic organic groups. The existence of preformed receptors for such artificial products of the chemical industry is inconceivable. Therefore this part of Ehrlich's theory has had to be abandoned and replaced by other theories. My object is to examine whether these theories are reconcilable with recent experimental results and to review our present knowledge of the nature of antibodies.

ISOLATION OF ANTIBODIES

If immune sera are precipitated by the fractional addition of ammonium sulphate or of concentrated phosphate buffer solutions, the antibodies pass into the globulin precipitate. Their bulk is found in the γ-globulin fraction. Further fractionation is achieved by dialysis. Most of the antibodies, chiefly the precipitins, remain in the soluble pseudoglobulin fraction, while agglutinins and several other antibodies have been found in the englobulin fraction (Haurowitz and Tanasoglu 1944).

The specific separation of antibodies from other serum-globulins can be achieved by their combination with the homologous antigens. Cellular antigens, such as bacteria and blood corpuscles, are not very suitable, because their cells absorb only a thin monomolecular layer of antibody molecules (Mudd et al. 1930). On the other hand, relatively large quantities of antibody are carried down from immune sera by soluble antigens, such as proteins and the specific polysaccharides of bacteria.

If natural proteins are used as antigens, the precipitate contains a mixture of two proteins: the antigen-protein, and the antibody-globulin. It is hardly possible to separate these two proteins by chemical or physical methods. To overcome this difficulty, use has been made of chemically marked antigens—e.g., hæmoglobin, coloured azoproteins, and proteins containing foreign tracer elements, such as iodine, bromine, and phosphorus. Since the antibodies are colourless and free from these elements, the amount of antigen in the precipitate can easily be determined by chemical analysis. It is evident that the accuracy of such analyses is far higher than that of the customary precipitin test. It is shown, moreover, by such analyses that the substance precipitated with the antigen forms the bulk of the precipitates. Its amount in a given volume of immune serum is almost constant, and it is independent of the sequence and the composition of the added test-antigens, provided that an excess of antigen is avoided (Haurowitz 1943). There is no doubt, therefore, that this substance consists mainly of antibodies.

The isolation of purified antibodies has been achieved by the action of calcium hydroxide (Felton and Bailey 1926) or of concentrated salt solution (Heidelberger et al. 1936) on the precipitate of specific polysaccharides from pneumococci. Recently we have extracted antibodies to azoproteins from their precipitates by means of cold *N*/10 hydrochloric acid containing 5% of NaCl (Haurowitz and Tekman 1946).

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The composition of the antibody—its content of carbon, nitrogen, hydrogen, and certain amino-acids—can be calculated indirectly from determinations of the respective elements or amino-acids in the pure antigen on the one hand, and in the precipitate on the other, if the antigen/antibody ratio of the precipitate is determined at the same time. Such indirect analyses show that the elementary composition and the percentage of amino-acids in antibodies and in normal serum-globulins of the rabbit is approximately the same (Breinl and Haurowitz 1930). Also the molecular weight (Heidelberger and Pedersen 1937), the electrophoretic behaviour, and other physicochemical properties of purified antibodies are very similar to, or identical with, those of normal serum-globulins. All these observations support the view that antibodies are proteins very similar to the serum-globulins.

The alleged preparation of protein-free antibody solutions is based on the fact that the chemical protein reactions are much less sensitive than the usual serological reactions (Marrack 1938, Haurowitz 1939). Another argument against the protein nature of the antibodies—namely, their resistance to the action of trypsin—is explained by the resistance of native serum-globulins to the action of this enzyme (Breinl and Haurowitz 1930). Larger quantities of trypsin or its protracted action bring about the hydrolysis of normal serum-globulins as well as the inactivation of antibodies (Rosenheim 1937).

STRUCTURE AND FORMATION OF ANTIBODIES

To explain the differences between antibodies and normal serum-globulins, the structure of protein molecules has to be discussed briefly. The molecular weight of the serum-globulins is not far from 175,000 (Burk 1937). This giant molecule is formed by a long chain of more than 1000 amino-acids. On the other hand, it has been established by chemical and physical measurements that the molecules of the serum-globulins are more or less spherical molecules, whose diameter does not exceed the length of 10–20 amino-acids. It is accepted, therefore, that the peptide chain of the globulin molecules is *folded*, so that the molecules acquire a spherical shape (Haurowitz 1935). The specificity of proteins is apparently due to the specific sequence of the amino-acids in the peptide chain and/or to a specific folding or branching of this chain. An endless number of specific proteins can be brought about by variations of the sequence or of the manner of folding.

The formation of protein molecules from simple amino-acids takes place apparently in each cell and is most probably catalysed by enzymes. Since the effect of proteases and other enzymes in vitro is never species-specific, the existence of a chemical organiser within the cell has been postulated (Bergmann and Niemann alleged harmful effects of hypnotic sleep, or even for missing an appointment. We commiserate Mr. Casson on his embarrassing success.

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* Abstract of an address delivered to the Turkish Medical Society.

INSECTICIDES IN THE BLOOD-STREAM

MAN has shown considerable ingenuity in attempting to protect himself and his possessions from noxious insects. Solids, liquids, and gases, with many kinds of apparatus, have been used to poison them in their various stages. A simple way of destroying blood-sucking pests would be by feeding the insecticide to the host and so poisoning the insect through the blood it swallows. Some progress has been made towards making this a practical proposition.

The first quantitative experiments with this method seem to have been made with D.D.T. and the pyrethrins.[1] Bed-bugs fed on rabbits 3–5 hours after these had been given either D.D.T. or pyrethrins at the rate of 230–400 mg. per kg. body-weight died a few hours afterwards. Pyrethrins were more rapidly effective than D.D.T., causing prompt paralysis of the stable-flies (*Stomoxys calcitrans*) which fed on the rabbits. Recently it has been shown that 'Gammexane' is very effective when used in this way.[2] Rabbits were given 50 mg. of pure gammexane per kg. body-weight daily; after 4–5 days bed-bugs were fed on the rabbits and were paralysed, some dying later. Mosquitoes which fed on the rabbits were rapidly stupefied and all died; the tick ornithodorus was temporarily intoxicated.

These experiments cannot yet be directly applied in practice, because the insecticides used, especially the synthetic ones, are definitely toxic to mammals. To render the blood-stream insecticidal for reasonably long periods it is necessary to give fairly large doses, bordering on the limits of safety for mammals. The effects of D.D.T. or gammexane on mammals are known to be cumulative; but the subject has not been so fully studied that the safety-limits can be precisely defined. Pyrethrum would, no doubt, be safer; but repeated doses, as well as being expensive, might give rise to allergic reactions.

THE AMERICAN HOSPITAL

THE changes taking place in our own hospital system have whetted our interest in what is happening in other parts of the world, and especially in America. But too often this interest is concentrated upon buildings and equipment. We know what the skyscraper hospitals on the other side of the Atlantic look like, but we are less familiar with their background and the principles on which they are based. Many American books with their enthusiasm for the latest techniques have not helped us to understand where their practice meets and where it diverges from our own, and it is a relief to find in Dr. Corwin's able monograph [1] a readable account of the basic conceptions which animate the hospital world of the United States.

In America, as in this country, there has been in the last fifty years an unprecedented development of hospital provision, and the need is recognised for a more generous use of public money. The Hill-Burton Bill recently passed by the United States senate provides for a federal subsidy of 75 million dollars a year for the next five years for the construction of public and other non-profit hospitals in accordance with plans approved by the surgeon-general of the U.S. public-health service. Yet American opinion remains set against nationalisation of the hospitals with the implication it carries of a hospital service free to all. How is this possible? Voluntary provision has been supplemented, Dr. Corwin explains, not only by hospitals maintained at the public expense, as in this country, but also by greater development of private and semi-private accommodation, and by payments by public bodies for indigent patients in non-profit hospitals. The income from these paying patients is the mainstay of voluntary hospital finance in America, and the system has gone far to enable voluntary finances to weather periods of depression.

The system arose because in Colonial days no American hospital had an endowment of any kind, voluntary income was considerable but inadequate, and "an American has little if any sympathy with pauperism." Thus the hospital managers determined to establish paying wards, and in the last dozen years or so the phenomenal development of Blue Cross plans have enabled the middle classes to take advantage of the extensive provision of private and semi-private accommodation. The American hospital's sensible preoccupation with diet may be due in part to the presence of these paying patients. Whatever the reason, in 1943 they employed 6482 full-time dietitians, whereas there are only about 300 qualified dietitians in the whole of this country today, of whom only a small proportion are employed in hospitals. But Dr Corwin has little to say about the problem of the chronic sick which looms so large to us, and here perhaps at least we may be more awake than our friends in America to reality. Nevertheless Dr. Corwin considers that the paying system has great merit, for it has saved "the voluntary hospitals in the U.S. from a pauper or poor law system." Our own National Health Service adopts a different outlook. Our hospital service is to be free to all, with private beds as a mere adjunct and concession to private practice. Which is the right approach, and which system is, in the long run, least likely to succumb to the temptation to lower the standard of provision available for the bulk of the community?

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ANTIGENS have been defined as "substances which, on introduction into the tissue of an animal, give rise to the development of antibodies," and antibodies as "substances developed in the living body in response to the presence of antigens" (Browning 1931). It is obvious that these definitions are far from satisfactory.

The first attempt to explain the nature of antibodies was made by Ehrlich in his well-known side-chain theory. The main point of Ehrlich's theory, the complementary structure of antigen and antibody, has been confirmed by recent investigations. But the assumption that antibodies are formed by the regeneration of receptors preformed in the living organism cannot be reconciled with our present knowledge. This assumption was reasonable so long as only natural antigens, such as bacteria, blood corpuscles, toxins, and proteins, were known. Later, Landsteiner and his co-workers demonstrated that the specificity of natural antigens was altered by the introduction of certain chemical groups into the antigen molecule. These groups have been called "determinant groups" (Doerr), because they determine the specificity of the antigen and the corresponding antibody. Landsteiner provoked the formation of antibodies against nitro groups, arsonic groups, and other synthetic organic groups. The existence of preformed receptors for such artificial products of the chemical industry is inconceivable. Therefore this part of Ehrlich's theory has had to be abandoned and replaced by other theories. My object is to examine whether these theories are reconcilable with recent experimental results and to review our present knowledge of the nature of antibodies.

ISOLATION OF ANTIBODIES

If immune sera are precipitated by the fractional addition of ammonium sulphate or of concentrated phosphate buffer solutions, the antibodies pass into the globulin precipitate. Their bulk is found in the γ-globulin fraction. Further fractionation is achieved by dialysis. Most of the antibodies, chiefly the precipitins, remain in the soluble pseudoglobulin fraction, while agglutinins and several other antibodies have been found in the euglobulin fraction (Haurowitz and Tanasoglu 1944).

The specific separation of antibodies from other serum-globulins can be achieved by their combination with the homologous antigens. Cellular antigens, such as bacteria and blood corpuscles, are not very suitable, because their cells absorb only a thin monomolecular layer of antibody molecules (Mudd et al. 1930). On the other hand, relatively large quantities of antibody are carried down from immune sera by soluble antigens, such as proteins and the specific polysaccharides of bacteria.

If natural proteins are used as antigens, the precipitate contains a mixture of two proteins: the antigen-protein, and the antibody-globulin. It is hardly possible to separate these two proteins by chemical or physical methods. To overcome this difficulty, use has been made of chemically marked antigens—e.g., hæmoglobin, coloured azoproteins, and proteins containing foreign tracer elements, such as iodine, bromine, and phosphorus. Since the antibodies are colourless and free from these elements, the amount of antigen in the precipitate can easily be determined by chemical analysis. It is evident that the accuracy of such analyses is far higher than that of the customary precipitin test. It is shown, moreover, by such analyses that the substance precipitated with the antigen forms the bulk of the precipitates. Its amount in a given volume of immune serum is almost constant, and it is independent of the sequence and the composition of the added test-antigens, provided that an excess of antigen is avoided (Haurowitz 1943). There is no doubt, therefore, that this substance consists mainly of antibodies.

The isolation of purified antibodies has been achieved by the action of calcium hydroxide (Felton and Bailey 1926) or of concentrated salt solution (Heidelberger et al. 1936) on the precipitate of specific polysaccharides from pneumococci. Recently we have extracted antibodies to azoproteins from their precipitates by means of cold N/10 hydrochloric acid containing 5% of NaCl (Haurowitz and Tekman 1946).

PROPERTIES OF PURIFIED ANTIBODIES

The composition of the antibody—its content of carbon, nitrogen, hydrogen, and certain amino-acids—can be calculated indirectly from determinations of the respective elements or amino-acids in the pure antigen on the one hand, and in the precipitate on the other, if the antigen/antibody ratio of the precipitate is determined at the same time. Such indirect analyses show that the elementary composition and the percentage of amino-acids in antibodies and in normal serum-globulins of the rabbit is approximately the same (Breinl and Haurowitz 1930). Also the molecular weight (Heidelberger and Pedersen 1937), the electrophoretic behaviour, and other physicochemical properties of purified antibodies are very similar to, or identical with, those of normal serum-globulins. All these observations support the view that antibodies are proteins very similar to the serum-globulins.

The alleged preparation of protein-free antibody solutions is based on the fact that the chemical protein reactions are much less sensitive than the usual serological reactions (Marrack 1938, Haurowitz 1939). Another argument against the protein nature of the antibodies—namely, their resistance to the action of trypsin—is explained by the resistance of native serum-globulins to the action of this enzyme (Breinl and Haurowitz 1930). Larger quantities of trypsin or its protracted action bring about the hydrolysis of normal serum-globulins as well as the inactivation of antibodies (Rosenheim 1937).

STRUCTURE AND FORMATION OF ANTIBODIES

To explain the differences between antibodies and normal serum-globulins, the structure of protein molecules has to be discussed briefly. The molecular weight of the serum-globulins is not far from 175,000 (Burk 1937). This giant molecule is formed by a long chain of more than 1000 amino-acids. On the other hand, it has been established by chemical and physical measurements that the molecules of the serum-globulins are more or less spherical molecules, whose diameter does not exceed the length of 10–20 amino-acids. It is accepted, therefore, that the peptide chain of the globulin molecules is folded, so that the molecules acquire a spherical shape (Haurowitz 1935). The specificity of proteins is apparently due to the specific sequence of the amino-acids in the peptide chain and/or to a specific folding or branching of this chain. An endless number of specific proteins can be brought about by variations of the sequence or of the manner of folding.

The formation of protein molecules from simple amino-acids takes place apparently in each cell and is most probably catalysed by enzymes. Since the effect of proteases and other enzymes in vitro is never species-specific, the existence of a chemical organiser within the cell has been postulated (Bergmann and Niemann

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* Abstract of an address delivered to the Turkish Medical Society.

1937, Haurowitz 1939). This organiser directs the catalysed synthesis of proteins in such a way that species-specific and cell-specific proteins are formed. But it is not yet clear whether this organiser forms a part of the enzyme molecule or is identical with insoluble parts of the cell, such as its membrane, stroma, or structural elements of its nucleus—e.g., chromosomes and genes. It has been assumed that polar groups of the organiser—e.g., carboxyl and amino groups—attract, by means of their electrostatic forces, the opposite poles of the amino-acid molecules and keep these molecules in a fixed position during the synthesis of the protein molecule, so that the amino-acids combine with each other in a specific sequence and the peptide-thread folds or branches off in a definite specified manner (Breinl and Haurowitz 1930, Haurowitz 1939).

Investigation of the fate of arsanil-azoproteins in the organism of the injected animals had shown that the bulk of the injected antigen was deposited, within an hour, in the liver and in the bone-marrow—i.e., in the sites of globulin-formation (Haurowitz and Breinl 1932). On the other hand, azogelatin, which is devoid of antigenic properties, passes into the urine, no appreciable amount being deposited in the liver (Haurowitz et al. 1943). It has been shown, moreover, that the most powerful determinant groups of the antigen are acid groups, such as sulphonic, arsonic, or carboxylic groups (Landsteiner and van der Scheer 1927). If introduced into the protein molecule they suppress the original species-specificity of these proteins and give rise to a new chemospecificity. Neutral groups—e.g., methyl and ester groups—are much less effective or quite ineffective. On the basis of these observations the theory has been advanced that antigens, after their deposition in the cells of the reticulo-endothelial system, disturb the synthesis of normal globulins, so that abnormal globulins (antibodies) are formed whose molecular shape is complementary to polar groups on the surface of the antigen molecule (Breinl and Haurowitz 1930, Haurowitz 1939, 1942, Mudd 1932).

If the specificity of the antigen molecule is due to its polar groups, one would expect the effect of positively charged alkaline groups to be equal to that of the negatively charged acid groups mentioned above. This has been confirmed more recently by means of azoproteins containing positively charged quaternary ammonium groups (Haurowitz 1942). Hence it follows that the "determinant" property of certain chemical groups is not due to their acidic or alkaline character but to the **inductive forces of their different polar groups.**

Since the molecules of the antigen and the antibody are spherical or ellipsoidal, only small parts of their surfaces can approach each other. It is to be expected, therefore, that the inductive effect of a determinant group of the antigen molecule is restricted to a limited area on the surface of the antibody molecule. This view is supported by experiments performed with antigens which possess two different determinant groups A (arsanil-azo-group) and I (iodo-group). Antibodies of the type anti-A and anti-I were formed, but no anti-AI (Haurowitz and Schwerin 1943). This experiment proves, moreover, that a single antigen can give rise to the formation of several types of antibody, each of them being adjusted to a certain determinant group of the antigen molecule (Haurowitz 1942).

The structural adaptation of the antibody to the determinant groups of the antigen molecule will not, in general, be perfect, because the peptide chain, which forms the scaffold of the antibody molecule, is flexible only to a limited degree. Each immune serum, accordingly, contains a whole series of antibodies differing from each other by the degree of adjustment to a certain determinant group of the antigen (Landsteiner and van der Scheer 1936, 1938). Whereas antibodies whose adjustment is fairly good combine irreversibly with the antigen molecules, "low-grade" antibodies (Heidelberger and Kendall 1935) form loose reversible compounds with the antigen, no precipitate being carried down in the latter case.

Whereas the theory of complementary antibodies is in good agreement with the results of immunological experiments, other theories cannot be reconciled with the experimental facts. Jordan (1939), starting from general physical considerations, has assumed that antibodies are formed by the reproduction *in vivo* of the *determinant groups of the injected antigen.* According to Jordan, antibodies contain the determinant groups of the homologous antigen or similar groups if identical groups cannot be produced in the organism. Jordan's theory has been disproved by the observation that antibodies to iodoproteins, bromoproteins, and phosphoproteins are devoid of iodine, bromine, and phosphorus respectively (Haurowitz et al. 1942).

According to Pauling and Campbell (1942), antigens do not interfere with the synthesis of antibodies from amino-acids but can convert normal globulins into antibodies. This view is based on the formation of antibodies in vitro, if serum-globulins are denatured cautiously in the presence of suitable haptens—e.g., arsanil-azoresorcin and methyl-blue. Similar experiments carried out in our laboratory indicate that the precipitates obtained in such experiments are not due to the effect of antibodies but are brought about by the non-specific flocculation of globulins charged positively at pH 5·0–5·5, by negatively charged azoproteins (Haurowitz et al. 1946).

It has been assumed (Burnet et al. 1941) that the alteration brought about by the action of antigens on cells is hereditary, so that later generations of the cell would be able to produce antibodies in the absence of antigens. This would explain the fact that the immunity to some diseases, such as yellow fever, lasts for many years or even for a lifetime. But neither the absence of antigens in such organisms nor the formation of antibodies in the absence of antigens has been proved hitherto.

COMBINATION BETWEEN ANTIGEN AND ANTIBODY

The combination of antigen molecules with molecules of the antibody is due to the electrostatic inductive forces of their polar groups (carboxyl group, hydroxyl group, amino group). These forces lead primarily to such an orientation of the polar molecules that groups of the same charge are repelled from each other, while opposite groups approach each other closely. The intensity of the inductive forces, effective between two polar groups, is inversely proportional to the fifth power of their distance. This means that these forces are negligibly small, unless both polar groups approach each other very closely. Since opposite poles, owing to the primary orienting effect, are much closer to each other than poles of the same charge, the attractive forces must always surpass the repulsive forces, and polar molecules will, in general, attract each other, forming more or less loose compounds. The hydration of proteins, their combination with water molecules, is brought about by such forces.

The fact that no aggregation takes place between the molecules of normal serum proteins, in spite of their polar groups, is explained by their hydration. The polar groups of a protein molecule are saturated much more easily by the small water molecules than by polar groups of large protein molecules, the latter not being able to approach very closely, for sterical reasons. If however, the shape of the antibody molecule is adapted spatially to the polar groups of the antigen molecule, large parts of the surface of both particles will be able to come very close to each other. In such cases the inductive forces may become so strong that the molecules of the antigen and antibody remain attached to each other (Haurowitz 1939).

This combination of antigen and antibody particles is the first stage of all serological reactions. It is followed by various secondary phenomena. If the antigen is a soluble protein or polysaccharide, each determinant group on the surface of its molecule will be occupied by an antibody molecule, and the large antigen-antibody aggregates will be precipitated (Haurowitz et al. 1936, Haurowitz and Schwerin 1942). It has been assumed by Marrack (1938), Heidelberger and Kendall (1935), and Pauling (1940) that antibody molecules are multivalent—i.e., that each antibody molecule has several specifically adapted groups—and that the precipitation of soluble antigens is due to the formation of a framework of antigen and antibody molecules. Cellular antigens are covered with a layer of antibody molecules and thus lose the negative surface potential necessary for the stability of their suspensions (McCutcheon et al. 1930). This leads to an agglutination of the cells. Also in hæmolysis, cytolysis, phagocytosis, and other serological reactions the primary combination of the antibody with the antigen is a prerequisite for secondary reactions brought about by the presence of the complement or other factors. The ratio of the precipitating, agglutinating, opsonic, and complement-fixing titres in immune sera to pneumococci and in purified preparations of their antibody is the same; it may be inferred, therefore, that all these reactions are caused by one and the same antibody (Felton and Bailey 1926).

CELLULAR ALLERGY

Whereas humoral allergy has been ascribed to the passage of altered globulins (antibodies) into the blood, cellular allergy is apparently due to the presence, in the cells, of abnormal proteins structurally adjusted to the antigen molecules. The reaction taking place between specifically altered cellular proteins and the injected antigen has not yet been proved experimentally. But it is most probable that the primary reaction is the same—i.e., the combination of the determinant groups of the antigen molecule with specifically adapted areas on the surface of the newly formed cellular proteins. It is not yet known why this primary reaction provokes a hypersensitivity of the smooth muscles and other classical symptoms of anaphylaxis.

SUMMARY

Experiments made with antigens chemically labelled by the introduction of foreign tracer elements have shown that, contrary to what is the case with the natural antigens, such labelled antigens can be determined quantitatively by chemical analysis.

This procedure gives us a deeper insight into the nature of antibodies.

Results obtained with these artificial antigens are also valid for antibodies to natural antigens—e.g., the pathogenic bacteria.

Since most bacteria contain a multiplicity of different antigens, each of them may lead to the formation of several antibodies.

Our present knowledge of the nature of antibodies and their relation to antigens can be summarised as follows:

(1) Antigens are substances which disturb the normal process of protein synthesis in vivo, with the result that abnormal proteins are formed whose molecular surface is adapted complementarily to polar groups on the surface of the antigen molecule.

(2) If the altered proteins pass into the blood-serum they act as antibodies. If they remain within the cells they are responsible for the phenomena of cellular allergy and of anaphylaxis.

(3) The combination of antibody molecules with molecules of the antigen is a consequence of their complementary structures, which enable them to approach each other so closely that the inductive forces of the mutual polar groups become effective, and strong attraction between antigen and antibody molecules results.

References at foot of next column

HEALTH IN THE FACTORIES

REPORT FOR 1945

THE report for 1945 by the Chief Inspector of Factories,[1] to which we have already referred briefly,[2] records a general trend towards shorter working hours; a 44- or 45-hour week is now quite common, and in places a 5-day week has been tried without loss of output. During the year the hours of employment of women and young persons were greatly reduced; this journal has consistently maintained that youngsters should work no more than 40 hours a week.

The report draws attention to the awakening of interest in colour schemes, which many firms are introducing during renovations; light colours are usually chosen and pastel shades of light green, buff, and blue are especially popular. In some schemes brighter splashes are provided by painting roof trusses, stanchions, and pillars in a contrasting colour such as blue, red, or yellow. It is pointed out, however, that the haphazard use of colour is unlikely to be successful.

ELECTRIC SHOCKS

The Senior Electrical Inspector reports 13 cases of electric shock with unconsciousness successfully resuscitated by artificial respiration applied for up to half an hour. These potential fatalities represent only a proportion of the accidents in which artificial respiration could and should have been attempted. The majority of "unconscious" shocks occur at pressures below 250 volts, and because of the nature of the apparatus handled the patient is usually "held" by the live contact. Records suggest that the chances of recovery are slightly greater with higher voltages because contact is seldom maintained; but serious burning is common. Most of those who are going to recover with artificial respiration do so in the first 10 minutes; a good proportion recover in the second 10 minutes, but fewer after that. Unfortunately attempts at resuscitation are often abandoned within a quarter of an hour. It is not widely enough known among doctors that lumbar puncture is a useful adjunct: removal of the excess cerebrospinal fluid produced by electric shock enables the stunned respiratory centre to respond better to artificial respiration.

GENERAL AND SPECIFIC RISKS

The Senior Medical Inspector meets the criticism that his branch pays too much attention to occupational

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[1] Annual Report of the Chief Inspector of Factories for the Year 1945. Cmd. 6992. H.M. Stationery Office. Pp. 104. 2s.

[2] *Lancet*, Jan. 4, p 30.

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risks, and too little to the common cold and other general illnesses, by referring to the work against dirt, overcrowding, and bad ventilation, and the attempts to obtain good washing facilities and factory canteens. "The number of chills and colds prevented, and indeed the amount of positive health secured by such means, are statistically immeasurable, but surely vast." Further, he says, 'the shrinking numbers of specific industrial diseases are a measure of the effectiveness of preventive measures. As an instance of uncontrolled risk he cites a rayon factory in an occupied country. When the factory was liberated over 80 cases of carbon bisulphide poisoning were found, many of them in a nearby mental hospital. In this country there have only been 3 cases of poisoning by carbon bisulphide during the last six years.

TOXICOLOGY

D.N.O.C.—One of the most interesting passages in the section on industrial toxicology is that on di-nitro-ortho-cresol (D.N.O.C.). Two deaths (one in a factory) have occurred recently as a result of making and using this chemical which is now in demand as a fungicide and insecticide. It has a toxic action on the body not only when taken by mouth but also when inhaled as a dust or fume or absorbed through the skin. The main symptoms are excessive sweating, thirst, fatigue, anorexia, and loss of weight—symptoms comparable with those of poisoning by dinitrophenol. One of the fatal cases developed these symptoms following a month's exposure to fumes from molten D.N.O.C. The second, who was exposed for a month to an agricultural D.N.O.C. spray (0·5 %), was taken ill suddenly and died 35 minutes after admission to hospital in coma, with cyanosis of the lips and ears and increased respiration-rate. The department has records of 10 non-fatal cases within the last three years. Of these 7 occurred in a factory where for two years D.N.O.C. had been made in the form of a paste without any trouble. Latterly it had been dried, ground, and mixed as a powder; and inhalation of dust from the dry powder appears to have caused the illness in these 7 cases. Preventive measures include the control of dust by exhaust ventilation, good washing accommodation, and medical supervision. The body-weight of workers should be recorded every fortnight.

Dangers of Soot.—The soot in oil-fired furnaces has often been shown to contain about 13 % vanadium. The acute irritation of eyes, nose, throat, and chest experienced by men engaged in cleaning oil-fired furnaces may be caused by this substance, which is known to produce these symptoms when inhaled as a dust. Similar effects were noted in 1930–31 among a small group of men exposed to oil-fuel soot in their work of cleaning boiler flues of oil-burning ships. The Government chemists found that this soot contained 40 % water-soluble iron sulphate derived from the sulphur of the oil fuel. In contact with water the soot was highly acid, which was thought to account for its irritant effect on mucous membranes.

Methyl Bromide.—From methyl bromide 9 cases of gassing, with 3 deaths, were reported. The first fatality was in a man of 58 who had been employed in its manufacture for a year. After complaining of headache at work in the early hours of the morning he collapsed, and died later in "status epilepticus" with extreme cyanosis. The second death was in a boy of 14: entering an aeroplane he came into contact with an accidental discharge of methyl bromide from fire-extinguishers. He was dead when found, and the post-mortem findings were those of asphyxia. The third case was a man of 32 who for three days had been engaged in the open air on emptying methyl-bromide fire-extinguishers. At the end of the third day he collapsed, went into coma with convulsions, and died; the blood contained 34 mg. of bromide per 1000 c.cm. of blood.

Nitrous Fumes.—There were 29 cases of gassing by nitrous fumes; but for the first time in any year with a double-figure incidence none was fatal. All but 8 cases arose in connexion with nitration processes; 3 occurred through exposure to fumes from the treatment of metal with nitric acid, alone or with sulphuric acid; while 2, 1 severe, arose during oxyacetylene welding or cutting in poorly ventilated spaces. After exposure to nitrous fumes the initial symptoms of coughing and irritation are often transitory, and, as in gassing by phosgene, a period of quiescence precedes the onset of acute symptoms. "These facts are not always appreciated at the time and when this is so a typical report states that after a short rest and treatment in the ambulance ro a return to work or home was permitted; subsequ physical exertion may precipitate the onset some ho later of acute symptoms such as painful cough, a sense constriction in the chest and distressing breathlessnes

Carbon Monoxide.—There were 218 cases of gass by carbon monoxide, of which 18 were fatal. Th figures maintain the average for the past six yea there is as yet no sign of a return to the much lo pre-war level when for six years (1933–38) the aver was 81 cases with 9 fatalities.

DERMATITIS

The cases of dermatitis reported voluntarily decrea by over 2000. There were fewer from industries c nected with the making of munitions of war; and t shift of employment towards a more normal patt was further reflected in a higher incidence among work making synthetic resins, pottery, and metal plati and those engaged in printing. Of the 98 cases amon dockers 17 were caused by handling, in a high wi a cargo of arsenic trioxide in barrels, some of whi were broken. There was a similar incident in 1943 wh 39 dockers were affected, some severely. "Copra itc which has been associated with dockers in the pa affected 8 young women engaged in cleaning and repairi sacks which had been used for copra and previous for grain; the lesions were mainly on the face and nec the sacks having been carried by the girls in bundl on their shoulders. Mites have been held responsib for "copra itch" and also for cheese and grain "itches In this outbreak two varieties of mites, brown and brig blue, were found in the sacks; the brown mites survive heating for two hours at about 120° F, but the blu mites succumbed.

ALUMINIUM FOR PNEUMOCONIOSIS

The report gives a warning about the use of aluminiu and alumina in the prevention and treatment of t pneumoconioses. Even if aluminium dust is ultimate proved to inhibit silicosis in man, in practice it ca never supplant the proved methods of dust suppressi and control: "At the best it can only become a ancillary aid in the prevention of silicosis." The depar ment has records of at least 1 death ascribed to t inhalation of particles of aluminium; observations o the Continent have also pointed to harmful effec from its inhalation.

HEALTH CENTRES

MEETING AT ROYAL SANITARY INSTITUTE

ADDRESSING the Royal Sanitary Institute on Jan. 1 Prof. R. H. PARRY, medical officer of health for Brist said that the health centre originated in the Unite States of America as a substation of health departmen —"a neighbourhood office in the city-wide organisatio of civil government." American experts, though agreei that the activities of large health departments shou be decentralised, are not unanimous on the other acti ties that should be concentrated on the district heal centre. Prof. Ira Hiscock [1] has referred to one activi which most would agree should be prominent in all re health centres:

> "The best service to the patient renders it desirable coördinate records of the different clinics and services, a to associate with these, as closely as possible, all nursi and social records pertaining to the same person or famil Economy and convenience are promoted by having t files in a record room, from which records may be distrib ted to the divisions as needed. This ensures more expe filing and better statistical control. Family folders a frequently used. A central alphabetical index is essenti if the relation of the services rendered to the populatio

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[1] Hiscock, I. V. District Health Administration: A Study Organization and Planning, Lancaster, Pa, 1936.

of a district, as well as the interrelations of services to individuals, is to be known. Without a good central index, a major health center is seriously handicapped."

The National Health Service Act will decide the national policy regarding health centres for some years to come. In Bristol the question of health centres has long been under consideration. These have been pictured as supplying a field service which would be brought into close contact with hospital diagnostic departments through divisional health centres attached to hospitals.[2] Development on these lines may be possible if the local authorities are allowed to administer their health centres—the regional hospital board supplying the consultant service required by local authorities. It is still thought that district centres must be under the exclusive control of the medical officer of health, so that the environmental and social aspects of public-health problems may be properly studied; and it is to be hoped that the general practitioner will be a member of the health-centre team. The combination of health centre and medical-care centre would promote coördination between the two.

Dr. D. **Brown** (Bootle) said that in health centres the general practitioner requires (1) the promotion of intimate contact with patients, (2) suitable equipment, (3) improved clerical assistance, and (4) radiological and other diagnostic facilities. The patient needs (1) a centre within a mile of his home, (2) treatment by a single doctor, without which confidence cannot develop, and (3) education in health matters. For the first 2–3 years experimental centres of various types should be tried; only when the results have been studied should centres be built throughout the country.

Dr. R. C. **Webster** (Barnes) said that experience of the Darwen centre[3] has convinced him of the advantages of centres having non-slip floors and being cheerfully decorated, with tiles on the lower parts of the walls to prevent defacement by children.

Dr. J. D. **Kershaw** (Colchester) suggested that in areas where principal health centres are constructed on expensive land it would be wasteful to include suites of rooms for each of the clinics which are held less often than daily. At the same time it would be wrong to construct multi-purpose suites to be shared by several clinics; these tend to be satisfactory for none. Those clinics which are not held daily might be conducted in other buildings near the principal centre.

SPECIALISTS AND THE ACT

In a letter issued before the council decided to recommend negotiation, the consultants and specialists committee of the British Medical Association urged specialists "not to take any appointments on Regional Boards or in any way to compromise the position of the general body of the profession, pending the decision of the Special Representative Meeting of the Association . . . and subsequently if the final decision is against . . . negotiation."

The features in the Act to which the committee objects are: (1) consultants and specialists will be employed by regional hospital boards or boards of governors and will undertake all their hospital work in hospitals owned by the State; (2) the appointment and removal of the chairmen of regional hospital boards and local executive councils is vested in the Minister; (3) there is no right of appeal to the civil courts against dismissal from the service; (4) all hospitals are to be transferred to the Minister, the provision of private accommodation being subject to the Minister's control, and only those on the staff within the service being permitted to undertake treatment of private patients in pay-bed accommodation; (5) the Act empowers the Minister to acquire nursing-homes and medical institutions, and thereby to deprive consultants and specialists of any alternative form of institutional practice: and (6) the general effect will be to deprive the public of an independent consultant service.

Reconstruction

INFORMATION AND ADMISSION

AN OFFICE FOR EACH HOSPITAL REGION

R. E. Peers

SECRETARY, EMERGENCY BED SERVICE, LONDON

The medical organisation of a region under the National Health Service may be likened to a pyramid, with general practice forming its base and a teaching hospital at its apex. This pyramid will contain almost everything that the region can reasonably require. But there will still be certain services which cannot or need not be provided in every region.

Patients are not to be confined within regional boundaries, and all facilities throughout the country will be accessible to everyone. But how is the doctor, be he general practitioner or on the staff of a hospital, to know, first, where each item of this abundance is to be found, and, secondly, how his patient can get the benefit of it? It seems that he will have to be assisted by information and admission offices possessing all the information he may need. The nearest approach to such an office which we have in this country is the London Emergency Bed Service, which deals, however, only with urgent admissions and (more or less unofficially) with inquiries for unusual equipment. Several similar but smaller organisations operate in other large centres; and county medical officers of health control admissions to infectious-diseases hospitals.

What is now wanted in each region, and possibly in the sub-regions too, is an organisation to deal with the admission of any type of case, whatever the illness. To this organisation the doctor in difficulties must be able to turn in the certainty that he will receive intelligent help.

ARRANGING ADMISSIONS

Most patients are normally admitted to the nearest hospital; and there should be no interference with the doctor's right to send the patient to the hospital of his choice. Clearly the doctor should be able to approach the local hospital direct, rather than through an office which may be some distance away. (A compulsory admissions office, as discussed in the Hetherington report on hospital policy in Scotland, would look very neat on paper, but would not perhaps work so well in practice.) The duties of the office will be to arrange admission when requested by a doctor, if possible to the hospital he considers most suitable. It will also have to arrange the transfer of patients between hospitals. With non-urgent cases, such as the chronic sick and convalescents, speed is less important than the selection of the right place; and the choice may be made best with the assistance of people familiar with all the institutions. The regional office would also cater for patients who must go to other regions for treatment—for example, those needing plastic surgery, and diabetics to be trained at one of the few centres where these patients are taught to lead a full and active life. Lastly, the use of these offices for the collection of cases of any particular type for the benefit of medical research or training is well worth considering.

The regional office would have to accept responsibility for getting any doctor's case admitted to hospital; and its powers as regards the hospitals would have to be defined. If it had the right to claim admission to any hospital, its authority would have to be used with discretion. The office must be the servant of both doctor and hospital, and it must accept the doctor's diagnosis. This does not mean that the doctor may not be questioned in order to ensure a full understanding of the patient's condition; but the whole object should be to assist the doctor in his difficulties, and the office must not fall into the habit of telling the doctor what is good for him or of hindering him with regulations. On the other hand, ease of access should not cause the doctor to claim admission needlessly.

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[2] See Parry, R. H. *Lancet*, 1946, i, 471.
[3] See Webster, R. C. *Ibid*, p. 515.

The office should also be prepared to advise both doctors and hospitals where special treatment can be obtained, and possibly where apparatus or other requirements are available; and it must be able to transport these items. It should also be closely linked with the ambulance service, which under the Act is to be controlled by counties and county boroughs.

PUBLIC RELATIONS

So much for the doctor. But what of the public? Will they not require, and have a right to, direct contact with the National Health Service? Many will have questions to ask with which they need not and should not trouble their doctor, and they must be able to get advice as to the working and scope of the service from their personal angle. The press, too, must know where it can go for information. All this suggests the necessity for a public-relations section of the information office, with a separate staff but with access to all relevant facts.

A regional office dealing with all sorts of inquiry, whether medical or not and from whatsoever source, would have a formidable task. But this task will have to be performed if the public's demand for a satisfactory service is to be satisfied.

Public Health

A Pioneer Looks Back

THE public-health system as we know it today has been evolved during the past thirty or forty years. The lead has come from Parliament; but much of its legislation has been permissive rather than mandatory, so that the moulding of the service has been left largely to local conscience and initiative, the less enterprising areas trailing in the wake of others which have made the most of their powers. Among the authorities which have set the pace is Willesden, whose public-health affairs have for the past thirty-four years been controlled by Dr. George F. Buchan. On his retirement, Dr. Buchan has written a review of his work,[1] which reflects in microcosm the improvements in the whole nation's health during the present century. When he took office in 1912 the birth-rate was 25·6 per 1000 and the death-rate 11·8 per 1000; the infant-mortality rate was 124 per 1000 live births and the maternal-mortality rate 4·5 per 1000 births. A generation later the death-rate was 8·3 and the infantile and maternal mortality-rates had been reduced by more than a half, while the average age at death had been extended by 26 years. And the mortality in children aged 1–5 years had decreased from 1·5 to 0·08 per 1000 per annum. Dr. Buchan belongs to the generation of hygienists that has helped to achieve these remarkable improvements; his account, though impersonal, suggests how ability and resourcefulness have contributed to their attainment.

Infectious Disease in England and Wales

WEEK ENDED JAN. 11

Notifications.—Smallpox, 0; scarlet fever, 1058; whooping-cough, 1928; diphtheria, 232; paratyphoid, 4; typhoid, 4; measles (excluding rubella), 10,223; pneumonia (primary or influenzal), 1264; cerebrospinal fever, 56; poliomyelitis, 14; polioencephalitis, 2; encephalitis lethargica, 3; dysentery, 87; puerperal pyrexia, 142; ophthalmia neonatorum, 74. No case of cholera, plague, or typhus was notified during the week.

Deaths.—In 126 great towns there were no deaths from enteric fever, 1 (0) from scarlet fever, 2 (0) from diphtheria, 10 (2) from measles, 9 (0) from whooping-cough, 79 (8) from diarrhœa and enteritis under two years, and 74 (14) from influenza. The figures in parentheses are those for London itself.

Liverpool and Manchester each reported 10 deaths from diarrhœa and enteritis.

The number of stillbirths notified during the week was 272 (corresponding to a rate of 26 per thousand total births), including 47 in London.

Health Centres of Tomorrow

IV—ADMINISTRATION AND REMUNERATION

How, and by whom, is the centre to be run? It would be wrong to try to answer this question categorically now. Many schemes are theoretically possible, and only experience can show which is the best for varying types of health centre. Nevertheless, something must be said if we are to paint an understandable picture of the health centre of tomorrow.

Clearly there can be no simple, obvious, and universal administrative pattern. At least three administrative units of the new health service will be concerned with the health centre. The local health authority (i.e., the county or county-borough council) will build and equip it, and supply the auxiliary staff of nurses, midwives, secretaries, and health visitors. The local executive council (covering the same area) will recruit, appoint, and pay the general practitioners and the dentists. The specialist services provided (pathology, radiology, or visits by consultants or specialists for consultation at the centre) will ultimately be the responsibility of the regional hospital board. The divided responsibility of these administrative units, and sometimes their remoteness from the actual centre, will make it very hard for any one of them to undertake full and proper administrative charge. There will therefore have to be a management committee for each centre, and this committee ought to be given a good deal of autonomy in meeting its day-to-day requirements. The doctors and other health workers in the centre should feel that they have a full democratic voice in the running of their own centre, and they should have ample representation on this management committee.

Such a committee will need to have executive officers, and in the absence of experience it is not yet apparent who they would best be. The doctors and dentists would probably choose one among themselves who would be the chairman of the medical committee, and their regular spokesman in any discussions with the local authority or the executive council; but he should be one of the clinical team, *primus inter pares*, in no way acting as a medical superintendent of his colleagues. Though he would be consulted on matters of principle and policy, he could not be expected to undertake the detailed daily routine administration of the centre, and the larger centres will need an executive officer or officers answerable to the management committee for this detailed administrative work. According to our previous proposals this executive officer would be the lay secretary of the centre.

So far as the doctors themselves are concerned, each centre must have its own medical committee consisting at least of all the doctors and dentists working as principals in the centre. This committee would be the arbiter on all matters touching the work and coöperation of the doctors in the centre. It would allocate accommodation and ancillary staff among the doctors; it would decide upon the engagements, employment, and instruction of assistants; it would agree, when necessary, rotas of duty, and make arrangements for holidays and study-leave; and it would inaugurate schemes for the health education of the patients at the centre. Probably, too, the medical staff would have to give careful thought to the means of ensuring that the group of doctors working in the centre worked in true partnership, and not in perpetual competition.

COMPETITION FOR FEES?

Before they can achieve this happy state of affairs many factors will need to be considered, not least the thorny subject of remuneration. Through all the years of discussion on the new health service the Ministry of Health have consistently contended that a method of payment depending solely on the allocation of capitation fees to the centre doctors, in proportion to the numbers of patients on their individual lists, would destroy all hope of amicable coöperation among them and would jeopardise the whole experiment from the start. This contention has been borne out by recent experience of group practice in the United States, where it has been found essential to make some partnership arrangement if the group is to be kept together.

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[1] The Health of Willesden. By George F. Buchan, M.D., F.R.C.P., D.P.H. Willesden Borough Council, Health Department, 54, Winchester Avenue, N.W.6.

If perpetual competition remains, most of the advantages expected from group practice will be endangered. Holidays and study-leave will be hard to arrange. The sharing of work during a temporary illness will not be easy. It will be impossible to encourage practitioners to interest themselves in specialties if this means that the other members of the centre have to refer their patients to a competitor rather than a partner. Even education for the people attending the centre will be hard to arrange, for the doctor able and willing to give instruction will hesitate to do so lest he be accused of doing it to enlarge his personal list. Moreover, it will be difficult if not impossible to allocate fairly the ancillary help which the centre will provide for the doctors working in it. As the Coalition white-paper pointed out:

> "It seems fundamental that inside a Centre the grouped doctors should not be in financial competition for patients. All the practical advantages of the Centre—the use of nursing and secretarial staff, record keeping, equipment, the availability of young assistant doctors in particular—will be, under a system of a salaried team, at the disposal of the group in whatever way they like collectively to arrange; it is the whole idea that they should arrange their own affairs together in this way. But if individual remuneration is based on mutual competition for patients, complication will enter into any attempt of the group to allocate and share these services—for the more any one individual is able to draw on the ancillary helps of the Centre (and particularly on medical assistants) the more he will gain and his fellows lose in the contest for patient lists. There is therefore a strong case for basing future practice in a Health Centre on a salaried remuneration or on some similar alternative which will not involve mutual competition within the Centre." (Cmd. 6502, pp. 31–32.)

In view of the determined opposition of the majority of practitioners to remuneration by salary, it is unlikely that the method of payment which the Coalition Government had in mind will be adopted. We do not yet know whether Mr. Bevan will persist in his proposal to include a basic salary in the remuneration of all general practitioners in the service; but a case can certainly be made in favour of its application to some of the doctors at the health centre. This applies particularly to those working as assistants. For the rest it might be better if some method were devised of sharing the remuneration accruing to the centre in a way comparable to present-day partnership arrangements.

PARTNERSHIP

This will not be easy. Most of our present partnerships have originated from the necessity of the new entrant to general practice finding by purchase a place in which to work, and his share of the practice receipts has largely depended on the proportion of the practice he has been able to buy, either on entry or later. Many of the most important clauses in the partnership deed set out these financial arrangements, and it is round them that the contract between the partners is built and continues. Now that the sale and purchase of practices is to be abolished, and penalties discourage any subsequent hidden sale of goodwill, many believe that the bonds of not a few existing partnerships will be dissolved, and that the Act, far from encouraging, as it intended, a greater resort to group practice, may in its early days reduce the number of partnerships and increase the proportion of doctors in individual practice.

Yet the advantages of group practice are such that in the end we shall certainly have to find ways of establishing it on a satisfactory basis. Probably the health centre will become the focal point for the renaissance of partnership practice, and it is essential that the financial arrangements shall be such as to foster the best principles of practice in partnership.

Different methods will have to be tried; but in the main it may be best to arrange some relatively loose contract readily adjustable by mutual consent at agreed intervals. In assessing the shares to be allotted to the different doctors working in the centre, numerous factors will need attention. For instance, part of the remuneration of general practitioners undertaking regular graded specialist work, or administrative responsibility, might be paid in respect of these extra duties. This, however, should not necessarily mean that their total remuneration is substantially higher than that of their colleagues in the centre. It would be better if, in view of their special aptitude and the time they gave to these particular tasks, they were relieved of some of the more routine duties of the centre; though, as we said in a previous article, they should not cease to be genuinely general practitioners. Their extra emoluments for their special work would then compensate for the fact that they had fewer ordinary patients on their lists.

ASSISTANTS

It is important that assistants should work at health centres whenever the size and activity of the centre justify their employment. There is probably no better way of instructing, and enlarging the outlook of, the newly qualified doctor—whatever his ultimate aim—than by enabling him to spend a period of apprenticeship in general practice under the helpful supervision of a group of established and experienced practitioners. If the assistant intends himself to become a principal in general practice, optimally he should spend at least two years as an assistant to a health centre. During this time he should be paid a salary, and not attempt to acquire a list of capitation fees of his own. Only in this way will it be possible for him to take the fullest advantage of working for, and with, all his colleagues in the centre, and so gain the most varied experience.

Ordinarily, when he has completed this period of tutelage, he would look for a vacancy in a group practice. This might be in the centre where he has served as assistant, but more probably would be elsewhere. A centre employing six principal practitioners could well employ two assistants. In some of the less popular areas it might be found desirable to raise this proportion to three assistants to six principals. (One of the best expedients for attracting doctors to underdoctored areas might well be the early establishment there of health centres, offering good working conditions and satisfactory commencing remuneration.)

During his apprenticeship the assistant should be given the widest opportunity of practising, first under supervision but later independently, all the techniques of general practice. He should feel himself a junior colleague of his fellow-practitioners, and in no way be restricted to the less skilled or more menial tasks. As he becomes experienced he should quickly take a full place in the economy of the centre. He should take his turn on the rota for emergency duty, and be able to deputise for a principal who is ill, off duty, on holiday, or on study-leave.

It is not intended that doctors in health centres shall work strict and exact hours and not be available to their patients except during their tour of duty. Most doctors would agree that exclusive hours are neither desirable nor practicable. Nevertheless, there will have to be someone available night and day to cope with emergency calls, and if we are to allow the doctors proper leisure and proper sleep this can probably best be attained by arranging for each to take his turn to be on call for night and emergency duty. At the larger centres sleeping quarters will be provided for the doctor on duty. Where this is not done, the resident caretaker must be in a position to summon medical assistance at all hours.

PRIVATE PRACTICE

Under the National Health Service Act doctors in the public service are still allowed to continue in private practice. It is therefore probable that when health centres are established some, if not all, of the doctors who elect to serve in them will simultaneously have in their charge private patients. The question will then arise as to whether they should be allowed or encouraged to use the facilities of the health centre for the examination and treatment of their private patients. For many reasons it seems preferable that private practice should not be conducted from the health centre but only from the doctor's own consulting-room. Any services which could not be provided there would be obtained from the appropriate consultant—privately or at hospital, as the patient elects.

TRY THE EXPERIMENT

These are but tentative suggestions, and the conditions of work in, and administration of, the centres, when we set them up, must remain malleable. Nobody knows the answer to some of the questions raised, and extensive experiment is needed to test all the ways of work and of reward which offer a reasonable hope of providing a satisfactory *modus vivendi*. Ideas and guidance from central authority will have their place, but the staff of each health centre should be encouraged to find out for themselves how best they can serve their neighbourhood. For authority to say that a particular thing must be wrong because it has not been done before should be considered a crime.

It is in administration particularly that we shall meet the difficulty of preserving the best in private practice when it is grafted on to a larger tree. The new stock should give better support, better nourishment, and perhaps larger fruit. But great care will be needed to prevent loss of the finer flavours.

Medicine and the Law

Death from X-ray Apparatus

A RADIOGRAPHER lost his life in the performance of his duties at the Derby Borough Health Department's chest centre last November. At the subsequent inquest the coroner is reported to have observed: "I think the corporation has failed in its duty to its employees and everybody else by having a machine like this, unless efforts have been made unsuccessfully to get a shock-proof apparatus." According to the report, the tuberculosis officer at the centre, after screening a patient, told the radiographer that it would be necessary to make some adjustments to the apparatus. Apparently during this work of readjustment a brilliant white flash occurred and the radiographer was electrocuted, efforts to save his life being unavailing. The coroner asked why a town like Derby could not provide shock-proof apparatus, and was told that they are very difficult to acquire.

It will surprise many to hear of the difficulty of obtaining shock-proof X-ray apparatus. The international and British recommendations for X-ray protection as long ago as 1934 were expressed in these terms:

> "Wherever possible, earthed guards or earthed sheaths should be provided to shield the more adjacent parts of the high-tension system. Unsheathed leads to the X-ray tube should be in positions as remote as possible from the operator and the patient. The use of 'shock-proof' X-ray equipment, in which the high-tension circuit is completely enclosed in earthed conductors, is recommended. In all cases, however, indiscriminate handling of X-ray tubes during operation should be forbidden. Unless there are reasons to the contrary, metal parts of the apparatus and room should be efficiently earthed."

Manufacturers were not slow in putting such apparatus on the market, yet in 1946 a highly dangerous non shock-proof X-ray apparatus installed in 1936 was still in use by one of our borough health departments. It is well to note that this apparatus was not part of the equipment of an ordinary hospital diagnostic department. The question immediately arises as to where advice is sought by the corporation on the acquisition, use, and upkeep of such specialised gear as modern X-ray plant. In this country no considerable hospital diagnostic or radiotherapeutic department is under anyone but a qualified radiologist, and if borough or other health departments set up special clinics for the X-ray examination of patients they should surely be put in charge of a qualified radiologist. Accidents may happen in spite of all the precautions we know, but the lesson of Derby must be taken seriously to heart.

Overdose of Nepenthe

At an inquest at Kingston on a 15-month baby it was suggested that the doctor attending the child had prescribed a teaspoonful dose of 'Nepenthe.' In her evidence the doctor stated that she wrote "Query, half a teaspoonful," expecting the chemist to check the proper amount. She had not previously prescribed the drug and did not know for certain the usual dose. A representative of the parents pressed the witness with the fact that there were 60 drops to a teaspoonful and that only two or three drops should be given to a child of that age. She replied that her prescription stated that the drug should be taken in water. Dr. D. Haler, pathologist, said that the cause of death was bilateral mastoiditis; in his opinion the overdose had accelerated death to only a minor extent. He agreed that a teaspoonful of nepenthe would undoubtedly be "a grossly improper overdose" for a child of 15 months. The parents' representative said they had the strongest possible desire for a second post-mortem examination. The coroner observed that he did not object if they were prepared to find another pathologist; he would not himself make any order for that purpose. He adjourned the inquest for a week. When it was concluded a week later, a verdict of death by misadventure was recorded.

The pathologist's evidence as to the cause of death seems not to have been displaced by any contrary opinion. Quite apart however from the possible danger to the patient, instances when careless or hurried prescription and inadvertent overdosing can be alleged are instructive for medical students. The profession is entrusted with statutory privileges in relation to dangerous drugs; the concession cannot be justified unless care and knowledge accompany the use of them. Nepenthe is a proprietary preparation of opium containing about gr. 1 in 130 minims. The dose for a 15-month child should not have exceeded two drops.

From The Lancet 100 Years Ago

Professor BIGELOW, *of Boston, to Dr.* FRANCIS BOOTT, *of London.*

Boston, Nov. 28, 1846.

MY DEAR BOOTT,—I send you an account of a new anodyne process lately introduced here, which promises to be one of the important discoveries of the present age. It has rendered many patients insensible to pain during surgical operations, and other causes of suffering. Limbs and breasts have been amputated, arteries tied, tumours extirpated, and many hundreds of teeth extracted, without any consciousness of the least pain on the part of the patient.

The inventor is Dr. Morton, a dentist of this city, and the process consists of the inhalation of the vapour of ether to the point of intoxication. . . .

I took my daughter Mary, last week, to Dr. Morton's rooms, to have a tooth extracted. She inhaled the ether about one minute, and fell asleep instantly in the chair. A molar tooth was then extracted, without the slightest movement of a muscle or fibre. In another minute she awoke, smiled, said the tooth was not out, had felt no pain, nor had the slightest knowledge of the extraction. It was an entire illusion.

Mr. ROBERT LISTON, *of University College Hospital, to Dr.* BOOTT.

Clifford Street, Dec. 21, 1846.

MY DEAR SIR,—I tried the ether inhalation to-day in a case of amputation of the thigh, and in another requiring evulsion of both sides of the great toe-nail, one of the most painful operations in surgery, and with the most perfect and satisfactory results.

It is a very great matter to be able thus to destroy sensibility to such an extent, and without, apparently, any bad result. It is a fine thing for operating surgeons, and I thank you most sincerely for the early information you were so kind as to give me of it.

In England Now

A Running Commentary by Peripatetic Correspondents

THE anonymous Whitehall medical advisers have been copping it hot in the press lately for their alleged refusal to sanction extra rations for exceptional cases. I met one in the flesh the other day and invited him in for a cup of black coffee with saccharine (grey market—i.e., through the hospital dispensary), chosen to avoid awkward questions over rationed food. I found him worried about his future. He at once dispelled the idea that he sits in an armchair all day long. In fact he is an active physician, with this advising business as a side-line. He gets telephoned by pals in the Ministry from time to time or sometimes even gets letters. All sorts of subjects crop up and he tries to give a judicial solution of the problem as stated. But he has a hunted look. The recent developments have startled him. At first in this job he felt he was serving the community in a big way, but now, it appears, he is the hidden hand, preventing doctors from giving their patients the treatment they think essential. He has even been accused of denying sick people the necessities of life. He cannot recollect ever having done this, but I suppose his answers may have been twisted by the administrators to suit their ends. Politics have come into it now. He never thought food was a political matter, but now he says that if it wasn't for the present Government none of the problems would arise. He is patiently looking for a means of breaking off his connexion with Whitehall. It will not be long, he hopes, before he is once more being called in as a proper consultant and giving the same advice for a substantial fee.

* * *

"Do your legs swell?" "Gee, yes, they *are* swell; they're the best part of me." "I see we don't speak the same language, but I get your idea and quite agree with you."

We don't meet many G.I. brides in reverse, so to speak, in our antenatal clinic, but this one was a good specimen, obstetrically and socially, and we got on just—swell.

* * *

One of the most unnerving features of being suddenly confined to bed is the light-hearted way in which you are expected to overcome the inhibitions of years and uncaringly expel your excreta while between the sheets.

The ubiquitous bottle is an instrument badly designed for this purpose. Not only is it constructed liberally to spill its contents when placed horizontally on the floor, but its capacity is unflatteringly inadequate. In fact, it's a slight on British manhood. As an anatomy student I was never able to form a very accurate impression of the size of the human bladder, but now I have only to imagine a bottle upturned in the pelvis and the impression is stamped, staggeringly, on my mind. I find micturition progressively inhibited by the disquieting prospect of the thing overflowing into the bed. There seems no way to form an accurate estimation of the state of affairs down there apart from direct inspection, which is undignified. The most discreet guide, it appears to me, is to listen to the change of note as the rising tide enters the spout.

Like bridge, although the use of the bottle is simple enough to pick up, it's the finer points that distinguish the skilful performer from the common-or-garden. An experienced bottle-man can employ the receptacle without betraying by sight, sound, or expression his little secret. At the most, his face takes on a characteristic sort of inscrutability.

Of bed-pans enough has already been said in these columns; I will merely add that they defy the laws of elementary geometry by having length and breadth but no depth.

* * *

I used to get a bit tired of the raging controversy over "medical superintendents"—what's in a name anyway? And had I been a director (I was to the Frenchmen: M. le Directeur), or a "dean" (rural variety, subspecies temporarily detached), or what not, would it have made much difference? Of course some people used to think that sitting in an office all day (part of) was a very soft thing—until a reprobate house-man had to be dealt with, when it was: "Glad I'm not in your shoes, old man."

But what *did* I do? Item: Dr. Blank of Little Mucham wants Mr. So-and-so admitted. ? Obstruction. Will you send ambulance? Item: Coroner's office on the phone (must remember to see young Dr. New—his first "quest"—get his evidence on paper—clearly written—not too many medical terms—coroner is a layman). Item: The engineer reports boiler defect; no steam in 2nd theatre tomorrow (see X about his list). Item: May Professor Scram (U.S.A. orthopod) visit next week? Item: Inconsolable relative in ward Z. Item: Matron reports Nurse Frill (weekend leave, 3rd-year nurse, children's ward) has wired ill at home with measles and will I please drop a hint to the second H.S. that it would be convenient if he starts his round at 10 o'clock rather than at 10.50? That urgent return for the Ministry had better wait till tomorrow. I expect So-and-so will scrub me, or try to, at the next medical staff meeting—what's my line? Minutes for the hospital committee must go tonight and those letters should be answered; got to be careful how I answer that one from the Isolation Hospital.

No, I suppose it was pretty cushy and a layman or one of my colleagues could have done it a darned sight better. Plenty of kicks and too few ha'pence. Pity I bothered. What's in a name anyway? I wonder.

* * *

On reading your leader on peritoneal dialysis I wondered whether, in uræmia, urea is present in the lacrimal secretion. If so, it should be easy to remove an appreciable quantity with the help of half an onion.

* * *

Cautionary Tale.—A man of 40, brother of a doctor, was admitted under my care for chronic abdominal pain. He had recently been discharged from one of the largest London hospitals where a physician with an international reputation in gastro-enterology had failed to discover any lesion; and to save unnecessary expense I accepted all the reports from the other institution. The X-ray results were said to be completely negative; a test-meal showed achlorhydria which my colleague had explained as familial (the brother had the same "peculiarity"); and there was a severe anæmia, regarded as due to some obscure tropical disease.

The patient was, to say the least, unprepossessing. He grumbled at every detail in his treatment; no anodyne relieved his pain. Further to his prejudice, he was perpetually pestering us for all sorts of certificates to support a claim to a pension to which he regarded himself as entitled after a short term of military service in West Africa (wherefore, no doubt, the tropical disease idea). He left my ward with a thoroughly reciprocated lack of affection but continued to call on me as an outpatient for a further three months during which his symptomatology increased in preposterous detail. He steadily lost weight, but as he said that he ate nothing and was living in the poorest circumstances this was hardly unexpected. Then one day he arrived deeply jaundiced and a large abdominal tumour was palpable.

I learnt a lot from this experience. That the worst neurotic may have a mortal illness. That it is wrong to accept the opinion of any authority when there is an opportunity to perform your own investigations. That, however easy it may be thus to salve one's conscience, it is wise to avoid prejudice and not overlook an underlying condition because a patient exaggerates or fabricates complaints that are transparently ridiculous. That one should always be uneasy over the existence of anæmia in any *man* and presume some malignant process if none of the recognised causes can be satisfactorily identified. And finally, that some physicians can persuade themselves they are never wrong. For when in penitence, sackcloth and ashes, and all the rest of it I went to tell my senior colleague of our inglorious performance he was only momentarily disconcerted. "I believe in the neurogenic factor in the ætiology of malignant disease," said he. "That chap worried himself into this."

Letters to the Editor

THE CRUX

SIR,—After negotiation—what? Suppose the Minister were to agree to good terms and conditions but refuse any modification of the Act, would you then advise doctors to renounce their fundamental right as citizens of this country—the protection of the courts?

Under the Act, a doctor may be charged by anonymous officials of the Ministry and deprived of his livelihood, without any right of appeal except to the same officials.

This, to me, is the crux. If doctor and patient, for both are involved in this, can rely on the ultimate appeal to justice in the courts, then one may count on British good sense to produce a fair service in spite of basic salary, nominated representation, controlled certification, and so on. If not, the stage is set for corruption, coercion, and apathy.

This is the point which has been reached by the sober and reasonable debate in your editorials. Standing, as you do, for justice as the basis of freedom and liberty, I hope THE LANCET will *leave no doubt in the minds* of the Minister and the negotiators that it entertains no difference from the B.M.A. on this fundamental issue, however much divergence there may be in details.

London, W.1. HERMON TAYLOR.

⁂ The subject of this letter is discussed in a leading article.—ED. L.

THE FRACTURED SPINE

SIR,—The development of civilian flying seems to be causing an increase in the number of fractured spines, and their treatment may now have to be undertaken by those inexperienced in the application of hyperextension-plasters.

Serious sores may be easily caused, and yet they can almost always be avoided if the two following precautions are taken:

(1) A strip of adhesive felt 6 in. wide and about 36 in. long is fixed down the centre of the back over the spinous processes, and smaller strips of the same material cover the iliac crests, symphysis, and manubrium. Stockinet or an old bathing costume may be put over this, but no cotton-wool should ever be used.

(2) The first plaster-of-paris applied to the back of the *hyperextended patient must be a 6-in. longitudinal slab from* the base of the neck to the sacrum. This is held in place by circular 6-in. plaster bandages supplemented, of course, by additional slabs and, in particular, by the all-important anterior strut which takes its bearing on the manubrium sterni and symphysis pubis. The common mistake is to start with circular bandages round the lumbar region (which is, of course, in marked lordosis) with the result that they tend to slip down into the lowest part of the hollow of the back and make a sharp transverse ridge which can and does cause disastrous plaster sores.

Every orthopædic and fracture department has the necessary equipment, but it is my firm belief that even the smaller hospitals should always have a stock of 6-in. plaster bandages and adhesive felt. The latter can be obtained in convenient sheets 1 yd. by 19 in. and $^5/_{16}$ in. thick from Messrs. William Mather Ltd., Dyer Street, Chester Road, Manchester, 15.

London, W.1. ERIC I. LLOYD.

GERMANY

SIR,—Scientists, particularly in the medical field, have generally held to the principle that the latest discoveries for saving life or mitigating suffering should be used for the benefit of all *mankind. It is therefore with grave* concern that we note that, owing to the completeness of the economic breakdown in Germany, the patients in the German hospitals are largely deprived of some of those remedies with which their lives might be saved or their sufferings lessened.

A few months ago we received a letter from Dr. Ruth ~~Smatznig, of the children's hospital~~ in Charlottenburg, in the British sector of Greater Berlin, asking if we could send her even a small amount of penicillin for those cases requiring it most urgently. At that time there was, as far as she knew, apart from those hospitals receiving children under treatment for venereal disease, no children's hospital in Berlin in which penicillin was available for other infections amenable to penicillin. A little more penicillin has now been made available for other cases than venereal disease, but there is still far less than is required by all types of hospitals.

We have recently sent out from the Ecumenical Refugee Commission of the World Council of Churches, in conjunction with Save Europe Now, 2000 mega units of penicillin, which were flown across for us by the R.A.F. and which the public-health authorities of B.A.O.R. are distributing for us among the hospitals in the British zone and in Berlin. They would gladly receive a similar consignment from us monthly, if we can send it, and more is urgently required. Your readers are in a position to assess the seriousness of the situation and we would ask them to enable us to continue sending it. Donations can be sent to the chairman of the Ecumenical Refugee Commission, 21, Bloomsbury Street, London, W.C.1. This organisation is duly registered under the War Charities Act.

HENRY CARTER
YOLANDE FRIEDL.

ELECTRICAL CONVULSIVE THERAPY

SIR,—I should like to support Dr. Paterson (Dec. 7), who quotes Fostig's experience in the treatment of animals by electrical currents without irreversible changes in the brain.

About eighteen months ago I conducted at a civilian mental hospital a small investigation on possible structural damage to the central nervous system from convulsive therapy. The cerebrospinal fluid (C.S.F.) of fifteen melancholics who received this therapy was examined before and after the completion of their series of convulsions (this varying from seven to twelve applications). In every case there was not the slightest change in the C.S.F. (cells, protein, globulin, chloride, or Lange curve). In the same way three very violent cases of mania who had had several hundred applications of convulsive therapy over a period of years had a completely normal C.S.F.

Although in itself this does not prove much, it helps to corroborate the results of the animal experiments.

Middlesbrough. R. HIERONS.

HERPES VIRUS THERAPY OF WARTY NÆVI

SIR,—A patient of mine had three congenital warty nævi on his penis. Some days later herpes genitalis of the prepuce developed and was spontaneously cured in fifteen days. A month after the cure the herpes recurred near one of the nævi, and gradually invaded and destroyed it, leaving an inconspicuous scar. The same happened to the remaining nævi within two months.

This observation led me to study the action of the virus of herpes on hyperplastic growths in man. For this purpose I isolated the virus from a case of herpes labialis in a hare, cultured it on the chorio-allantoic membrane of the chick embryo, and inoculated it into a congenital warty nævus of the middle finger. *Simultaneously some of the virus was inoculated*, by scarification, into the lip of a hare, with a positive result, typical herpetic lesions being produced.

In the first four days no change in the nævus on the finger was noted, and the scarification did not heal. On the seventh day there was a small ulcer, and this increased daily, destroying the nævus. On the tenth day there was no trace of the growth and only a small ulcer, which healed spontaneously in four days. This was two years ago, and there has been no recurrence.

In another case I inoculated the virus into a rodent ulcer. After a week the margin of the ulcer became detached. *Sections stained by Herzberg's contrast* method showed the presence of minute bodies, suggesting that the virus can be cultivated in human carcinoma. The patient was not cured.

These observations suggest (1) that the virus of herpes labialis in the hare can be successfully and safely inoculated in man; (2) that the virus can be useful in the treatment of warty nævi; and (3) that the virus can be cultured in carcinomatous tissue in man.

Further work is in progress, notably on the treatment of cancer and other new growths. Meanwhile I wish to call the attention of research-workers to this field and ask for their coöperation.

Lisbon. PUNDOLICA GAITONDÉ.

RESCUE OF GENERAL PRACTICE

SIR,—The medical profession has been built on the family doctor. No matter how we may embellish the superstructure, which is becoming florid, the edifice will subside if we weaken the base.

Specialism in particular organs and diseases increases every day, and new subdivisions of doctors deal with certain stages of life or occupations. Man is tending to be segmented for medical purposes. Meanwhile, shorn of one function after another, the general practitioner is fast losing the right to his title. Yet, among us all, it is his indispensable task to view the patient as a whole—body, mind, and spirit. He, if specialist is needed, chooses the appropriate one, and sees that the treatment proposed for a local disorder harmonises with the interests of the body generally and the mental make-up. He can protect the patient from misdirected intervention, and protect the consultant from wasting his time.

But this minor mediatory rôle of the practitioner, though it seems to fill the mind of our politicians, is a by-product of specialism and may be transient. It is as the friend of the whole community when illness befalls that the general practitioner has made history. Opening out before the coming generation is a sphere of influence still wider, which may be of even more moment. The doctor is to "guide his flock" in the general care and cultivation of their bodies that they may enjoy abounding health; he is to be aware of the constant insult to Nature which our present manner of life represents, and is to be resentful of the low general level of physique. Think what this would mean for a Britain in which disease prevails in teeth, tonsils, stomach, bowels, and feet. Is it asking more for human beings than the farmer gives the flocks and herds on which he prides himself? The more the practitioner attends to such work the fewer gross deviations from health will there be requiring specialists.

What is the way to this great goal? How can we reconcile increasing specialism with the preservation of the paramount importance of general practice? To the doctor should be restored undivided responsibility for his patients, for the "maintenance and repairs" of health. Features which increase the interest and competence of his practice should be jealously guarded: we must keep the cottage hospital and press for its urban equivalent, the general practitioner's hospital annexe, which is overdue.

The practitioner should be in charge of infant and school life. Impressive may sound the special facilities of an infant-welfare clinic, but ineffectual are the best efforts of the official doctor at a few minutes' interview once a week or month to instil into a mother the healthy upbringing of her child. Incomparably better chance has he whose eye is on the home conditions, who lives "on the spot" and is "in and out" of the patients' houses. Moreover, what he learns of the emerging personality enhances his prowess in handling the patient in maturity. Thanks to such association in those impressionable years a man or woman will be less secretive and more readily resort to his doctor for medical advice.

The number of his patients should be no more than the doctor can handle with due deliberation and visit at hospital, sharing their progress—seeing an interesting operation, or, alas, an occasional and enlightening post-mortem. Collaboration with the specialist for the patient's good results in an alert mind, knowledgeable, and informed. Beside these routine facilities, any scheme for intermittent refresher courses pales into insignificance.

In matters of personal everyday illness in the home, and emergencies requiring immediate recognition, the family doctor has to be expert. He should have good powers of intuition and be thoroughly conversant with common psychological disorders. The patient rightly consults him for every kind of disorder from tip to toe; so general competence must be his forte. The corollary is that he must have his wits about him and his armamentarium portable in a small bag. In sparsely populated areas he should be of above-average calibre, have some practical ability in the simpler uses of the microscope and X-ray machine as special aids to diagnosis, and receive a reward proportionate to higher responsibilities.

What a travesty of this ideal is the present state of general practice and its trend which the National Health Service Act accelerates. The doctor finds his patient less and less *his*. This division of responsibility impairs keenness. He is being robbed of interesting aspects of practice, of the spur to effort that comes from competition, of outlets for initiative, enterprise, and originality born of independence. He is harassed by filling in forms. In working the Insurance Act he was underpaid by legislation that took advantage of the fine traditions of the family doctor. The "panel" has become a stigma on the profession and has inevitably led, as all have agreed, to deplorable two-grade practice. The Government virtually admit the incompetence of it by creating an increasing host of auxiliary services to atone for its deficiencies. The danger is that men of quality will refuse the present remnants of a noble calling which no longer give opportunity for the use of their faculties but require them vainly to try to reclaim the ill-health of family life. Hence the inadequate ranks of general practice are being further depleted by increasing emigration and the diversion of young doctors to public health or other special branches.

The glaring fault, of panel practice particularly, has been that not enough time is given to the patient. For efficient service we shall need twice as many general practitioners, and the medical schools must direct themselves to training them. The curriculum requires drastic revision if the student is to learn what he will need in the daily run of practice. The course itself should be shortened to five years, and nobody should become an independent practitioner until he has been qualified for three years, including one as an assistant. To achieve this numerical expansion more use should be made by undergraduates of the general hospitals in towns near university teaching centres.

The present scheme for a National Health Service rightly emphasises the desirability of doctors in urban areas working together—though for this the ordinary partnership suffices. But it neglects the primary need for reform in training and for the upgrading of the general practitioner through large responsibilities. At the birth of a new health service it is incumbent on the leaders of our profession to insist on the *conditions that make good work possible* in general practice.

Bristol. A. WILFRID ADAMS.

SCIENCE AND PHILOSOPHY

SIR,—While fully supporting the plea in your leader of Nov. 30 for more conceptual thinking in scientific medicine, I am not sure that the barriers between science and philosophy are being broken down quite so readily as your comments suggest. It is a curious phenomenon—perhaps psychologists could supply the reason—that the mathematical physicists, Eddington and Jeans in particular, are always cited by theologians and others as examples of scientists becoming dissatisfied with their own arid materialistic pastures and wandering over the forbidden Descartian barrier into the happy hunting-grounds of metaphysics. Judging from what an amateur like myself can understand of such high matters, the philosophers would probably agree in the use of the word "example" but in a considerably different and not unduly flattering sense. The case for the prosecution for such flagrant trespass is admirably summed up by the late Prof. Susan Stebbing in her fascinating book *Philosophy and the Physicists* and again in her remarks at the symposium of the Aristotelian Society (May 19, 1943).

Counsel for the prosecution called for the summary sentence of immediate expulsion from the metaphysical fold, while the brilliant counsel for the defence, Prof. E. T. Whittaker, made a brisk counter-attack comparing Professor Stebbing's book to a "commentary on some of the more mystical poems of Wordsworth by Mr. Bertrand Russell." The latter eminent philosopher had already conducted an independent campaign against such scientific intruders in his book *The Scientific Outlook*, employing rather the Voltairean rapier than the Swiftian battle-axe.

As far as Bertrand Russell and the school of logical empiricists are concerned, it would appear that a decidedly brisk engagement is in progress between them and many of their colleagues who seem to regard the empiricists as a deadly virus menacing the whole body philosophic; or if one may be allowed to mix metaphors—"one can scarcely avoid the conclusion that they have allowed themselves to be diverted from the path of progress in philosophy, along which they began to march, into a profitless cul-de-sac" (Dingle, H. *Nature, Lond.* Oct. 9, 1943, p. 397).

With Homeric battles between such giants on the earth in these days, it is perhaps scarcely surprising that the humble "medicine man" is somewhat reluctant to enter the lists.

Khartoum. E. S. HORGAN.

TREATMENT OF TUBERCULOSIS

SIR,—Recent correspondence prompts me to grind what, I fear, may be a somewhat blunted axe. I think that perhaps the answer to the problem is to be found in the address from which Dr. Simmonds writes, since I note that, like many other erstwhile sanatoria, his institution is now called a "hospital." Yet Dr. Simmonds writes of the "modern *sanatorium*," and a period of treatment "in a suitable *sanatorium*," and exhorts us to "take a reasonable view of the extent of apprehension and alarm in *sanatorium* patients."

For some years now surgical interference in the treatment of pulmonary tuberculosis has become increasingly fashionable. Is it too late to recall that up to, say, ten years ago sanatorium treatment was recognised as an entity, and that sanatoria existed as such (there are a few left)? There was no feeling of "apprehension and alarm" in these places. Patients could take months of complete physical and mental rest without interruption, and large numbers of them derived great and lasting benefit.

There is a place for both the hospital and the sanatorium, but let us not confuse the two types of institution nor the mental outlook of the patients therein. And let us not forget that the quiet and peaceful surroundings of the true sanatorium have as prominent a place in the treatment of the tuberculous as the noisy and restless environment of the surgical wards of the chest hospital.

F. TEMPLE CLIVE
Preston Hall, Maidstone. Medical Superintendent.

LONDON AS INTERNATIONAL MEDICAL CENTRE

SIR,—You do well to point out that we in this country "rather shabby, rather tired, and rather poor . . . have come to think too meanly of ourselves." Although we may not forget it, we do fail to remind ourselves and to take pride that for two years we stood single-handed against the mightiest array of principalities and powers ever marshalled in battle, not only against our Western civilisation but against the whole Mind and Spirit of Man.

Others do not forget. Throughout the world, and more particularly on the continent of Europe, there are multitudes who remember, and remembering look to us for guidance. Some of these found refuge in this country during the war years; some either from force of circumstance or from choice passed under the totalitarian tyrannies in their own lands. Of those living in the occupied countries, some few never lost their faith in Great Britain; others despaired; but all were amazed and still wonder at the strength, immaterial even more than material, by which this country was enabled to make its stand, and all equally desire knowledge of those British institutions in which it had its source.

No matter how tired or how shabby, it is our duty as a nation to do all in our power to satisfy this craving and to make known and available to others the sources of such strength as did and does lie in us.

British Medicine is the one of our institutions in which we as doctors must be particularly interested; you, Sir, testify to American belief in the great possibilities inherent in present developments in British Medicine; I have ample evidence that throughout Western and Central Europe the medical communities look to Great Britain for guidance as never before.

The British Medical Association with great foresight has recognised this desire on the part of the doctors of continental Europe and has lately allocated the sum of £1000 for the purpose of sending British medical men and women to lecture on the Continent. This is a splendid gesture and I am greatly honoured at having had the privilege of giving in Czechoslovakia the first of these lectures. The British Council, so far as its somewhat niggardly allowance permits, includes medicine within its activities; but there is vastly more to be done.

The disappearance of the great postgraduate medical school of Vienna, and the odium which now attaches to German medicine, has created a vacuum in Europe which can only be filled by the rise of another postgraduate medical centre. It awaits us in this country to fill this want; the opportunity offers for London to take in the world on a far greater and more ample scale the place occupied in succeeding ages by such great schools as Cos, Salerno, Bologna, and Vienna.

"Rather poor" indeed we are; but the prestige which accrues to us through our institutions is now our greatest asset. To fail to exploit it to the full will be poor economy indeed.

The time is ripe for the development of a great postgraduate medical centre in London; this might well evolve from the British Postgraduate Medical School, but never in its present remote site, among its uninspiring surroundings and in its utterly inadequate buildings. The centre would necessarily include a large general hospital, together with all the necessary laboratories and other facilities for research and teaching; its scope would be international, but it might also house the secretariat correlating postgraduate medical teaching throughout all the future university hospital regions.

The activities and the influence of the centre would be felt throughout the whole country; but for the complete fulfilment of its international purpose it is essential that it be housed in the heart of London itself and upon a site vivified by the millennial tradition upon which as a nation we build.

Wolverhampton. S. C. DYKE.

CHILBLAINS

SIR,—The interesting article by Dr. Winner and Mr. Cooper-Willis on chilblains in Servicewomen (Nov. 9) leads me to mention some personal experiences with this distressing disorder.

The first 10 years of my life were spent in Montana, where winters are dry and intensely cold. The second 10 years were spent in Seattle, Washington, where winters are very wet, and mean temperatures are almost the same as in Oxford. I never even saw a chilblain until the winter of 1931–32, when I was residing at Oxford. During that winter and the next three my knuckles and heels were sorely troubled with chilblains.

My wife's history is somewhat different from mine. She grew up in New Zealand, where it is accepted that chilblains are an inevitable and unpleasant feature of life in winter, and she continued to have chilblains on the feet every winter for six years in England. We have now lived 11 years in Boston, Massachusetts, where winters are severe, and neither one of us has had any *trace of chilblains during this time*; nor have our two children, boys aged 4 and 6. Other familial controls are my brother, who has continued to live a chilblainless life in Seattle, and my wife's sister, who has continued to endure English winters plagued with chilblains.

After reading the article by Dr. Winner and Mr. Cooper-Willis I asked twelve young women who work in this laboratory the question: "What is a chilblain?" Eight of them answered, "I've heard the word, but I don't know what it means." After the meaning was explained, one of them said, "So that's what my father has every winter!" He is a sheet-metal worker on construction jobs outdoors. Every winter he suffers cruelly from itchy, painful, secondarily infected inflammatory areas around his knuckles, but the trouble always disappears in the spring. To my mind, the above experiences support the idea that chilblains are properly classified as disorders related to environmental stress and not to familial or degenerative factors.

ROBERT E. JOHNSON
Director.
War Department, Medical Nutrition
Laboratory, Chicago, 9.

SIR,—Dr. Dowling (Jan. 4) deprecates the use of large doses of vitamin D in the treatment of "such trivial complaints as chilblains." I am sure he would not use the same adjective to describe the annoyance and irritation of this malady or the inroads it makes on the time of a busy practitioner.

Following the work on chilblains by Tecoz, Lavril, Pelicier, and others, who successfully used calciferol

15 mg. (600,000 I.U.) administered in one single dose, I have myself tried, during the last two cold spells, 600,000 I.U. of vitamin D_2 ('Sterogyl 15') in 14 cases of chilblains (7 adults and 7 children). The children were given the preparation orally, the adults hypodermically. In 10 cases improvement was marked on the third day. They each received a second dose one week later. By the tenth day the position was:

cured	8 (5 adults, 3 children)
improved	3 (1 adult, 2 children)
no benefit	3 (1 adult, 2 children)

None of these patients has shown any reaction or intolerance.

In view of this I must, for the time being at any rate and with all respect, disagree with Dr. Dowling and continue to use vitamin D_2 as a potent curative agent in chilblains.

London, W.1. J. J. PHELAN.

IMPENDING DEATH UNDER ANÆSTHESIA

SIR,—Even twenty-five years ago, when Mr. Reddington was commencing the practice of surgery, it was well known that cardiac arrest occurred just as often during minor procedures, such as reduction of a dislocated shoulder, extraction of a tooth, and dilatation and curettage, as during capital operations. I was therefore amazed that he should confuse cardiac arrest and shock.

As I pointed out in my article of Jan. 4, the expectation of death under an anæsthetic is 1 per 1000 under the favourable conditions of a teaching hospital. It is therefore only a matter of time and every surgical practitioner must come face to face with this ordeal. Even yet, Mr. Reddington's anæsthetist may report to him that the patient's heart has ceased to beat. If I understand Mr. Reddington correctly, this will be an occasion for him to give up his anæsthetist; or is it surgery that must sustain the loss?

In the meantime, I feel sure that Mr. Reddington's fears are unfounded, and that there is not a qualified surgeon in any part of the world who, after reading my paper, would become so excited as to open the thorax instead of the abdomen, and to massage a heart that was still beating.

London, W.1. HAMILTON BAILEY.

SIR,—I would question Mr. Hamilton Bailey's statement (Jan. 4) that "manifestly, artificial respiration is futile if the heart is not beating." I have several times demonstrated to my own satisfaction that artificial respiration can maintain some carotid circulation and oxygenation in the corpse.

When the pupil has dilated immediately after death it can, in a reasonably intact body, be made to contract to a medium size by a short spell of artificial respiration; and when this is stopped it dilates again. The procedure can be repeated.

I conceive that, this being so, oxygenation sufficient to prolong cerebral viability might be expected by persisting with artificial respiration while more active measures are being instituted.

Shirley, Warwickshire. W. BRIAN GOUGH.

PREVENTION OF PULMONARY TUBERCULOSIS

SIR,—Dr. J. F. Brailsford (Dec. 28) quotes this remark by Dr. George Day (Nov. 16) about patients with tuberculosis: "In all three the disease was diagnosed early and brought early to treatment without avail." Dr. Brailsford proceeds: "We know that healthy girls can enter sanatoria as nurses, contract the disease, and die of it in the institutions meant to cure, in spite of treatment from the earliest recognisable sign."

In my opinion, physicians and nurses who are to have charge of tuberculosis cases should, by breathing and physical exercises, fully develop their chests and lung capacity, for it seems to me that lungs which are thoroughly aerated must have a better chance of resisting the disease.

Man has lost the art of whole-lung breathing. Lower-costal or flank breathing is hardly ever seen. Time and again one sees upper-costal breathing or the pernicious belly-breathing, both of which leave the lungs underdeveloped.

Every nurse likely to be in contact with phthisis should have at least 6 weeks' treatment to develop her lung capacity and general physique. The massage departments of nearly all the London teaching hospitals are, I believe, familiar with all details of my exercises. I have several reprints of an article in the *British Journal of Tuberculosis* (October, 1934) explaining these exercises, and I will send a copy to anyone who may desire one.

London, W.1. CORTLANDT MACMAHON.

POTATOES AND WATER-BRASH

SIR,—When looking through some old medical pamphlets I recently came across one on water-brash, which appears to have been a disease caused by a kind of food deficiency which is not seen today. The author of the pamphlet, Dr. George Henning, who was physician to the Taunton and Somerset Hospital, was in practice from 1800 to 1831, when, because of the Napoleonic wars, a normal diet was beyond the reach of most people. Many of the poor, unable to buy bread, lived almost entirely on potatoes. These were the people who suffered from water-brash, and among them it was very common.

The pamphlet is entitled *Practical Observations on the painful affection of the stomach called Cardialgia Sputatoria or Water-Brash*, and the following quotation from Varro appears on the front page: "ut non solum quoad vivam, quid fieri oporteat necessarios meos moneam, sed etiam post mortem." The name "cardialgia sputatoria" was suggested by Dr. Henning because it indicates the condition's two essential symptoms—namely, a distressing pain at the pit of the stomach and repeated gushes of watery fluid into the mouth. The disease was commonly attributed to the diet, though Dr. Henning says there was some doubt about this explanation because many individuals escaped the trouble though living on the same miserable food. Henning's recommendations for treatment are of little consequence, but in these post-war days it seems worth while to remark upon his paper which calls attention to a widespread war-time disease caused by a dietary defect, and records the diet itself.

Marlborough. HAROLD BURROWS.

R.M.B.F. CHRISTMAS FUND

SIR,—I would like through your columns to thank all who have generously subscribed to our Christmas gifts fund. It is a very great pleasure to be able to report that over £2200 has been received. On behalf of the committee I warmly thank all the contributors and also the many committees and societies who helped forward the fund by arranging special collections and by sending donations. We are very grateful to all.

C. LUTHER BATTESON
Hon. Treasurer.
Royal Medical Benevolent Fund, 1, Balliol House,
Manor Fields, London, S.W.15.

POSTANAL PILONIDAL SINUS

SIR,—The recent discussion [1] revealed some difference of opinion in regard to the origin of this condition.

A similar condition occurs in the Rhodesian ridgeback—a breed of dog which is uncommon in Britain. The name is derived from a characteristic well-defined ridge of hair running along the back from the mid-thoracic to the mid-lumbar region. The hair in this ridge forms a definite pattern, and each end of the ridge is whorled, the shape of the entire ridge being not unlike that of an attenuated violin.

Unfortunately the breed is subject to cysts; the commonest site is on the ligamentum nuchæ over the posterior cervical or anterior thoracic vertebræ, but many are situated just posterior to the occiput. The lesion takes the form of single or multiple tubes extending from the epidermis to the deep connective tissue; some are attached to the thoracic spines while others end blindly in the muscles or ligamentum nuchæ. They may lie dormant for months, but often they form fulminating abscesses. While dormant, no pain is felt; but in the active state considerable pain is evinced. Usually hair and inspissated pus is encountered on probing the cysts. Spontaneous recoveries are rare; a chronic suppurating sinus is formed, with hair deeply embedded in the epithelial lining at the base.

Radical operation is the only treatment. Each of the sinuses must be followed to its origin and dissected out.

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1. *Lancet*, 1946, ii, 484, 582, 617.

If fully excised, resolution and healing is uneventful; but incomplete removal of the cyst invariably means a recurrence. Histologically the cysts are akin to the dermoid cysts and teratomata met with in other animals, and we regard those as congenital. Moreover, in view of their frequence we regard them also as hereditary.

Johannesburg. CAMPBELL DICKSON.

Obituary

HERBERT JOHN GREEN

M.B. ABERD., F.R.C.S.E., M.R.C.O.G.

Mr. H. J. Green, who died at the Queen Mary Hospital, Roehampton, on Dec. 27, was born in 1906 at Boyndie, in Banffshire, where his father was a farmer. From Banff Academy he went to the University of Aberdeen, where he graduated M.B. in 1930. After holding house-appointments at the Aberdeen Royal Infirmary and the Royal National Orthopædic Hospital, London, he settled in 1932 in practice in Banff and was appointed to the staff of the Chalmers Hospital. Here he carried out much surgical work of high quality, and in 1937 obtained the Edinburgh fellowship. His interest focused on obstetrics and gynæcology, and he gave up his practice on his appointment as house-surgeon at the Jessop Hospital for Women, Sheffield, in 1938. The following year he was appointed registrar to the hospital and tutor in the department of obstetrics and gynæcology of Sheffield University, and in 1940 he took the M.R.C.O.G. Two months after his appointment as registrar, Green was called on service as medical officer to the Banffshire R.A. Territorial unit, and he served throughout the war, for the greater part of his service holding appointments in India and Ceylon, where he was surgical specialist. He attained the rank of lieut.-colonel.

"Just over a year ago," writes J. C., "Mr. Green was demobilised and took up again his appointment in Sheffield, where his interest in obstetrical and gynæcological work continued unabated. He was a careful and conscientious surgeon, and it seemed likely that he would worthily uphold the reputation of the Jessop Hospital in the future. But this was not to be. Tall and of a genial disposition, he had many friends both in Banff and Sheffield, and he was held in high esteem by the board and staff of the Jessop Hospital, and by the students, who profited much by his teaching."

Mr. Green leaves his wife with two sons.

Births, Marriages, and Deaths

BIRTHS

Bromage.—On Jan. 16, in London, the wife of Dr. P. R. Bromage—a son.

Chalmers.—On Jan. 11, at Inverness, Dr. Mary Chalmers (née Evans), the wife of Dr. K. M. Chalmers—a son.

Davies.—On Jan. 14, the wife of Dr. A. L. Davies—a son.

Farquhar.—On Jan. 9, at Birmingham, the wife of Dr. John Farquhar—a son.

Harrison.—On Jan. 17, at Oxford, the wife of Major T. B. Harrison, R.A.M.C.—a son.

Kilgour.—On Jan. 8, the wife of Dr. D. R. Kilgour—a son.

MacKichan.—On Jan. 4, at Kampala, Uganda, the wife of Dr. Ian MacKichan—a son.

Rose.—On Jan. 14, at Birmingham, the wife of Mr. G. K. Rose, F.R.C.S.—a son.

Sharrard.—On Jan. 8, at Sheffield, Dr. Ethel Sharrard (née Spedding), the wife of Dr. J. W. Sharrard—a daughter.

Sterndale.—On Jan. 16, at Portadown, the wife of Dr. Harold Sterndale—a daughter.

Stewart.—On Jan. 14, at Henfield, Sussex, to Dr. Elizabeth Stewart (née Geach), wife of the Rev. David Stewart, R.N.—a son.

MARRIAGES

Begg—Heath-Stubbs.—On Jan. 11, at Lymington, Hants, Francis John Henderson Begg, M.B., to Edith Heath-Stubbs.

Calder—Brydone.—On Jan. 11, in London, William Norman Calder, M.B., of Johnshaven, Montrose, to Barbara Brydone.

Halle—Saunders.—On Jan. 11, at Cambridge, Helmut Max Halle, M.R.C.S., to Frances Mary Saunders.

McCarthy—Knox.—On Jan. 9, at Amritsar, Denis Arthur MacKaura McCarthy, M.B.E., Indian Police, to Eileen Muriel Dallas Knox, M.B.

DEATHS

Collyer.—On Jan. 12, at Croydon, Brice Collyer, M.D. Lond.

Hewitt.—On Jan. 11, at Strete Ralegh, Exeter, Alfred James Hewitt, C.B., C.B.E., L.R.C.P.E., surgeon rear-admiral R.N.

Lawson.—On Jan. 19, Sir Arnold Lawson, K.B.E., F.R.C.S., aged 79.

Rose.—On Jan. 12, at Edinburgh, Alexander Rose, M.D. Aberd.

Smith.—On Jan. 14, George Melville Smith, M.R.C.S., of Broxbourne, Herts.

Notes and News

AN ACCIDENT SERVICE

THE committee of the Manchester, Salford, and Stretford Joint Hospitals' Advisory Board, set up to consider what arrangements should be made for the treatment of accidents in their area, have accepted the British Orthopædic Association's recommendation that patients suffering from soft-tissue injuries should be treated by the same teams of specialists as those suffering from fractures. The committee therefore propose that accident centres with inpatient and outpatient facilities should be set up. Whether this arrangement would actually demand more staff is uncertain, for it would usually only mean that patients would be transferred from one department to another in the same hospital.

In Birmingham one hospital has been set aside for the treatment of accidents, but in Manchester it is unlikely that, for many years, any hospital could be spared for this single purpose. The committee therefore recommended that centres should be provided at the large general hospitals which already have fracture departments. To each a plastic surgeon should be attached, and there should also be facilities for reablement and occupational therapy. They suggest that central Manchester could best be served by a unit at the Royal Infirmary, and south Manchester by a unit at Withington Hospital. In north Manchester they feel that Ancoats Hospital and Crumpsall Hospital should combine to provide a joint centre, and they suggest a similar arrangement for Salford between the Royal Hospital and the Hope Hospital.

Burns should be treated, the committee believe, in special wards so constructed that infection from outside is excluded. The number of cases would be unlikely to warrant setting up such units at each accident centre, and one each for Manchester and Salford should suffice. They suggest that the hospital which should provide the burns service for Salford should be left for agreement between the Salford corporation and the Royal Hospital. In Manchester it is likely that Withington Hospital will be the home of the main plastic centre for the area, and the committee feel that the spare wards for the treatment of burns should naturally gravitate there also.

Once these specialised centres are set up, the other hospitals and ambulance services in the area should give only first-aid or first-stage treatment before sending the patients to the appropriate centre.

A PENICILLIN FILM

STARTING with a description of the physical, chemical, and pharmacological properties of the drug, the Ministry of Health film, *Penicillin in Medical Practice*, tells of methods of testing pathogen sensitivity, and the organisms and diseases against which penicillin is effective. The various vehicles used and the techniques for their administration are described, and the remainder of the film demonstrates a series of examples of its use in medical and surgical conditions, in the treatment of venereal diseases, and in ophthalmology. The film was intended to be generally available nine months ago, but difficulties with the colour process and other reasons have caused delay. Taken as a whole it is not up to the usual standard of the Realist Film Unit productions—it contains too little of broad principles and too many detailed examples, the captions are difficult to read, and the image on the screen is unsteady. Yet the practitioner, if he avoids assuming that by using penicillin he can now safely treat conditions which formerly he sent to a specialist, will obtain some useful information from the mass of detail.

Directed by Jane Massey for the Ministry of Health. Distributed by the Central Film Library in 16 mm. only, sound, colour, 35 minutes.

ELLA SACHS PLOTZ FOUNDATION

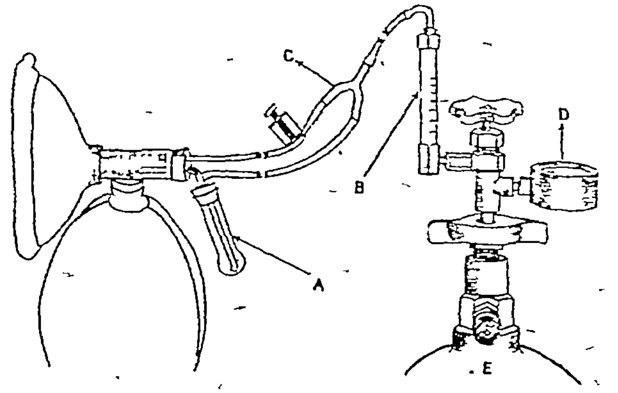
DURING the 23rd year of this foundation for the advancement of scientific investigation, 40 applications for grants were received, of which 20 came from the United States, and the remainder from seven different countries in Europe, Asia, and North and South America. Altogether 20 grants were made during the year. Grants are made to researches in medicine and surgery. They may be used for the purchase of apparatus and supplies for special investigations, and for the payment of unusual expenses incident to such investigations, including technical assistance, but not for providing apparatus or materials which are ordinarily a part of laboratory equipment. Stipends for the support of investigators are granted only nder exceptional circumstances. The maximum grant will sually be less than $500, and applications for the year 947–48 should be sent before April 15 to Dr. Joseph C. Aub, assachusetts General Hospital, Fruit Street, Boston, 14, ass., U.S.A.

INTERNATIONAL CENTRE OF RELIEF

THE relationship of the League of Red Cross Societies representing all national red-cross and red-crescent rganisations) to the International Red Cross Committee (a Swiss body), which was one of the main subjects of discussion at the international conference at Oxford in July,[1] has now been decided. The League of Red Cross Societies will in future be responsible for the transmission of donations; and the International Red Cross Committee will continue, as hitherto, to give further help to civilian populations when needed, especially where it is necessary for the matter to be dealt with by a neutral body. In a statement signed by both organisations[2] the announcement is made of the creation of an international centre of relief for the purpose of helping people in war-devastated regions by buying for them food, clothing, and drugs. The centre will accept gifts from the national red-cross organisations through the League of Red Cross Societies and directly from bodies not connected with the red cross.

A SIMPLE PENICILLIN INHALER

Dr. L. V. Knutson, of Whittingham Emergency Hospital, Preston, writes: The penicillin inhaler shown in the figure has been in use at this hospital during the last 5 months and was improvised from materials available in the hospital. The results of its use have been satisfactory. The spray used is a Rogers's extra fine crystal spray intended for cocainisation in nasal operations, manufactured by Messrs. F. A. Rogers, 1, Beaumont Street, London. The penicillin is vaporised too quickly when all the oxygen passes through the spray, so most of the oxygen is passed through a tube in parallel, and the flow can be adjusted by means of a screw clip as shown; 25,000 units of penicillin in 1 c.cm. of water is placed in the spray four times a day and is sprayed out in 10–15 minutes. The oxygen is used at the rate of $2^1/_2$ litres per minute, the patient filling the bag by exhaling into it after a deep inspiration. Patients learn to use the apparatus after a brief explanation and find it comfortable.



The inhaler assembled. A, Rogers's crystal spray; B, flow-meter; C, glass Y-tube; D, pressure-gauge; E, oxygen cylinder.

LIVER EXTRACT REGULATIONS

LIVER for therapeutic purposes now being more plentiful, the Liver Extract (Regulation of Use) Order, 1945, has been revoked; both injectable and oral preparations may therefore be freely manufactured and used in treatment.

University of Cambridge

Elmore medical research studentships are shortly to be awarded for work in the university department of medicine. The commencing salary will ordinarily be £400 per annum, and the appointment will be tenable in the first instance for two years. Applications should reach the regius professor of physic by Jan. 31.

University of Glasgow

The following degrees were conferred on Jan. 11:

M.D.—W. T. Walker, Henry Wapshaw, Hubert Wyers (all with commendation); G. A. Macgregor.

M.B., Ch.B.—R. A. Caldwell, Winifred E. Cameron, J. E. Carlyle, Eileen Carroll, A. A. Chazan, Joan R. Christison, J. I. Cohen, Anne L. Craig, K. B. M. Crawford, A. H. Dawes, H. B. Farrell, Alexander Forrester, D. A. Jack, R. R. Kennedy, K. B. Lazarus, J. B. Lister, John McLenachan, M. C. Macleod, R. M. H. McMinn, William McNaught, W. C. MacPherson, A. M. Mathewson, Mary D. Milne, W. A. Mullen, Margaret E. Murison, F. S. Preston, W. H. D. Scotland, Allan Scott, A. L. G. Smith, D. D. Smith, D. H. Sproull, Lesley Stewart, A. A. Thomson, Wilfrid Waldie, Nathan Weiner, Agnes A. M. White.

University of St. Andrews

The following were successful in recent examinations:

M.D.—W. G. Davidson (with honours).

M.B., Ch.B.—Margaret J. Davies, Helen M. Dean, A. F. Fairlie, Mary Gibson, W. J. Halpin, Betty I. Lumsden, Helen L. W. Esplin, R. D. Mills, T. W. Roberts, Patricia A. Scott, J. A. Smith, Eileen Steel, J. M. L. Winton, Janet S. Young.

University of London

Mr. J. B. Hunter has been appointed dean of the faculty of medicine for the period 1946–48.

Mr. Geoffrey Bourne, D.SC., has been appointed to the readership in histology, tenable at the London Hospital medical college, as from Jan. 1.

Society for Relief of Widows and Orphans of Medical Men

At a meeting of the directors on Jan. 8, with Dr. R. A. Young, the president, in the chair, £1815 was voted for half-yearly grants: widows aged 65 or over received £37 10*s*. and those under 65 received £25. Members now demobilised from H.M. Forces should notify the secretary of their address; membership is suspended while arrears of subscriptions remain unpaid. Membership is open to any registered medical man residing within 20 miles of Charing Cross, and relief is granted only to the necessitous widows or orphans of deceased members. Particulars may be had from the secretary of the society at 11, Chandos Street, London, W.1.

Harveian Society of London

At the annual general meeting on Jan. 15 the following officers were elected for 1947: president, Dr. Macdonald Critchley; vice-presidents, Mr. A. Wallis Kendall, Mr. J. H. Peel, Mr. John Hunter, and Mr. W. Eldon Tucker; hon. treasurer, Sir Cecil Wakeley; hon. secretaries, Dr. Peter Turtle and Mr. Rodney Smith.

British Institute of Philosophy

During Lent term the following lectures will be held at 5.15 P.M. at 14, Gordon Square, London, W.C.1: Jan. 27, Mr. D. G. C. Macnabb, On Being Reasonable; Feb. 27, Sir Edmund Whittaker, F.R.S., Philosophical Problems Relating to Science; March 21, Mr. W. A. Pickard-Cambridge, Morality—its Nature and Source; April 25, Prof. G. C. Field, D.LITT., On Understanding Plato. On Friday, March 14, at the eugenics theatre, University College, Gower Street, W.C.1, at 7.30 P.M., Prof. L. J. Russell, D.PHIL., will speak on Philosophy and Life.

A Pious Tribute

The centenary of W. H. Duncan's appointment as the first M.O.H. of Liverpool was the theme of Sir Allen Daley's recent presidential address to the Society of M.O.H.'s (*Lancet*, 1946, ii, 611). Later this year, to mark the centenary, Messrs. Hamish Hamilton will publish a monograph on Duncan's life and work by Prof. W. M. Frazer, the present M.O.H. of Liverpool.

Overseas Scholarships for British Graduates

Each year scholarships are awarded by the British Council to a number of overseas students, usually graduates. Since the end of the war scholarships have been offered in return to British graduates by Czechoslovakia, Sweden, the Netherlands, and Finland; and Dr. J. N. Mickerson has lately been awarded a scholarship for the study of diseases of the heart and chest in Sweden. Scholars will in future be selected during the Spring term.

Glasgow's Refuse

Uncollected refuse has been piling up in Glasgow owing to a strike of cleansing-department men which began nearly four weeks ago. The deputy medical officer of health is reported as saying last week that there is no immediate danger to public health. Most people, he said, were burning as much as they could.

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[1] See *Lancet*, 1946, ii, 172.

[2] *Rev. int. Cr.-Rouge*, 1916, 28, 877.

Obstetrical Examinations in Australia

For the first time examinations for the M.R.C.O.G. are to be conducted in Australia. Sir William Fletcher Shaw will represent the college at examinations at Melbourne on Feb. 18 and 19, and at Sydney on Feb. 25–27.

Demonstrations of Contraceptive Technique

On Thursday, Feb. 6, at 2.30 P.M., a practical demonstration of the technique of the use of a variety of contraceptive methods will be given at the C.B.C. Clinic by Mrs. Marie Stopes, D.SC. Medical practitioners should apply for tickets to the secretary, C.B.C., 108, Whitfield Street, London, W.1.

Wireless Calls for Medical Advice

Ships' surgeons are advised by the Ministry of Transport (notice no. M296) to consult the Merchant Shipping Medical Scales before prescribing treatment in response to a wireless call from a British ship with no surgeon on board. Surgeons can thus see what drugs, &c., are likely to be available.

Commonwealth and Empire Tuberculosis Conference

A health and tuberculosis conference, arranged by the National Association for the Prevention of Tuberculosis, will be held in London from July 8 to 10. There will be special *reference to the problem as it affects the British Commonwealth*, and representatives from all the Dominions and Colonies have been invited; but all aspects of tuberculosis will be dealt with, and it is hoped that many visitors from other countries will attend. On the first day Mr. Aneurin Bevan, Minister of Health, will speak on Tuberculosis and the National Health Service Act. Fuller particulars of the conference, which is open to doctors and laymen from this country and from overseas, may be had from the secretary-general, N.A.P.T., Tavistock House North, Tavistock Square, London, W.C.1.

Foreign Awards

The King has granted permission for the wearing of the following American and Belgian decorations conferred in *recognition of distinguished services in the cause of the* Allies:

LEGION OF MERIT

Commanders

Major-General Sir ALEXANDER BIGGAM, K.B.E., C.B., M.D. Edin., F.R.C.P., K.H.P., late R.A.M.C.
Major-General D. C. MONRO, C.B.E., C.B., M.B. Edin., F.R.C.S., K.H.S., late R.A.M.C.

Officer

Brigadier E. R. BOLAND, C.B.E., F.R.C.P., R.A.M.C.

BRONZE STAR MEDAL

Brigadier Sir STEWART DUKE-ELDER, K.C.V.O., M.D. St. And., F.R.C.S., R.A.M.C.
Major P. M. TURQUET, M.R.C.S., R.A.M.C.

CHEVALIER OF THE ORDER OF LEOPOLD II WITH PALM, AND CROIX DE GUERRE 1940 WITH PALM

Captain A. R. TURNBULL, R.C.A.M.C.
Lieutenant A. N. WRIGHT, R.C.A.M.C.

Standards for Equipment

At a conference of hospital organisations held by the British Standards Institution on Jan. 14 in response to a suggestion from the British Hospitals Association, it was agreed to set up a hospital equipment committee with the following terms of reference:

> To investigate the need and to make recommendations for the preparation of British Standards for articles of hospital equipment in common usage especially those requiring continual replacement and for such further equipment as may from time to time be considered desirable.
>
> To make recommendations for any necessary action to develop the use of British Standards prepared on its recommendations.

The following organisations have been invited to nominate representatives:

British Medical Association; Royal College of Physicians of London; Royal College of Surgeons of England; Royal College of Obstetricians and Gynæcologists; Society of Medical Officers of Health; Association of County Medical Officers of Health; Mental Hospitals Association; Medical Officer of Health, L.C.C.; British Hospitals Association; Society of Medical Superintendents; Royal College of Nursing; College of Midwives; Association of Hospital Matrons; Association of Municipal Corporations; Ministry of Health; War Office; Air Ministry; Admiralty; Ministry of Supply; Department of Health for Scotland; County Councils' Association; Trades Union Congress; Institute of Hospital Administrators; Purchasing Officers Association; Central Council for the Care of Cripples; The Order of St. John; and British Red Cross Society.

The reduced prices for 'Penicillin Glaxo' announced in our advertisement columns on Jan. 11 (p. 9) came into effect on Jan. 1, and not from Feb. 1 as stated.

Diary of the Week

JAN. 26 TO FEB. 1

Monday, 27th

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5.30 P.M. *Odontology.* Prof. T. Pomfret Kilner: Restorati Facial Contour—Graft or Prosthesis? Mr. Warren Ha Sterilisation of Dental Handpieces.

Tuesday, 28th

ROYAL SOCIETY OF MEDICINE
8 P.M. *Medicine* and *Physical Medicine.* Dr. W. S. C. Cope Dr. Philip Ellman, Dr. G. D. Kersley: Ætiology of Ch Rheumatism.
EDINBURGH POSTGRADUATE BOARD FOR MEDICINE
5 P.M. (Royal Infirmary.) Dr. Douglas Guthrie: Is Med Still an Art?

Wednesday, 29th

BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck Street, W.1
5 P.M. Prof. W. V. Mayneord, D.SC.: Applications of At Physics in Medicine. (Fifth of six lectures.)
SOCIETY OF CHEMICAL INDUSTRY
6.30 P.M. (Burlington House, Piccadilly, W.1.) Prof. E. Cap M.SC.: The Nation's Milk-supply and its Best Use.
ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLAS 242, St. Vincent Street
4 P.M. Mr. P. H. Mitchiner: Surgery in Two Wars.
ST. MUNGO'S COLLEGE MEDICO-CHIRURGICAL SOCIETY, Glasgo
7.30 P.M. (Royal Infirmary.) Mr. P. H. Mitchiner: Su Experiences in the Middle East.

Thursday, 30th

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fi W.C.2
5 P.M. Mr. John Howkins: Movement of the Diaphragm Operation. (Hunterian lecture.)
SOCIALIST MEDICAL ASSOCIATION
7.30 P.M. (296, Vauxhall Bridge Road, S.W.1.) Dr. H. Jo Occupational Hazards of the Health Worker.
EDINBURGH POSTGRADUATE LECTURES
4.30 P.M. (Royal Infirmary.) Dr. Ninian Bruce: Limita of Personality.

Friday, 31st

INTERNATIONAL LEAGUE AGAINST EPILEPSY
10 A.M. (National Hospital, Queen Square, W.C.1.) Pa will be read.
LONDON CHEST HOSPITAL, Victoria Park, E.2
5 P.M. Dr. J. Smart: Congenital Abnormalities of the Lun
LEEDS AND WEST RIDING MEDICO-CHIRURGICAL SOCIETY
7.30 P.M. Pathological meeting.

Appointments

ALSTEAD, STANLEY, M.D. Lpool, F.R.C.P.: joint medical consul for the Highlands, Inverness.
BUCKWOLD, A. E., M.D., L.M.C.C., D.C.H.: deputy medical su intendent and resident M.O., Booth Hall Hospital, Manche
DAVIES, I. J., M.D. Wales, D.P.M.: deputy medical superinten Mapperley Hospital, Nottingham.
FISHER, HENRY, M.D. Berlin, L.R.C.P.E., D.P.M.: psychi specialist, Mapperley Hospital, Nottingham.
FOURMAN, PAUL, M.D. Lond., M.R.C.P.: graduate asst. to Nu professor of clinical medicine, the University, Oxford, at Radcliffe Infirmary.
GILCHRIST, K. J., M.B. Lond., F.R.C.S.: surgeon specialist, Col War Memorial Hospital, Suva, Fiji. (Colonial Service.)
HOLMES, J. MACD., M.D. Leeds, M.R.C.P.: consulting physi Crewe and District Memorial Hospital.
MCEVOY, N. R., L.R.C.P., D.C.H.: asst. M.O.H., Dudley.
MARTIN, J. F., M.B. N.U.I., D.P.H.: M.O.H. and school M.O., Du
MILNER, K. O., M.D. Leeds, D.P.M.: superintendent, Ashton Certified Institution, Nottingham.
MUNRO, T. A. H., M.D. Edin., F.R.C.P.E.: director, York C Guy's Hospital.
SCHNEIDER-GREEN, J. E., M.B. Lond.: M.O. i/c venereal dis clinic, Royal East Sussex Hospital, Hastings.

Department of Health for Scotland:

*GRAHAM, H. A., M.D. St. And.: regional M.O.
*HENDERSON, W. K., M.D. Edin., M.R.C.P.E.: regional M.O.

Queen Elizabeth Hospital for Children, Hackney:

COWAN, H. A., F.R.C.S.E., D.L.O.: E.N.T. surgeon.
HAWORTH, ELIZABETH M., M.R.C.S., D.M.R.E.: radiologist.
HODSON, C. J., M.B. Lond., M.R.C.P., D.M.R.E.: radiologist.

British Legion Village:

CLIVE, F. T., M.B. Lond.: principal M.O., British Legion Village.
DAWKINS, VERONICA, M.D. Brist.: physician, British Legion Sanatorium, Nayland.
RINKEL, L. R. J., M.R.C.S.: superintendent, British Legion Sanatorium, Nayland.

* Subject to confirmation.

WARNER DIARIES.—A few of these diaries are still available free to doctors if they will apply to William R. Warner & Co Ltd., Power Road, Chiswick, London, W.4.

SUPPLIES OF CURARE.—Referring to the shortage of curare mentioned in our leading article of Jan. 18 (p. 107), Messrs. Burroughs Wellcome & Co. inform us that the shortage existing up to the end of 1946 has now been overcome, and future supplies of *d*-tubocurarine chloride are now assured.

MEDICAL ASPECTS OF MARRIAGE GUIDANCE

EDWARD F. GRIFFITH
M.R.C.S.
CLINICAL ASSISTANT TO THE PSYCHOLOGICAL DEPARTMENT, MIDDLESEX HOSPITAL; CONSULTANT TO THE MARRIAGE GUIDANCE COUNCIL

Now that marriage-guidance councils are being established throughout the country, it is important to assess the contribution that the doctor may make to this branch of preventive medicine.

An analysis of the statistics of the Registrar-General's reports shows that there were about 42,000 applications for divorce or separation in 1944. A further rise may be expected in the post-war years; hence the marriage breakdown-rate, which was nearly 15% in 1944, may well reach 20% in the near future, where it is likely to remain until the evil effects of hasty marriage, long separation, overcrowding, and the disorganisation of war are removed. A leading article in the *Times* of March 27, 1946, called attention to the fact that there were 38,000 impending divorces in the Fighting Services alone. The number of divorces begun only reflects a fraction of the cases of known infidelity (Hawthorne 1946). War and the evils of war, however, are not the sole cause of the present unsatisfactory situation. Deeper and more serious causes can be found in the changing social mores, which give an entirely new interpretation to personal behaviour. To many people what is right is decided for them by what they themselves feel to be right after weighing up the pros and cons of their own particular problem.

The reports also show that in 1938–43 the average number of women who bore extramaritally conceived children was for each year almost exactly 80,000 (Mace 1945), which is equivalent to 1 in 3·3 of all first maternities. Though some allowance may still be made for the old custom of proving fertility before marriage, it may safely be presumed that in most of these cases the pregnancy was not intended, and that the couple "were too ignorant or too careless to take proper preventive measures or they did so without success" (Mace 1945). It may be safely estimated that 1 in 10 of all women have sex relationships outside marriage. This rate is higher in the lower age-groups. In 1938 40% of all girls marrying under the age of twenty were already pregnant; 30% of those aged twenty; and 20% of those aged twenty-one (Mace 1945).

In most of these "cover-up" marriages the seeds of emotional conflict are already sown, and ignorance of the basic principles of the sexual function, together with feelings of fear, guilt, or shame engendered in one or both partners, will soon produce a rich crop of disharmonies and encourage the development of such conditions as dyspareunia, frigidity, premature ejaculation, and impotence. These unsatisfactory relationships, occurring as they must in thousands of homes every year, cause much preventable unhappiness, anxiety, and ill health in the parents, and various forms of antisocial and delinquent behaviour in the children, who are likely to build the same unstable family pattern when they grow up and marry. Because of these cumulative effects, therefore, the situation is even more serious than may at first appear.

The increase in venereal disease, premarital relationships, abortion, and illegitimacy, to say nothing of the dysgenic tendencies in breeding, are additional pointers to a state of general moral instability, which is made no better by the paucity of houses, the crowding together of families, and the general economic disturbances of the present age.

Finally, there is evidence from the women's welfare centres and other sources, both here and in America, that it is still rare to find the marriage in which sufficient orgasm is achieved. Of 100 married women attending a birth-control clinic, whose cases were analysed by me in 1933 and discussed at a conference of the National Birth Control Association in July of that year, 41 said that they had no satisfaction, 52 that their feelings were slight, 3 that they were satisfied, and 4, who had received premarital teaching, that they obtained a satisfactory mutual orgasm. A more recent and as yet unpublished analysis of a larger number of cases shows some improvement on these figures, especially among those who have had premarital instruction. Broadly speaking, however, the picture remains much the same. In more than a quarter of the cases reported by Dickinson and Beam (1932), the woman never experienced an orgasm, and an additional 14% experienced it but rarely. Out of 1133 couples investigated by Terman (1938) 1 woman in 3 rarely or never achieved an orgasm. Dickinson (1941) considers that premature ejaculation and inadequate orgasm are the commonest conditions to deal with, a conclusion well borne out by the experience of those working in this field in this country.

Though it may have been possible for people to shut their eyes to these facts in the past and persuade themselves that personal relationships were the concern of the individual alone, that position cannot be maintained today. There is, in fact, a serious breakdown in the pattern of monogamy. Thus, the manner in which each individual behaves must have a profound effect upon society as a whole; it is essential for him or her to equate personal behaviour with social responsibility. But if the individual has a duty to society in the matter of sexual behaviour, so has society a duty to the individual. If we demand a well-thought-out attitude to marriage, we must provide adequate facilities for positive expression.

The work of a marriage-guidance council (M.G.C.) can therefore be considered under two broad headings—remedial and preventive. Remedial work, though predominant at the moment, should become decreasingly important as and when the factors leading to marital disharmony are eliminated by preventive measures. Though a M.G.C. does not provide medical treatment, it does refer patients to suitable marriage consultants, or ensure the provision of clinic facilities for adequate examination and premarital guidance, which should include the necessary laboratory and gynæcological facilities. The active coöperation and support of the local practitioners should always be enlisted.

Remedial Work

The bulk of the work of a newly established M.G.C. is remedial and covers a large field which does not necessarily have any medical content. At the London centre applications for help come from all over the country and from every type of person, and cover every possible social, legal, religious, and medical problem. In the past three years the London M.G.C. has dealt with several hundred cases, apart from an extensive postal correspondence, which often involves several hundred letters a week. Misunderstandings about the nature and purpose of marriage, lack of creative outlets, boredom, and a lack of any real feeling of responsibility and trust, all contribute to the eventual upheaval. Understanding, sympathy, toleration, and, in particular, a sense of duty are noticeably absent from many of these cases. Lack of efficient housing accommodation; a too close relationship with parents, who often insist on interfering in the affairs of a newly married couple; arguments over money occasioned by one or both earning independent incomes and secretiveness about the family income; all are fruitful sources of friction which eventually affect the stability of the relationship and undermine that broad and sympathetic consideration for the needs of the other partner which are so essential to an adequate marriage relationship. Sex disharmony, lack of orgasm, inefficient technique, ignorance, and an inability or unwillingness to have children are additional factors leading to emotional maladjustment. The relationship between many a couple is often so emotionally and spiritually sterile that all one can say about the marriage is that it is merely a licence for cohabitation. The basic requirements for establishing a constructive partnership are conspicuous by their absence.

If sexual maladjustments could be prevented, many marriages could be saved. The lack of knowledge exhibited by many otherwise well-informed people about the elementary principles of sexual hygiene is extraordinary.

The tendency to separate the individual into specialist compartments is most unsatisfactory. It by no means follows that frigidity can be cured by the psychologist, or inadequate orgasm by the gynæcologist; each may need the help of the other. Nor is it of much use to attempt reconciliation unless the other partner is willing to coöperate. Thus, every endeavour should be made to see both partners either together or separately; not until this has been done should a decision be made about treatment. In some cases the couple can be brought together by one person; in others it may be necessary to send husband and wife to different doctors. Man is a whole and should be viewed as a whole, in particular in regard to his sexual troubles, which so often are a mixture of technical ignorance, emotional misunderstanding, irrational fears and inhibitions, minor physical conditions, economic distress, and spiritual disharmonies.

It is probable that the marriage consultant of the future will and should be drawn from the ranks of the general practitioners, whose outlook and training often make them eminently suitable for this type of work. The fact of receiving a medical training by no means necessarily implies that the doctor has clarified his own thinking about sex problems, or that he will approach them with understanding, wisdom, and toleration. It is, however, essential to reach this state of maturity before attempting this type of work. The marriage consultant must have a good knowledge of general medicine; psychology, particularly the sexual psychology of both sexes; gynæcology, including contraception and sterility; and an understanding of the adolescent mind. The cases that will present themselves to him are almost always complicated and often require the wisdom of a Solomon and the patience of a Job. Some, in the light of our present limited knowledge, appear to be insoluble; others solve themselves with exceptional rapidity and a small amount of guidance.

Whereas it cannot be said that a marriage which is sexually adequate will be successful, though it may "favour happiness without guaranteeing it" (Terman 1938), it can be said with some confidence that a marriage which is not sexually adequate will be unsuccessful, however promising its start. The tragedy is that so many marriages which, at their onset, appear to be psychologically and temperamentally suitable, break down through preventable sexual maladjustments. If the fears, worries, anxieties, and taboos which lead up to these unsatisfactory conditions could be removed or avoided, and adequate preparation could be given before marriage, the whole pattern of the marriage relationship could be altered towards a positive and creative fulfilment, and the stability of the family unit strengthened in a generation.

There is urgent need for the establishment of more effective methods of marriage reconciliation. The divorce-court machinery should be amended in some way to make this possible, and there should be far greater cooperation between doctors and lawyers. Matrimonial courts should be extended, and the assistance of marriage consultants should be made available in the courts.

This is not the place to discuss in detail the various medical conditions (Griffith 1945) that are met in the investigation of marriage disharmony. A more fruitful line of approach is to consider what may be done to prevent the conditions from ever arising, and to minimise their seriousness when they do arise.

Preventive Work

The essence of marriage-guidance work lies in prevention, which consists of preparation for marriage, premarital consultation, and sex education.

PREPARATION FOR MARRIAGE

Until recently most attempts at preparation for marriage on the Continent or in America have been directed towards the provision of a health certificate stating that the individual is free from venereal disease (Sheppe 1941) and the grosser forms of physical disability, such as tuberculosis, mental deficiency or feeble-mindedness, and other hereditary conditions (Kopp 1938) The more positive idea of adequate premarital instruction and clinical assistance, in both the physical and the psychological spheres, is a comparatively new conception and has been forced upon us both by increasing scientific knowledge of the human personality and by the distressing failure of the former policy of laisser-faire. Most of the original work in this field was done abroad, in Germany and Sweden before the war, and in America under the leadership of such doctors and sociologists as Dr. R. L. Dickinson in New York, Paul Popenoe in Los Angeles, Margaret Sanger, and Prof. Ernest Groves.

Any advance that has been made in this country is largely due to the pioneer work of the Eugenics Society and the activities of the Family Planning Association (formerly N.B.C.A.), in whose clinics the picture of sexual disharmony has been slowly unfolding itself during the past twenty years. Many other organisations have considered this problem from one angle or another. All are concerned with remedies rather than with prevention. Slowly but surely it is becoming apparent that the answer to many of their difficulties is only to be found in adequate preparation for marriage and the creation of a stable family background. No matter how good people's intentions may be, marriages will go wrong so long as we do not provide the elementary essentials; when their intentions are not so strong and the background not so stable, the result is disaster.

Certification.—Compulsory examination or certification is not likely to prove acceptable in this country, and it is probable that better results can be obtained by a constructive policy of education. The establishment of efficient and well-staffed marriage-guidance centres at which people could obtain expert help and guidance would probably have a most beneficial effect on the whole population. The London M.G.C., originally started in 1937 and re-established in 1943, was the first organisation in this country to attempt the provision of an adequate premarital service. It is staffed by doctors, lawyers, social workers, and ministers of religion, all expert in their own particular sphere of work and all ready to work together and pool their ideas. Similar centres are springing up all over the country.

Desirable Qualities.—One of the first considerations that must present itself to anyone dealing with the problems of marriage and the family is that of the quality of the stock which is reproducing itself. It is generally recognised now that we are breeding dysgenically; that those whose qualities are such that they should be increasing the population very considerably are not doing so, whereas those less suitably gifted are more prolific. It has been shown by various authorities that the least intelligent families have on the average some three times as many children as the most intelligent, fertility declining evenly from one extreme to the other. The reversal of this adverse trend should be one of our primary objectives (*Eugenics Review* 1945). Those concerning themselves with marriage-guidance work should have a clear idea of the most desirable qualities necessary for eugenic ling. The following five characteristics of excellence recently been suggested (*Eugenics Review* 1945):

Sound physical and mental health and good physique.

) Intelligence.

) Social usefulness; the individual should be a valuable coöperative member of his community, with moral ities which make him a good citizen.

) The individual should be free from genetic taints—i.e., ble to carry or transmit familial diseases and defects.

) It is desirable that he should be a member of a big, ed, and well-adjusted family, and that he should be fond hildren.

these I would add a sixth: that he should possess ense of spiritual awareness which will give him a sense personal integrity. These six qualities should, in a mmunity which provides good prospects for the future lfare of children, create a couple who, by intention d design, produce "a family large enough for replacement and provide for it a happy and healthy home" lacker 1945).

Presuming, therefore, that the above criteria are lfilled, and the couple—possessing, as they should, the me standards and cultural values—have reached agreement on such subjects as religion, education, and the lace of children in the family unit, the way is open for ffective premarital consultation.

PREMARITAL CONSULTATION

Before making any investigation or physical examination of the couple, it is necessary to reassure them and relieve any anxiety or nervousness which may be apparent. In no circumstances should matters be rushed, or the couple made to feel that the consultation is an ordeal. They should be encouraged to express their own views and desires regarding their marriage, so that an assessment can be made of their basic needs and psychological insight. Thus it may be wise to delay the physical examination until other matters which may be worrying them have been dealt with. Every case must be considered on its merits, and no hard and fast orders of procedure can be laid down.

Some couples come together, some separately. Some come six months before the wedding date, others the day before. Some want advice about a particular aspect of marriage, such as the genetic one or the state of their physical health, before deciding to become engaged. Some are timid, embarrassed, and woefully ignorant; others have the whole matter taped, even to deciding the best day on which conception should take place. Unless special circumstances exist, it is best for both partners to see the same doctor, both separately and together, in two or more sessions of about half an hour each. The most suitable time for the first visit is probably about a couple of months before the wedding, as this will allow plenty of time for the correction of any minor conditions.

Eugenic Background.—A full family history is essential if any attempt is to be made to assess genetic qualities. People are often seriously disturbed by the possibility of passing on inheritable diseases to their children, and often possess very inaccurate information about what is or is not transmissible. Others have not considered the possibility that there are dysgenic qualities in their family constitution which might debar them from having children; others occasionally under-estimate or ignore serious situations and even refrain from mentioning them to their future partner. The Eugenics Society has prepared a health schedule and a document on how to prepare a family pedigree, which will be found helpful in difficult cases.

Prediction Tests.—Many attempts have been made in America to devise machinery for the assessment of those qualities which make for stability in family life. According to Himes (1941), recent researches by sociologists, such as Burgess, Cottrell, and Terman, prove conclusively that success in marriage can be predicted within a modest range of error, and various prediction tests have been devised to enable people to choose a satisfactory mate. These elaborate methods have not yet been tested in this country.

Though it may be difficult to assess those factors which make for happiness in marriage, it is perhaps easier to recognise those which contribute to unhappiness (Terman 1938). According to Baber (1939) it is not merely the presence of this or that trait, commonly supposed to be undesirable, that makes a marriage unhappy: rather does it depend upon whether this trait, possessed by one, happens to clash with the attitudes or actions of the other. "Personality patterns fail or succeed in marriage not because they are different or similar, but because they interfere or do not interfere with each other's basic wishes. Marital conflict is not a difference in traits, but a collision of wishes" (Folsom 1934).

Though my own experience leads me to agree with this statement, I am inclined to think that it is not so much the collision of wishes which causes the trouble as the desire to change the partner and fit him or her into a preconceived pattern of what that partner should be. The one is always striving, consciously or unconsciously, to dominate the other and prevent freedom of growth and expression which are the essence of comradeship and love.

Terman (1938) lists the following eight points as being most productive of marital happiness:

(1) Superior happiness of parents.
(2) Childhood happiness.
(3) Lack of conflict with parents.
(4) Home discipline that was firm, not harsh.
(5) Strong attachment to parents.
(6) Parental frankness about sex matters.
(7) Infrequency and mildness of childhood punishment.
(8) Premarital attitude towards sex that was free from disgust or aversion.

"The subject who 'passes' on all of these items is a distinctly better-than-average marital risk" (Terman 1938).

Terman considers that the two most important sex factors making for happiness are adequacy of orgasm in the wife and equality in sex drive between husband and wife. Even so, these factors are apparently less important than a happy parental background, childhood happiness, or the amount of conflict between the child and the mother (Terman 1938). In my experience parental fixations and passive domination on the part of one or both parents are a fruitful source of future unhappiness and, very often, of sexual inadequacy. Of all the psychological factors militating against successful marriage emotional instability is probably the most decisive.

Pessimism, obstinacy, oversensitiveness to criticism, a determination to get one's own way and override the feelings of the other, lack of consideration, and dogmatism are unsuitable traits likely to lead to unhappiness. Though self-confidence in the husband makes for adjustment in marriage, self-sufficiency has the opposite effect. Ability to make friends and show an adequate capacity for socialisation is valuable; excessive introversion and self-examination are not. A similarity of cultural levels and religious activities makes for adjustment. Love gradually developing out of companionship, congeniality, and mutual interests is likely to prove more stable than love based on mere personal beauty or sex attraction.

The value of bringing unsatisfactory situations to the surface cannot be over-emphasised. Should the psychological picture prove too unsatisfactory, it may be necessary for the consultant to suggest the postponement of the marriage until the couple have had time to take stock of the situation. Ideally, society should provide adequate educative and recreational facilities for young people to learn about each other more adequately before engagement. Many potential marriage breakdowns can

be prevented or minimised by a frank recognition and discussion of difficulties, by some simple psychotherapy, and, above all, by adequate instruction in sexual procedure, so that full emotional release is likely to be established at an early date. A broken engagement is better than a broken marriage.

In the sexual sphere four factors seem to be generally accepted as being of supreme importance (Burgess 1939):

(1) Adequate sex instruction in childhood from parents, who should show a frank response to the child's questions and curiosity.

(2) The wife should never have desired to be of the opposite sex; nor should the mother have strongly desired a child of one particular sex.

(3) No sex shocks should have been experienced from the age of 10–15 years.

(4) There should have been no excessive petting before marriage.

Inadequate sexual adjustment, combined with an unsatisfactory psychological pattern, will lead to trouble in later years. The investigations made in America therefore provide us with pointers which should enable us to plan our own future work more adequately.

Elimination of Inhibiting Factors.—One or more of the following conditions or ideas, more closely connected with the sexual function and usually ignored or glossed over in the past, are constantly arising as inhibiting factors to a healthy marital adjustment:

(1) A negative approach to sex, often originating in early infancy, and usually due to parental mismanagement which has produced a series of fears, inhibitions, and misunderstandings. *The passive domination already mentioned, and* so often found in so many "good" homes in which sex is never mentioned, is as bad or even worse than the type of family where sex is loosely discussed. The effects, however, *can often be eliminated, and mutual harmony attained, by an* appreciative understanding of the situation.

(2) The presumption that the sex act is a mere copulatory activity, mainly concerned with self-amusement outside marriage and with reproduction inside marriage, is usually *combined with a refusal or inability to realise its social and* spiritual value. This attitude inevitably leads to emotional tension, which encourages a hasty and clumsy approach on the part of the man and premature ejaculation. In women it leads to excessive diffidence, over-sensitiveness, fear, and minor degrees of vaginismus and frigidity.

(3) "Sex is a naughty mystery, both frightening and exciting." Such an attitude has usually produced excessive sexual excitement during engagement without adequate release, self-stimulation (masturbation), and misguided sexual adventures. Having experienced excitement on the one hand, and lack of fulfilment on the other, the individual is always seeking new adventures in the hope of finding positive and satisfying adjustment. This situation often leads to premarital relationships, which usually prove unsatisfactory and, by prematurely awakening the emotional life, encourage other adventures or an acceptance of marriage as an escape from an intolerable situation.

(4) "Sex activity is a fatiguing process leading to the loss of vital energy." This idea, more prevalent in men than in women, is usually the result of foolish teaching about self-stimulation during adolescence. The number of young people frightened by threats of punishment of "sin," even bodily mutilation, by the over-anxious parent is still considerable (Pullias 1937).

(5) Many young people, *particularly men, are firmly* convinced that the practice of self-stimulation has led to permanent injury to their sex organs and mental lassitude. This situation is not improved either by the nonsense still widely disseminated by much "sex literature" or by the admonitions of so-called moralists. The idea that sex is beautiful or refreshing and essentially positive is foreign to the minds of the great majority of the parent population.

(6) "Man is capable of erection at any moment, and *once* this is established it can and should be maintained indefinitely." Its temporary disappearance is viewed with the gravest concern and is a fruitful cause of temporary impotence in the sensitive type of male. Very few people appear to understand that a temporary loss of erection is common, especially at the beginning of marriage, and should occasion no alarm. Fewer still seem to know how t the condition when it does occur.

(7) "A man should be able to perform the sex act times a night." This is a foolish and misinformed which prevails in every section of youthful society.

(8) "Once penetration is effected, the woman should ence orgasm automatically or at least when ejaculation place, even if this takes only a couple of minutes." The do not realise that the achievement of mutual orgasm practice, patience, and consideration in surroundings are emotionally and socially secure. This ignorance is due to the idea that the woman is a passive partner. few people realise that the vagina is a muscular possessing as positive a function as that of the penis.

(9) "Stimulation of the clitoris is an essential prel to coitus." Many men spend a considerable time rouse the woman, who is probably perfectly ready for in a few minutes (Griffith 1946). Many women do not guish between orgasm of the clitoris and vaginal orgasm. one is a precursor to the other and may or may not experienced. Petting, which usually includes stimulation the clitoris, fixes the emotions at an immature level.

(10) "Penetration must not be attempted until there sufficient vaginal lubrication and a considerable degree sexual excitement." No hard and fast rule can be laid about this, because couples vary considerably in their patterns, but the use of a simple lubricant will usually be useful. It by no means follows that natural lu always takes place or is sufficient, especially to begin with

(11) "Provided the woman is willing for penetration take place she has little further contribution to make." Th common misconception is due to a negative parental attitude combined with the idea that sex is merely a process which must be put up with and that passion is " quite nice." The distinction between the mating and reproductive aspects of the sex instinct has never bee understood. Such women often *encourage the development o* impotence in a sensitive man by this *non-coöperative attitude*

(12) "The penis must not be withdrawn *from the va* once penetration has occurred, and little or no *variation i* position is either possible or advisable." The use of a sheath encourages this idea owing to difficulties arising ov its management.

(13) "The whole sex act should be completed in abou five minutes—delay leads to fatigue and *is therefore physically* dangerous."

(14) "The only time to carry out the sex act is at night, in the dark, and in the cold." The æsthetics of sexual intimacy have still to be learnt by 90% of the *population.*

(15) "The man needs sexual activity more than th woman." This I believe to be profoundly untrue.

(16) The idea that man is easily *aroused* and as easily put off by unsuitable surroundings, fear of interruption, criticism or indifference, and various *other* minor factors foreign to many women.

(17) "A woman should pretend she gets an orgasm, whether she does so or not." This is the first step on the downward path to marital disharmony.

(18) "Sex and religion are antagonistic to one another; hence sexual enjoyment is neither 'right' nor 'nice'."

These and many *other* similar attitudes can usually be discovered by a little sympathetic questioning. Their persistence can only lead to unsatisfactory results. No sexual act can reach a mature fulfilment unless there is mutual coöperation and understanding.

The exhibition of passion appears to some people to be almost improper and, though they want it, they are *frightened of it.* The resulting tension causes much unhappiness, and many couples never reach a full orgasm, because they are afraid of releasing emotional energy. They are satisfied with the pleasure of *ejaculation* or the sensation derived from stimulation of the clitoris. Both, however, are expressions of an immature sexuality and cannot be compared with the maturity of a mutual orgasm (Reich 1942, Griffith 1946). To combat these negative ideas it is *necessary to consider some of the* principles necessary for adequate sexual adjustment.

Sexual Adjustment.—(1) Being in love is being in that state of mind in which one is concerned with the needs of the other person. Sexual activity, therefore, when it is

pressed on the copulatory level, is a self-seeking activity and can only lead to dissatisfaction and fatigue. As an expression of all that is highest and best in human nature it is a refreshing and creative activity of both body and soul which has nothing evil about it unless we make it so. Sex activity cannot function satisfactorily unless the couple are in spiritual accord.

(2) The sexual impulse has three complementary and mutually inclusive functions: the transference of sex energy into other creative channels, mating, and reproduction. The first is the channel through which sexual energy can be released in activities of social value and is the basis of vocational celibacy and the safety-valve which should prevent distortion or deviation. The second is one of the chief ways in which the emotional needs of man and woman can be fulfilled and is the more personal and intimate. The third, by creating children, is the fulfilment of the individual's biological and social needs and the way in which he perpetuates himself. All three must find expression both separately and together in the marriage relationship. There are times when sexual activity must be curtailed or forgone. There are times when the achievement of an emotional rhythm and orgasm is essential, and there are times when children must be brought into the world. Each has its own proper uses and provides its own rewards.

(3) Only recently, however, has the distinction between the mating and the reproductive functions been clearly recognised, and only still more recently—by the perfection of contraceptive methods—has it become possible to give effective expression to both in marriage. Now, for the first time in the history of mankind, is woman on an equality with man in this respect and able to regulate her sex life without the constant fear of unwanted pregnancies or abortion.

(4) Both the mating and the reproductive functions must be expressed if the married life of the couple is to be fully integrated. The tendency in the past has been to concentrate on the reproductive and to presume that the mating aspect will function automatically. But this is not so.

(5) The achievement of an adequate orgasm is of prime importance in the development of marriage harmony and should be established before the reproductive function is expressed. Once established, it is something to which the couple can return with confidence after the birth of each child. If the reproductive aspect is expressed first, it may take months before the mating aspect is fully established.

(6) It may take a week or six months to achieve this mutual orgasm. Failure to do so will produce an immature sexual pattern and is a fruitful source of marital disharmony (Reich 1942). Once it has been achieved, the couple should prove their fertility as soon as possible.

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It will be seen, therefore, that the elimination of unnecessary fears and anxieties is one of the most important functions of preparation for marriage. Some couples will not present any such problems; others will be full of them. The time taken over this part of the interview, therefore, will vary considerably. When these fears have been eliminated, however, the physical examination can be undertaken by both doctor and patient with confidence, because a proper understanding will have been reached regarding its nature and purpose.

Physical Health.—The physical examination is best divided into that of general health and that of sexual functioning. A full physical examination should always be carried out, unless there is evidence of its having been done recently elsewhere. In some cases it should include radiography of chest, measurement of blood-pressure, hæmatological investigations, and a serological examination for syphilis.

Sexual compatibility without psychological harmony is of little permanent value in marriage. Indeed it will soon disappear. On the other hand, psychological harmony by no means indicates that sexual compatibility will be achieved. The establishment of an adequate emotional rhythm between the partners is essential. Thus, not only must there be no psychological inhibiting factors and imperfect knowledge, but also there must be no bar to the effective performance of the sex act. Initiation should be painless and without fear. The achievement of mutual orgasm will take time, no matter how understanding, knowledgeable, and well-adjusted the couple may be.

In the man, the previous sex-history and experience, the degree of sexual development, the onset of puberty and night losses, sexual attitude and phantasy life, and the presence of any abnormality should be investigated. If the foreskin is tight, it can be gently eased by the patient or, if this proves unsatisfactory, removed by operation.

In the woman, the previous sex-history and experience, onset and nature of menstruation, and sexual attitude and approach should be investigated. An internal examination must always be made to determine the nature of the hymen and the condition of the sex organs, though an accurate assessment of the latter cannot always be made at this stage.

The hymen varies enormously in shape and consistence; it may be practically non-existent or so tight and rigid that it is impossible to introduce the tip of the index finger without causing pain. It is a mistake to think that coitus must always rupture the hymen; if the hymen is very resilient it may stretch easily without rupture. This is noted by Kerr (1944), who states that "penetration and actual conception can occur as a result of a stretching of the hymen merely." In such cases it is often extremely difficult to determine the degree of penetration or to assess the frequency of coitus. On the other hand, pregnancy can take place even when penetration is impossible, the sperms passing through the smallest orifice. Most hymens will permit the passage of the lubricated index finger to the first or second knuckle with ease; some will accept the whole finger. Most women can be taught to dilate their own hymens. Only in a small percentage (2–3%) will the hymen be found so rigid that it will require stretching or removal under light anæsthesia. In such cases careful dilatation with fingers and dilators is preferable to rapid stretching, which is inadvisable because it may lead to trauma and bleeding, and may produce hymenal tags which can become most troublesome later. Gentle dilatation under light 'Pentothal' anæsthesia, which produces excellent muscular relaxation, is sufficient for most cases, the vaginal orifice accepting two fingers to their full length. This can be done in the consulting-room, the patient returning home later in the day, or the patient can go into a nursing-home for the night. Only very occasionally does the hymen require surgical removal. In such cases, but not all, one finds a general resistance of the musculature, and some indication of immature sex development. Contraceptive technique can be taught after premarital dilatation if this is desirable. Occasionally the couple will decide to carry out the dilatation themselves after marriage, in which case the husband must be instructed in the necessary technique (Griffith 1946).

Technique.—Much has been written on technique, and yet there is still considerable ignorance of the simplest details, and much marital disharmony is caused through an inability to understand its principles. The first essential is to effect a full and painless penetration and to avoid premature ejaculation; the second is the achievement of mutual orgasm and the adequate release of

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It will be seen, therefore, that the elimination of unnecessary fears and anxieties is one of the most important functions of preparation for marriage. Some couples will not present any such problems; others will be full of them. The time taken over this part of the interview, therefore, will vary considerably. When these fears have been eliminated, however, the physical examination can be undertaken by both doctor and patient with confidence, because a proper understanding will have been reached regarding its nature and purpose.

Physical Health.—The physical examination is best divided into that of general health and that of sexual functioning. A full physical examination should always be carried out, unless there is evidence of its having been done recently elsewhere. In some cases it should include radiography of chest, measurement of blood-pressure, hæmatological investigations, and a serological examination for syphilis.

Sexual compatibility without psychological harmony is of little permanent value in marriage. Indeed it will soon disappear. On the other hand, psychological harmony by no means indicates that sexual compatibility will be achieved. The establishment of an adequate emotional rhythm between the partners is essential. Thus, not only must there be no psychological inhibiting factors and imperfect knowledge, but also there must be no bar to the effective performance of the sex act. Initiation should be painless and without fear. The achievement of mutual orgasm will take time, no matter how understanding, knowledgeable, and well-adjusted the couple may be.

In the man, the previous sex-history and experience, the degree of sexual development, the onset of puberty and night losses, sexual attitude and phantasy life, and the presence of any abnormality should be investigated. If the foreskin is tight, it can be gently eased by the patient or, if this proves unsatisfactory, removed by operation.

In the woman, the previous sex-history and experience, onset and nature of menstruation, and sexual attitude and approach should be investigated. An internal examination must always be made to determine the nature of the hymen and the condition of the sex organs, though an accurate assessment of the latter cannot always be made at this stage.

The hymen varies enormously in shape and consistence; it may be practically non-existent or so tight and rigid that it is impossible to introduce the tip of the index finger without causing pain. It is a mistake to think that coitus must always rupture the hymen; if the hymen is very resilient it may stretch easily without rupture. This is noted by Kerr (1944), who states that "penetration and actual conception can occur as a result of a stretching of the hymen merely." In such cases it is often extremely difficult to determine the degree of penetration or to assess the frequency of coitus. On the other hand, pregnancy can take place even when penetration is impossible, the sperms passing through the smallest orifice. Most hymens will permit the passage of the lubricated index finger to the first or second knuckle with ease; some will accept the whole finger. Most women can be taught to dilate their own hymens. Only in a small percentage (2–3%) will the hymen be found so rigid that it will require stretching or removal under light anæsthesia. In such cases careful dilatation with fingers and dilators is preferable to rapid stretching, which is inadvisable because it may lead to trauma and bleeding, and may produce hymenal tags which can become most troublesome later. Gentle dilatation under light 'Pentothal' anæsthesia, which produces excellent muscular relaxation, is sufficient for most cases, the vaginal orifice accepting two fingers to their full length. This can be done in the consulting-room, the patient returning home later in the day, or the patient can go into a nursing-home for the night. Only very occasionally does the hymen require surgical removal. In such cases, but not all, one finds a general resistance of the musculature, and some indication of immature sex development. Contraceptive technique can be taught after premarital dilatation if this is desirable. Occasionally the couple will decide to carry out the dilatation themselves after marriage, in which case the husband must be instructed in the necessary technique (Griffith 1946).

Technique.—Much has been written on technique, and yet there is still considerable ignorance of the simplest details, and much marital disharmony is caused through an inability to understand its principles. The first essential is to effect a full and painless penetration and to avoid premature ejaculation; the second is the achievement of mutual orgasm and the adequate release of

be prevented or minimised by a frank recognition and discussion of difficulties, by some simple psychotherapy, and, above all, by adequate instruction in sexual procedure, so that full emotional release is likely to be established at an early date. A broken engagement is better than a broken marriage.

In the sexual sphere four factors seem to be generally accepted as being of supreme importance (Burgess 1939):

(1) Adequate sex instruction in childhood from parents, who should show a frank response to the child's questions and curiosity.

(2) The wife should never have desired to be of the opposite sex; nor should the mother have strongly desired a child of one particular sex.

(3) No sex shocks should have been experienced from the age of 10–15 years.

(4) There should have been no excessive petting before marriage.

Inadequate sexual adjustment, combined with an unsatisfactory psychological pattern, will lead to trouble in later years. The investigations made in America therefore provide us with pointers which should enable us to plan our own future work more adequately.

Elimination of Inhibiting Factors.—One or more of the following conditions or ideas, more closely connected with the sexual function and usually ignored or glossed over in the past, are constantly arising as inhibiting factors to a healthy marital adjustment:

(1) A negative approach to sex, often originating in early infancy, and usually due to parental mismanagement which has produced a series of fears, inhibitions, and misunderstandings. The passive domination already mentioned, and so often found in so many "good" homes in which sex is never mentioned, is as bad or even worse than the type of family where sex is loosely discussed. The effects, however, can often be eliminated, and mutual harmony attained, by an appreciative understanding of the situation.

(2) The presumption that the sex act is a mere copulatory activity, mainly concerned with self-amusement outside marriage and with reproduction inside marriage, is usually combined with a refusal or inability to realise its social and spiritual value. This attitude inevitably leads to emotional tension, which encourages a hasty and clumsy approach on the part of the man and premature ejaculation. In women it leads to excessive diffidence, over-sensitiveness, fear, and minor degrees of vaginismus and frigidity.

(3) "Sex is a naughty mystery, both frightening and exciting." Such an attitude has usually produced excessive sexual excitement during engagement without adequate release, self-stimulation (masturbation), and misguided sexual adventures. Having experienced excitement on the one hand, and lack of fulfilment on the other, the individual is always seeking new adventures in the hope of finding positive and satisfying adjustment. This situation often leads to premarital relationships, which usually prove unsatisfactory and, by prematurely awakening the emotional life, encourage other adventures or an acceptance of marriage as an escape from an intolerable situation.

(4) "Sex activity is a fatiguing process leading to the loss of vital energy." This idea, more prevalent in men than in women, is usually the result of foolish teaching about self-stimulation during adolescence. The number of young people frightened by threats of punishment of "sin," even bodily mutilation, by the over-anxious parent is still considerable (Pullias 1937).

(5) Many young people, particularly men, are firmly convinced that the practice of self-stimulation has led to permanent injury to their sex organs and mental lassitude. This situation is not improved either by the nonsense still widely disseminated by much "sex literature" or by the admonitions of so-called moralists. The idea that sex is beautiful or refreshing and essentially positive is foreign to the minds of the great majority of the parent population.

(6) "Man is capable of erection at any moment, and once this is established it can and should be maintained indefinitely." Its temporary disappearance is viewed with the gravest concern and is a fruitful cause of temporary impotence in the sensitive type of male. Very few people appear to understand that a temporary loss of erection is common, especially at the beginning of marriage, and should occasion no alarm. Fewer still seem to know how to the condition when it does occur.

(7) "A man should be able to perform the sex act times a night." This is a foolish and misinformed which prevails in every section of youthful society.

(8) "Once penetration is effected, the woman should ence orgasm automatically or at least when ejaculation place, even if this takes only a couple of minutes." The do not realise that the achievement of mutual orgasm practice, patience, and consideration in surroundings are emotionally and socially secure. This ignorance is due to the idea that the woman is a passive partner. few people realise that the vagina is a muscular possessing as positive a function as that of the penis.

(9) "Stimulation of the clitoris is an essential pre to coitus." Many men spend a considerable time rouse the woman, who is probably perfectly ready for in a few minutes (Griffith 1946). Many women do not guish between orgasm of the clitoris and vaginal orgasm. one is a precursor to the other and may or may not experienced. Petting, which usually includes stimulation the clitoris, fixes the emotions at an immature level.

(10) "Penetration must not be attempted until there sufficient vaginal lubrication and a considerable degree *sexual excitement." No hard and fast rule can be laid* about this, because couples vary considerably in their patterns, but the use of a simple lubricant will usually be useful. It by no means follows that natural always takes place or is sufficient, especially to begin

(11) "Provided the woman is willing for penetration take place she has little further contribution to make." Th common misconception is due to a negative parental attitude combined with the idea that sex is merely a reproductive process which must be put up with and that passion is "n quite nice." The distinction between the mating and th reproductive aspects of the sex instinct has never bee understood. Such women often encourage the development impotence in a sensitive man by this non-coöperative attitude

(12) "The penis must not be withdrawn from the once penetration has occurred, and little or no variation position is either possible or advisable." The use of a sheath encourages this idea owing to difficulties arising its management.

(13) "The whole sex act should be completed in about five minutes—delay leads to fatigue and is therefore physically dangerous."

(14) "The only time to carry out the sex act is at night, in the dark, and in the cold." The æsthetics of sexual intimacy have still to be learnt by 90% of the population.

(15) "The man needs sexual activity more than the woman." This I believe to be profoundly untrue.

(16) The idea that man is easily aroused and as easily put off by unsuitable surroundings, fear of interruption, criticism or indifference, and various other minor factors is foreign to many women.

(17) "A woman should pretend she gets an orgasm, whether she does so or not." This is the first step on the downward path to marital disharmony.

(18) "Sex and religion are antagonistic to one another, hence sexual enjoyment is neither 'right' nor 'nice'."

These and many other similar attitudes can usually be discovered by a little sympathetic questioning. Their persistence can only lead to unsatisfactory results. No sexual act can reach a mature fulfilment unless there is mutual coöperation and understanding.

The exhibition of passion appears to some people to be almost improper and, though they want it, they are frightened of it. The resulting tension causes much unhappiness, and many couples never reach a full orgasm, because they are afraid of releasing emotional energy. They are satisfied with the pleasure of ejaculation or the sensation derived from stimulation of the clitoris. Both, however, are expressions of an immature sexuality and cannot be compared with the maturity of a mutual orgasm (Reich 1942, Griffith 1946). To combat those negative ideas it is necessary to consider some of the principles necessary for adequate sexual adjustment.

Sexual Adjustment.—(1) Being in love is being in that state of mind in which one is concerned with the needs of the other person. Sexual activity, therefore, when it is

FENESTRATION OPERATION FOR OTOSCLEROSIS

INTERIM REPORT ON 136 CASES

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THE deaf are becoming increasingly aware that there is now an active form of treatment which offers some of them at least a measure of relief from their affliction. An increasing number of deaf people are seeking advice from medical practitioner and aurist, and it should be realised that 1% of the population show evidence of clinical otosclerosis at some time in their life, and half of all the deaf apparently suffer with otosclerosis.

In the absence of any proved ætiological factor, treatment of this disease is directed towards alleviating the symptom of deafness. Hormones, vitamins, and irradiation have all had their trial with disappointing results. Many years ago it was noticed that the creation of a new opening in the bony labyrinth immediately restored the patient's hearing and often stopped the tinnitus. Presumably the restoration of hearing was due to mobilisation of the perilymph and endolymph, for the deafness of otosclerosis is due to the functionally impeded oval window which has become occluded by the otosclerotic bone proliferation.

It has been established that the only way to relieve this condition is by surgery, and a variety of operations have been devised for this purpose. In 1876 Kessel reported the removal of the ankylosed foot-plate of the stapes; the result was a restoration of hearing, but this was rapidly lost owing to closure by bony growth. Passow in 1897 obtained a similar result by fenestrating the promontory. Bárány in 1910 suggested creating a fistula of the semicircular canal, and in 1914 Jenkins covered such a fistula with a Thiersch graft. Between the world wars Holmgren, of Stockholm, and Sourdille, of Nantes, performed much of the early work on the surgery of this condition, and in 1939 I published the results of 14 cases of clinical otosclerosis treated by fistula operations.

In 1926 Lempert had devised a one-stage fenestration operation and he subsequently tried many ingenious methods of inhibiting bone regeneration to keep the fistula patent. In 1941 he described a new "fenestra nov-ovalis" operation, and in 1945 he published the results of an extensive series of cases in which he had inserted into the new opening, which he now makes in the dome of the vestibule, an autogenous cartilaginous graft or stopple.

Last year Shambaugh (1946), of Chicago, gave an account of 822 fenestrations performed under continuous irrigation, and reported that in 88% of cases of more than two years' duration a hearing improvement of ten decibels or over has been fully maintained. Shambaugh states that two years should elapse before considering the result "permanent"; up to this time bony closure of the window may still occur, though the proportion of closures occurring after the first six months is extremely small. In my own experience the percentage of closures in the first six months is higher in young adults (approximately 10%) than in those over fifty (approximately 5%). This may be due to the same factor that influences bony union of fractures in the young and the elderly.

I have been impressed by the high percentage of permanent results likely to be obtained from the fenestra nov-ovalis operation performed under continuous irrigation. I now employ it in all cases. The published work on the treatment of otosclerosis by measures other than surgical does not record a single case that has been improved to the serviceable level, yet many otologists are still unwilling to advocate the operation.

CLINICAL DIAGNOSIS OF OTOSCLEROSIS

In the early stages the deafness of otosclerosis is essentially a lesion of the sound-conducting mechanism; but later secondary degeneration, or disuse atrophy of the organ of Corti, may further enhance the deafness. Since there are other lesions of the sound-conducting mechanism which give rise to deafness it would be necessary for a biopsy to be performed before an accurate scientific diagnosis of otosclerosis could be made. Histological proof of otosclerosis is, however, present in abundance in cases of deafness bearing a definite clinical form, and on this evidence deafness thought to be otosclerosis should be referred to as "clinical otosclerosis."

Diagnosis is based on an air-conduction deafness having the following characteristics:

1. It is insidious in onset, though its commencement may be associated with an accident, illness, pregnancy, or worry.
2. It is progressive, though the rate of progress varies considerably from a mild deafness increasing slowly over many years to almost total deafness in two or three years (case 1: fulminating otosclerosis).
3. Presumably owing to cessation of activity of the bony lesion there may be apparent periods of arrest of the deafness.
4. A family history of hereditary deafness is usually obtainable (case 2). All deaf members of a family have the same blood-group.
5. It is more common in females than in males.
6. The age of onset of the deafness is usually between 18 and 30, though I have known a case of advanced deafness due to otosclerosis in a boy of 9 years. A child at school may be backward and blamed for inattention when in reality the inattention is due to deafness.
7. Debilitating diseases, severe mental disturbances, and pregnancy often accelerate the progress of the deafness. I have noticed that pregnancy does not always cause a depression of the hearing however.
8. The speech of the early otosclerotic is often soft and modulated, whereas in deafness due to nerve involvement the voice may be loud and strident.
9. The patient usually says that he hears better in a background of noise, such as while travelling in a train or motor-car.
10. Tinnitus—either unilateral or bilateral—in varying degrees is often present.
11. If the degeneration process involves the labyrinth, nausea and disturbance of equilibrium may be complained of.

Clinical examination shows all or most of the following signs:

1. Translucent tympanic membranes which are freely mobile on Seigalisation.
2. A pinkish blush in the posterior half of the drumhead, due to congestion of the mucosa over the promontory of the cochlea—the so-called flamingo shimmer.
3. The meatus is free from wax, or nearly so.
4. Patent eustachian tubes; inflation of the tubes gives no improvement in hearing.
5. A negative Rinné—that is, hearing by bone-conduction is better than by air-conduction.
6. Audiometry, which produces a graph having the character of a lesion of the conductive apparatus, together with tuning-fork and monochord tests with masking are necessary for a proper evaluation of the cochlear nerve function.

It must be realised that otosclerosis can occur in ears which have been subject to previous middle-ear disease, with resulting perforated, thickened, scarred, retracted, and adherent drumheads.

SELECTION OF CASES FOR OPERATION

Not all cases of clinical otosclerosis can be improved by the fenestration operation. In determining suitability for operation, I find it convenient to divide the cases into three groups:

Group I.—Those in which clinical and audiometric examination for both pure tone and speech establish beyond doubt emotional tension; the *third is the* intentional achievement of pregnancy. *In practice* one so often finds *that* penetration is far from satisfactory—*premature* ejaculation persists or develops instead of *diminishing*, and pregnancy takes place unintentionally and without any adequate release of emotional tension. An adequate rhythm of emotional response should be established before pregnancy is attempted. Except in special cases, this cannot be achieved unless a suitable contraceptive technique has been acquired. Anxiety over an unintentional pregnancy encourages premature ejaculation and inhibits the free achievement of orgasm. A newly married couple are primarily concerned with themselves; they want each other both psychologically and physically, and they wish to express their mutual love in coitus. My experience leads me to believe that the establishment of adequate orgasm is an essential prerequisite to pregnancy and an adjusted sex life later. People vary, however, and it would be most unwise to lay down any hard and fast rule.

If a couple, having carefully considered all the pros and cons, are firmly convinced that they do not wish to employ contraceptive methods to start with, their wishes should be respected. After all, it by no means follows that the woman will necessarily become pregnant at once, and she certainly will not achieve an orgasm if she is doing something of which she disapproves. Most couples, however, usually wish to proceed as I have suggested. Should they wish to use the "safe-period" method, they should be taught how to determine it. The main purpose of all premarital advice is to ensure that whatever is done is done *consciously*, willingly, and with forethought.

The technique of penetration is discussed fully by various writers (Van de Velde 1928, Griffith 1946, Wright 1943). It should be explained carefully to the couple. No marriage consultant should undertake this work until he has mastered the various aspects of his subject and is prepared to discuss them fully and dispassionately. Two of the commonest mistakes a couple can make are to prolong the first stage of love-making until the man is tired, and to use a condom at first because they are told by their advisers, both medical and lay, that it is impossible or inadvisable to teach a woman a contraceptive method before marriage. I believe this to be quite inaccurate and have only on the rarest occasions failed to give a woman adequate contraceptive advice before marriage. The use of a condom merely accentuates the worries and anxieties that most men experience on their honeymoon and, apart from encouraging rapid ejaculation, restricts activity in that the fear of the condom being dislodged inhibits temporary withdrawal, re-entry, or change of position. Though it is contrary to the accepted teaching, I am convinced that a condom should only be used in the most exceptional circumstances. Most women find it æsthetically objectionable, and most men are thankful to discontinue its use. I invariably ask a man with impotence or premature ejaculation to give it up and teach the woman an adequate contraceptive method. Coitus interruptus is always contra-indicated.

Some women find it very difficult to accept the mating aspect of the sex instinct. Their previous education and family background have been such that they either regard sexual intercourse as definitely unpleasing and painful or something that they must put up with for the sake of achieving pregnancy; their whole sexual outlook is conditioned by the reproductive factor. There must be a balance between the mating and the reproductive factors, but on no account must the first be omitted; it is in fact the precursor of the second.

Potency and Subfertility.—The investigations that are made at this time will enable the consultant to assess the potency and sexual attitude of the couple. If the man is willing, a seminological examination should made *to determine* the health and number of the spe Such an assessment should be encouraged by profession because the procedure is so simple. *determination* of the degree of development of woman's sex organs is more difficult, but any evidence subfertility should be noted, and *the couple told* to adequate help if pregnancy does not supervene after suitable *time*.

Family Planning.—Children should be intentionally created and adequately spaced. Modern contraceptive methods, if used by the woman and effectively taught by *the doctor, provide* such a high degree of security that *failure* need scarcely be contemplated. Doctors who are not prepared to coöperate fully with their patients in the *matter of contraception* and premarital advice should refer couples to those who are capable of giving the advice. One cannot decide the *type* of contraceptive suitable for any particular *woman simply by looking* at her or sending her to the local chemist or nurse. No soluble is safe when used by itself. No woman should be fitted with a diaphragm *or cervical cap* unless she is taught how to use it and is convinced that she understands its use and application. Neither is the use of a douche *desirable* or necessary. Modern contraception is fully reliable and easy to learn, provided *it* is properly taught. Its use provides for the proper achievement of orgasm and the effective spacing *of children. By no* other means can these *two* purposes be adequately achieved It is, however, but one part of preparation for marriage. Most birth-control clinics now provide a premarital service which is gradually improving.

SEX EDUCATION

The premarital consultation should *be* regarded as the terminal activity of a long preparatory period which should start in the home, continue in the school, and be developed in a series of lectures and discussions on every aspect of marriage and the family in all our universities industrial centres where youth is congregated, and in our youth groups. The educational facilities for this sort of work are much further advanced in Sweden and in the universities of the U.S.A. than in this country. Greater facilities should be provided for young people to meet in suitable surroundings, and the period of courtship and mate selection should be encouraged and respected both by parents and authorities. Finally, it must never be forgotten that the family, once created, must be encouraged to grow and helped over the various hurdles which it will inevitably meet. One of the future functions *of the* marriage-guidance councils must be directed *towards* providing a *follow-up* service for young married people, especially after they have had their first baby Every endeavour must be made to treat the family as a *unit and to* consider the difficulties of one member in *relation* to the whole.

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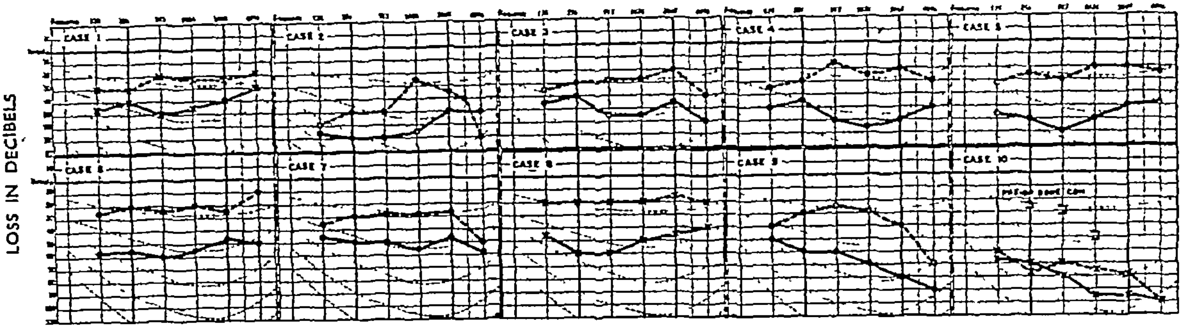

Audiometer charts of illustrative cases

The solid line shows the hearing loss before, and the broken line the loss after, fenestration. Right ear, crosses; left ear, circles.

Case 1: operation Sept. 27, 1945; audiogram Oct. 15, 1946.
Case 2: ,, Nov. 27, 1945; ,, Oct. 10, 1946.
Case 3: ,, Oct. 3, 1945; ,, Oct. 14, 1946.
Case 4: ,, Nov. 7, 1945; ,, Sept. 26, 1946.
Case 5: ,, Nov. 29, 1945; ,, Oct. 7, 1946.
Case 6: operation Dec. 18, 1945; audiogram Oct. 14, 1946.
Case 7: ,, June 6, 1938; ,, Oct. 11, 1946.
Case 8: ,, Dec. 23, 1945; ,, Oct. 14, 1946.
Case 9: ,, Jan. 27, 1945; ,, Oct. 12, 1946.
Case 10: ,, Sept. 8, 1945; ,, Sept. 10, 1946.

ment in hearing was obtained in most cases, but in all except 2 hearing rapidly returned to the preoperative level or below. The improvement in hearing of these 2 cases has now been maintained eight years. The poorness of the results in the early cases was undoubtedly due to imperfect technique.

(*b*) Since August, 1945, I have performed a second series of 100 fenestrations for clinical otosclerosis using in every case the Lempert technique of the fenestra nov-ovalis, with or without insertion of the cartilage stopple.

The results in the second series are summarised in the table. To obtain a fairer evaluation of the results only cases of between six and twelve months' duration are included. It is my practice no longer to operate on cases which are classified in groups II and III.

Selective group	Total no. of operations	Hearing never improved	Hearing improved but improvement was partly lost later	Hearing worse	Hearing improved and fully maintained
I	42	3	6	1	32 (76%)
II	9	5	2	0	2
III	4	4	0	0	None

ILLUSTRATIVE CASES

(*See Audiometer Charts*)

Group I

CASE 1.—Man, aged 41, deaf since the age of 23. Fenestration of right ear Sept. 27, 1945. Twelve months later the patient has no difficulty in hearing ordinary conversation. The tinnitus has subsided completely. Jacobson's nerve and accompanying blood-vessels were severed.

CASE 2.—Man, aged 50. Fenestration of left ear Nov. 27, 1945. This patient now hears ordinary conversation and without strain. Has put on over a stone in weight and developed an entirely new outlook on life.

CASE 3.—Woman, aged 37. Fenestration of left ear Oct. 3, 1945. This patient's hearing did not begin to return for six weeks after the operation, presumably because of traumatic labyrinthitis. Her hearing has now returned to the practical level.

CASE 4.—Man, aged 31. Fenestration of left ear Nov. 7, 1945 Audiogram $10\frac{1}{2}$ months after operation shows that the postoperative hearing is up to the conversational level. This patient was discharged from the Army in 1943 on account of deafness, and has now returned to his former employment as an accountant.

CASE 5.—Woman school-teacher, aged 29. Fenestration of left ear Nov. 29, 1945. The patient has been enabled to return to her occupation and no longer suffers from the nervous exhaustion and headaches at the end of a day's teaching which she experienced before the operation even though she wore a hearing-aid. Tinnitus has completely subsided. Jacobson's and sympathetic nerves denuded from promontory.

CASE 6.—Man, aged 34. Fenestration of right ear Dec. 18, 1945. His postoperative improvement after six months is well above the conversational level and he has no difficulty with ordinary conversation. He has been able to resume his musical interests with complete satisfaction.

CASE 7.—Man, aged 23. Left ear operated on by the Holmgren two-stage technique in June, 1938 Hearing improved to the conversational level and maintained for over eight years, while the hearing of the other ear has progressively worsened.

CASE 8.—Woman, aged 61. Deaf since age of 27 with severe tinnitus. Fenestration of right ear Dec. 23, 1945. Postoperative level ten months after operation is well above the conversational level. No difficulty in hearing experienced. Can now clearly hear the voices of her grandchildren for first time. Tinnitus now a low humming sound and does not bother her. Jacobson's and sympathetic nerves cut.

Group II

CASE 9.—Woman, aged 58. Severe tinnitus in the "head." Began to go deaf at the age of 17 and was considered to be a borderline case. Fenestration of left ear Jan. 27, 1945. Postoperative level shows that the hearing has risen above the conversational level. This case illustrates the result that may be obtained in a very small percentage of cases in this group. Severe tinnitus immediately followed the operation, but has now subsided completely. Jacobson's and sympathetic nerves cut.

Group III

CASE 10.—Man, aged 46. Fulminating clinical otosclerosis. Tinnitus severe. Fenestration of right ear Sept. 8, 1945. Thirteen months after operation the postoperative improvement of hearing is so slight as to be of no practical value However the tinnitus was partially relieved. Jacobson's and sympathetic nerves cut.

SUMMARY AND CONCLUSIONS

An account is given of the clinical diagnosis of otosclerosis with a brief description of the procedure of the fenestra nov-ovalis operation and an interim evaluation of 136 cases with illustrations in each of three selective groups.

Of 55 cases followed for six to twelve months useful improvement in hearing has been fully maintained in 34. Complete assessment is not possible under two years.

The fenestration operation is now an established surgical procedure capable of restoring practical and lasting hearing in carefully selected cases.

This is an operation in which improvements and modifications will produce more and more gratifying *that the reserve of cochlear nerve function is adequate.* In this group I expect 75–85% success.

Group II.—Borderline cases in which the extent of cochlear nerve damage is such that it will be necessary for a maximum improvement to be obtained if serviceable hearing is to result. In this group success can be anticipated in only about 20%.

Group III.—Cases in which the cochlear nerve has apparently so far deteriorated that the chances of success by the fenestration operation is nil. The so-called fulminating clinical otosclerosis falls into this group also.

If the cochlear nerve-endings are not capable of receiving and transmitting the stimuli, it is useless to create a new window. On the other hand, serviceable hearing has been restored in cases which were apparently hopeless. This fact makes the prediction of success or failure before operation still an uncertainty for a small percentage.

Unless the hearing of a patient, deafened by otosclerosis, is restored to the practical level—i.e., to a degree of 30 decibels loss or above, within the conversational range of 512–2048 D.V.—then the operation cannot claim to be successful, for it is of little value to improve the hearing of a patient with an 80% deafness to 60% deafness since they are still deaf for all practical purposes.

Contrary to what one might expect, advanced age does not necessarily deny the patient the operation provided that the cochlear nerve still retains its function. My oldest case is 69; my youngest 14 years. Cases of otosclerosis in which a previous middle-ear infection was present followed by complete resolution may also be operated on successfully.

If the clinical otosclerosis is of long standing and during the later phase paracusis Willisii has entirely disappeared, then in my opinion the case is usually unlikely to benefit from the operation. The ideal case is one in which, irrespective of age or sex, the progress of the disease has been slow and of such a degree that the cochlear nerve still retains an adequate amount of function. This can only be determined by careful and repeated audiometry for tone and speech.

RISKS OF THE OPERATION

The same risks are present in this as in any other major operation. Cases have been reported of postoperative embolism and pneumonia. Happily these are rare. In my present series of 136 cases no serious complication has occurred.

Unless infection supervenes in the labyrinth, then a depreciation in hearing below the preoperative level is not likely to occur, but in approximately 5% of the patients the hearing is not improved at all. The most troublesome aftermath of the operation is a temporary giddiness. The patient is usually ambulatory on the fourth day and leaves the hospital on the twelfth day. No lasting constitutional upset is experienced with this operation.

Usually the worse ear for air-conduction is operated on first provided the cochlear function is satisfactory. If the operation proves successful in the one ear, then it may be performed in the other ear also. However, unless the patient is a musician or school-teacher the second operation is rarely necessary.

The patient must be warned not to expect perfectly normal hearing after the operation, for this is never obtained.

OPERATIVE TECHNIQUE

In this delicate operation, perhaps more than any other, perfection of technique is essential, and this perfection can only be obtained under competent instruction and by much preliminary work on the cadaver. In the hands of the incompetent surgeon the operation is certain to come into disrepute.

It is my practice (after careful preoperative preparation of the meatus with a solution of 'Cetavlon' and 'Phenoxetol') to use the Lempert endaural approach. The mastoid antrum is opened, and sufficient mastoid cells exenterated. Working forwards the outer attic wall is removed to expose the incus and the incudostapedial joint. The incus is removed, together with the head of the malleus. The posterior bony meatal wall is taken down until the annulus forming the notch of Rivinus is removed. The cutaneous lining of part of the postero-supero-anterior meatal wall is then made into a flap which is accurately moulded over the vestibular dome.

Using a Zeiss binocular magnifying lens, the fenestra is now made by means of a series of fine burrs in the dome of the vestibule ampulla of the lateral semicircular canal. This part of the proceeding is performed under continuous irrigation, saline solution being run in at one side of the operation wound and out at the other, thus carrying away all bone fragments, &c. The edges of the fenestra are polished smooth with a gold burr and the endosteum opened. The last stages of fenestration are performed under a dissecting microscope.

Finally the tympanomeatal flap is carefully laid over the fenestra and maintained there by means of a wax and sponge dressing. The operation is performed under 'Pentothal sodium' after heavy premedication. The average duration of the operation is two hours. Asepsis of the cavity is assisted by preoperative and postoperative penicillin. The control of hæmorrhage is of the utmost importance throughout the operation, and to aid in this vitamin K and calcium lactate are administered preoperatively, while during the operation diathermy and fibrin foam are employed if necessary.

The immediate postoperative sequela of giddiness is controlled, as far as possible, by 'Omnopon,' &c. In some cases an immediate improvement in hearing is obtained, even through the dressing. Frequently, however, this hearing subsides about the third or fourth day to return again during the third or fourth week, and from then on until the end of six months further improvement may take place. The first dressing is removed on the seventh day under pentothal sodium and further dressings carried out as required until the cavity is lined with firm epithelium.

The patients are encouraged to get up immediately the acute vertigo subsides—usually the third or fourth day. They become fit to leave the hospital on the tenth to the twelfth day, and thereafter attend for dressings By using the endaural approach a bandage is dispensed with on the seventh day, a dressing in the meatus being all that is required. The operation and dressing are entirely free from pain, and after the first few days free from discomfort also.

Usually the new hearing has a distinctly tinny or metallic timbre. This, however, passes off and a more normal tone supervenes. If the hearing remains improved for six months one seems to be justified in assuming that it will remain permanently, although in a small percentage of cases it is found that the hearing may deteriorate even up to two years. It may then be necessary to perform a revision of the case by lifting the cutaneous flap overlying the cartilage stopple or simple fenestra, according to the technique employed, and re-examining the fenestra with the stopple in situ. If necessary a new stopple may be fitted, with restoration of improvement in hearing, or if no stopple has been used the newly formed bone may be removed and the fenestra re-formed. A fenestra so reconstructed rarely closes a second time.

RESULTS

The 136 fenestration operations were performed in two series with the war between them.

(*a*) During 1936–39 36 cases were operated on by fenestration of the lateral semicircular canal. Various methods were employed to eburnate the edges of the fenestra to prevent osteogenesis. Immediate improve-last fortnight of liver therapy she had urinary incontinence on only two occasions. There was no appreciable improvement in vibratory and position perception.

She was discharged from hospital on the fifty-eighth day, when the red-cell count was 4,370,000 per c.mm. and Hb 15 g. per 100 c.cm. (97%). She was advised to return for an injection of 1 c.cm. of liver extract weekly.

THYMINE

Four patients with addisonian pernicious anæmia have been treated with synthetic thymine (5-methyl uracil). To these patients 5–7·5 g. of thymine was administered twice daily by mouth; this was followed by a satisfactory hæmopoietic response. Though the response was not so great as that which follows parenteral liver-extract therapy or folic-acid therapy, the increased blood values were maintained throughout the 8 months the patients were given a daily dose of 4·5 g. of thymine. In two of these patients, however, neurological manifestations developed and progressed rapidly. After the start of parenteral liver-extract therapy these manifestations promptly disappeared. The following case-record is typical of the response observed in these four patients.

CASE 2.—A white woman, aged 57, was admitted to hospital in February, 1946, complaining of weakness, dizziness, and "anæmia" of 42 months' duration. During this time she had been given intermittent liver-extract therapy by various physicians.

She was well developed and moderately well nourished, and did not appear to be acutely ill. Her skin was pale and slightly icteric; the mucosæ, conjunctivæ, and nail-beds were very pale. Otherwise the physical examination was negative, and neurological examination revealed nothing remarkable.

Repeated gastric analyses showed no free hydrochloric acid even after histamine stimulation. Bone-marrow showed maturation arrest at megaloblastic level. Peripheral blood: red cells 1,750,000 per c.mm.; Hb 6·8 g. per 100 c.cm. (43%); white cells 3000 per c.mm.; reticulocytes 1·6%; colour index 1·2; icteric index 14·0.

She was given 10 g. of synthetic thymine daily. On the sixth day of therapy the reticulocytes reached a peak of 19%. By the sixty-second day of therapy the red-cell count was 3,790,000 per c.mm. and Hb 12·9 g. per 100 c.cm. (84%). She was discharged at this time and given 4·5 g. thymine daily as maintenance therapy. Except for mild paræsthesiæ she felt well until July, 1946, when she developed acute neurological symptons, which progressed rapidly. Within a few weeks she was confined to bed because of severe disturbance of locomotion, muscle weakness, poor coördination, impairment of sensation, constipation, and dysuria. Despite these neurological disturbances, satisfactory blood-levels were maintained during the 7 months she was on thymine.

In September, 1946, thymine was discontinued, and she was readmitted to hospital. Neurological examination revealed essentially normal reflexes; coördination was moderately disturbed; there was no position perception in the toes; vibratory sensations were absent below the mid-lumbar spine and moderately diminished in the hands; and there was moderate hypæsthesia in the lower limbs. Red cells 3,600,000 per c.mm.; Hb 10·7 g. per 100 c.cm. (70%); reticulocytes 2%; white cells 11,900 per c.mm.; icteric index 9·5.

She was given 1 c.cm. of 'Reticulogen' (refined liver extract) intramuscularly on alternate days until four doses had been given. A week without treatment elapsed; then four more doses of reticulogen 1 c.cm. were administered at the same intervals. Improvement was prompt and progressive. The paræsthesiæ subsided, coördination improved, and she was discharged 30 days after admission, able to walk with ease. Evidence of minor but definite mental aberrations, present before and during the early part of therapy, cleared entirely. Signs of moderate impairment of vibratory and position perception in the lower extremities and hypæsthesia of the hands, lower part of the legs, and feet persisted. On her discharge the red-cell count was 4,630,000 per c.mm.; Hb 14·2 g. per 100 c.cm. (92%); reticulocytes 0·8%; white cells 8300 per c.mm.

The following representative case-record shows that thymine does not protect against the neural degeneration which often develops in persons with addisonian pernicious anæmia, and that folic acid does not relieve the acute manifestations of subacute combined degeneration. Parenteral liver extract, on the other hand, was beneficial.

CASE 3.—A white man, aged 56, was admitted to the Hillman Hospital in March, 1946, complaining of extreme weakness. His illness had begun at least 4 years previously, with loss of weight and strength. Six months later he had had to discontinue his work as a preacher. By this time his appetite had become very poor, and he had developed flatulence and soreness of the tongue. He had grown progressively weaker and sought our medical aid in August, 1945.

After thorough laboratory and clinical studies, addisonian pernicious anæmia in relapse was diagnosed, and he was treated successfully with parenteral liver extract. At that time there was no evidence of neural degeneration. On his discharge from hospital he was advised to return for treatment at regular short intervals, but he did not do so because he lives about a hundred miles from the clinic. He felt well until January, 1946, when he was forced to stop work because of weakness and diarrhœa. The diarrhœa ceased after a few days, but he grew progressively weaker until March, 1946, when he asked to be readmitted to hospital.

He was still fairly well nourished but looked chronically ill; his skin, conjunctivæ, and mucosæ were very pale; the scleræ were slightly icteric; and the tongue was large, with hypertrophic papillæ. Otherwise the physical findings were essentially normal. Neurological examination showed no vibratory sensation below the pelvis; the ankle-jerks were absent; the plantar reflexes were occasionally extensor on both sides; and the other reflexes, together with perception of pain and touch and position sensation, were normal.

Repeated gastric analyses showed no free hydrochloric acid even after histamine stimulation. Bone-marrow showed maturation arrest at the megaloblastic level. Red-cell count 1,470,000 per c.mm.; Hb 5·1 g. per 100 c.cm. (33%); white cells 3850 per c.mm.; reticulocytes 1%; hæmatocrit 18%; mean corpuscular volume 122·4 cμ.

He was given 4 g. of synthetic thymine (5-methyl uracil) three times daily by mouth for 23 days. The reticulocytes reached a peak of 31·2% on the seventh day of therapy. His general condition improved greatly, and 24 days after the start of therapy the red-cell count was 3,380,000 per c.mm.; Hb 12·4 g. per 100 c.cm. (80%). He was discharged at this time, and a maintenance dose of 4·5 g. of thymine daily was prescribed.

When he was seen in the nutrition clinic two months after his discharge, he said he felt well generally but had some numbness and weakness of his feet and legs. The red-cell count was now 3,220,000 per c.mm.; Hb 13·4 g. per 100 c.cm. (86%); white cells 3900 per c.mm.; reticulocytes 2·8%. We tried to get him to stay in this hospital for therapy, but he felt he could not. During the next week the weakness and numbness of his legs and feet increased until he was unable to walk unassisted, and by this time the numbness involved his hands up to the wrists; there was tingling in his hands, lower extremities, and lower trunk region, and he had moderate superficial pain and tenderness over a wide zone of the mid-trunk.

A week later, thymine was discontinued (after 4 months), and he was urged again to come into the hospital. He did not come until 2 weeks later.

He now looked chronically ill, mentally dull and depressed, he could not walk and had great difficulty in shifting his position in bed because of extreme weakness and ataxia in the lower extremities; the skin and mucosæ were moderately pale but not icteric; the papillæ of his tongue were hypertrophic; and the abdomen was slightly distended with gas. The biceps and triceps reflexes were slightly hyperactive; the knee-jerks were slightly and equally hypo-active; the abdominal and Achilles reflexes were absent; and the plantar reflexes were consistently extensor on the left and about half the time on the right. There was severe hyperæsthesia to light touch and painful stimuli over the mid-trunk and somewhat less over the lower trunk; hypoæsthesia to light touch over the lower extremities and distal to the mid-region of the forearms; slight hyperæsthesia to painful stimuli over the thighs and soles; slight tenderness of the muscles of the thighs and calves; the muscles of the lower extremities results, but only in the hands of those who take pains to perfect their operative technique. Those who "try" the operation without adequate training in the difficult technique are almost certain to fail.

I have little doubt that as in America and other parts of the world, clinics for the advancement of this work will soon be established in all the large cities of England.

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LIVER EXTRACT, FOLIC ACID, AND THYMINE IN PERNICIOUS ANÆMIA AND SUBACUTE COMBINED DEGENERATION

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LIVER extract has proved effective in producing a hæmopoietic response in various types of macrocytic anæmia in relapse, in maintaining the blood at satisfactory levels, and in preventing and treating the neurological manifestations which often develop in addisonian pernicious anæmia. Many years' study of liver extracts has shown that the refined products administered parenterally produce much more dependable responses than do the crude products administered by mouth.

It is well known that liver extracts contain different members of the vitamin-B complex; and, in attempting to determine which, if any, of the B-complex vitamins were responsible for the anti-anæmic properties of liver extract, we have tested each of these vitamins as they were synthesised and became available for clinical use. Of the many which we have tested both singly and in combination over a period of years, folic acid was the first found to produce a definite hæmopoietic response in addisonian pernicious anæmia, nutritional macrocytic anæmia, and the macrocytic anæmia of pellagra, pregnancy, and sprue.[1] Later it was demonstrated that 5-methyl uracil (thymine) likewise produced a response in these types of anæmia, though less than that which follows folic-acid or liver-extract therapy. We realised that only by intensive and continued study of folic acid and 5-methyl uracil as anti-anæmic agents could we determine whether or not they could be substituted safely for liver extract. This paper is concerned with only one phase of these studies—the comparative value of parenteral liver extract and of folic acid and thymine by mouth, not only in producing and maintaining satisfactory blood-levels in persons with addisonian pernicious anæmia, but in relieving and protecting against the neurological disturbances which frequently occur in such cases.

It is extremely difficult and tedious to appraise the value of any therapeutic agent in subacute combined degeneration. For many years we have been studying the effectiveness of parenteral liver extract in maintaining satisfactory blood values and in preventing and treating subacute combined degeneration in addisonian pernicious anæmia. These studies are being continued. Since folic acid and 5-methyl uracil have been found to produce a hæmopoietic response in addisonian pernicious anæmia, we have been studying their value in preventing and treating subacute combined degeneration.

FOLIC ACID

In association with Drs. C. F. and R. W. Vilter, a study to determine whether or not folic acid is as effective as liver extract in controlling addisonian pernicious anæmia and in preventing the neurological disturbances was begun at the Cincinnati General Hospital in November, 1945. Twenty-one patients who had been maintained satisfactorily for 2–17 years on parenteral liver-extract therapy were selected for study. Liver extract was discontinued, and 70–105 mg. of synthetic folic acid weekly was substituted for 10–12 months. After 5–8 months of folic-acid therapy, paræsthesiæ in the extremities and an unsteady gait developed in four cases. Neurological signs gradually appeared and multiplied until there was unequivocal evidence of subacute combined degeneration. The dosage of folic acid was increased to 50–500 mg. daily for 10–40 days, but this increase was not followed by any subjective or objective improvement. When it was obvious that neurological improvement could not be effected with folic acid, or when the disease progressed rapidly, the folic acid was discontinued, and 5 c.cm. of refined liver extract was given daily by intramuscular injection. Within 10–12 days there was subjective and objective neurological improvement, and at the present time convalescence is progressing satisfactorily.

At our clinic in Birmingham, Alabama, folic acid was given to nine patients with subacute combined degeneration. Two of these patients seemed to be somewhat relieved, but we could not be certain. The other seven patients became worse on folic acid and were not relieved until after liver extract was given. The failure of folic acid to relieve the neurological disturbances and their subsequent response to liver extract are illustrated by the following representative case-record.

CASE 1.—A white woman, aged 76, was admitted to the Hillman Hospital in October, 1946, because of inability to walk unassisted, numbness of the legs and trunk below the costal margins and of the arms distal to the elbows, severe weakness, urinary incontinence, and moderate discomfort in the abdomen. These symptoms had begun in 1944 with coldness, numbness, and tingling, first in the hands and later in the feet,, and had progressed slowly until 4 months before admission, when they had rapidly worsened. She had never received anti-anæmic therapy and apparently had never had severe anæmia.

The patient was well developed but poorly nourished, and physical examination revealed nothing remarkable. Neurological examination showed severe involvement of peripheral nerves and the posterior column, and less severe involvement of the lateral column.

Repeated gastric analyses showed no free hydrochloric acid even after histamine stimulation. Bone-marrow showed maturation arrest at megaloblastic level. Peripheral blood: red cells 2,940,000 per c.mm.; Hb 11 g. per 100 c.cm. (71%); reticulocytes 2·8%; hæmatocrit 38%; mean corpuscular volume 126 cμ.

She was given folic acid 10 mg. by mouth for 22 days. The reticulocytes reached a peak of 10·2% on the seventh day of therapy, and on the final day the red-cell count was 3,810,000 per c.mm. and Hb 13·8 g. per 100 c.cm. (90%). Soon after folic acid therapy was started she said she felt stronger than she had for several months. Urinary incontinence continued, however, and on the twentieth day of therapy she began complaining of failing appetite, abdominal discomfort, vertigo, and depression. Neurological examination at this time showed that there had been no improvement in nerve involvement, and, for the first time, hyperæsthesia of the legs, tenderness of the calf muscles, and a consistently positive Babinski on the left were found.

Folic acid was discontinued on the twenty-third day, and she was given 2 c.cm. of liver extract intramuscularly daily for 5 days, and then 1 c.cm. daily for 26 days. Within a week after liver-extract therapy was started considerable symptomatic improvement had taken place. By the seventeenth day she could walk with only the assistance of a cane, and the upper level of numbness had receded from the costal margins to the knees, and from the elbows to the wrists. During the

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ADRENAL APOPLEXY ASSOCIATED WITH HYPERTENSION

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Adrenal hæmorrhage is one of the most unexpected and perplexing conditions encountered in clinical medicine. The interest lately taken in the Friderichsen-Waterhouse syndrome of adrenal hæmorrhage in septicæmia has tended to create the impression that this syndrome and adrenal hæmorrhage are synonymous. Adrenal hæmorrhage does, however, occur without septicæmia, as is illustrated by the following case.

A man, aged 60, was admitted to hospital with epigastric pain. He had been in good health until the day before admission, though several years previously he had been told that he had a high blood-pressure and that his heart was impaired. In the morning, at home, he had a constant but not severe pain round the umbilicus. After lunch he went to work. During the afternoon the pain shifted to the epigastrium and became much more severe. He was taken home, and that evening his doctor found him groaning and writhing in agony. He complained of a very severe pain in the epigastrium and the left lower chest. He was pale and sweating and had vomited several times. His pulse-rate was 100, temperature normal, and blood-pressure 200/100 mm. Hg. Heart and chest were normal. Examination of the abdomen was unsatisfactory, because the patient felt he could not lie down and twisted continuously. A tentative diagnosis of coronary thrombosis was made and morphine gr. $^1/_4$ was administered. The pain continued and next morning was most severe below the costal margin on the right side, and there appeared to be some tenderness in this area. The temperature was still normal. He was brought to hospital.

On admission he was acutely ill. His skin was pale, cold, and clammy. The heart was slightly enlarged to percussion, and the sounds were regular. No murmurs were heard. The abdomen moved well with respiration, but he had epigastric pain, which was increased by coughing. The abdominal wall was soft, but there was some tenderness throughout the entire upper portion, although no rebound tenderness was elicited. Neurological examination was negative. The neck was not stiff. The temperature was 99·8° F, pulse-rate 86, and the respiratory rate 26 per min. Blood-pressure was 210/110 mm. Hg. There was a leucocytosis of 10,600 white cells per c.mm. Nothing abnormal was found in the urine. An electrocardiogram showed left axis deviation, a poorly developed T_2-wave, and an inverted T_3: it did not suggest coronary occlusion. The serum-amylase level was not raised.

He was placed in an oxygen tent. During the first day his condition remained the same. He continued to have pain, and the skin remained pale and clammy. On the second day the blood-pressure fell to 96/50 mm. Hg, and the pulse was weak and irregular. That evening the rectal temperature rose to 103° F. He was very restless and disoriented. During the evening he was cyanotic and had Cheyne-Stokes breathing. On the morning of the third day he was moribund and could not be aroused by painful stimuli. The blood-pressure was 52/32 mm. Hg. He died seventy-two hours after the onset of the illness, without a diagnosis having been made.

Pathological Findings.—At necropsy the cause of death was found to be massive hæmorrhage into both adrenal glands, which were enlarged, the right weighing 30 g. and the left 20 g. The capsules were tense and bulging but intact. Section showed an area of blood-clot surrounded by a thin layer of golden cortical tissue. Macroscopically the adrenal blood-vessels were free from thrombi.

The heart weighed 500 g. and showed the characteristic enlargement of hypertension. The kidneys were normal in weight, and the capsules stripped readily, disclosing pale smooth surfaces. No significant lesions were found in the other organs.

Microscopically both adrenals presented a similar appearance. The central area of hæmorrhage was surrounded by necrotic cortex infiltrated by polymorphs. The arterioles in the capsule were markedly hyalinised. The medium-sized arteries had thickened walls, which in several places were necrotic (fig. 1) and infiltrated by a few acute inflammatory cells. The picture, however, did not suggest an acute arteritis, and it was thought that the arteries became necrotic owing to an interruption of the blood-supply.

Several small veins in the pericapsular tissues were filled with recent thrombi (fig. 2). It is impossible to say definitely from the microscopical appearance whether the hæmorrhage was caused by a rupture of an artery in the medulla or by a primary venous thrombosis. The history of hypertension favours an arterial hæmorrhage.

DISCUSSION

The adrenal gland is one of the most vascular organs in the body. Most diagrams show it as being supplied by only three arteries: the suprarenal, the renal, and the inferior phrenic. In a specimen injected with 'Latex' in the department of anatomy of the University of Toronto these arteries were seen to give off many small branches that entered the gland from all sides. The adrenal resembles the hub of a wheel with vessels running towards it like spokes. The arteries break up at once into capillaries; these are in intimate association with the cortical cells, and they in turn empty into sinusoids in the medulla that are drained by a single vein (Grollman 1936). The rich blood-supply and the delicate structure increase the vulnerability of this organ to hæmorrhage.

Except in cases of the Friderichsen-Waterhouse syndrome (D'Agati and Marangoni 1945, Williams and Ellis 1944, Lindsay et al. 1941, Morison 1943) adrenal apoplexy has never been diagnosed either clinically or at

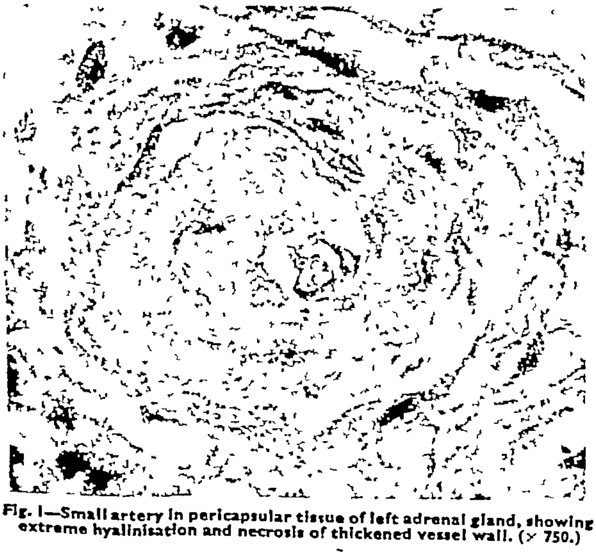

Fig. 1—Small artery in pericapsular tissue of left adrenal gland, showing extreme hyalinisation and necrosis of thickened vessel wall. (× 750.)

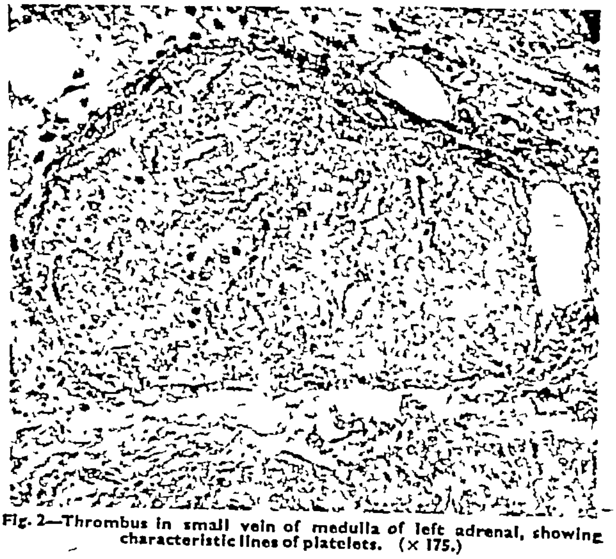

Fig. 2—Thrombus in small vein of medulla of left adrenal, showing characteristic lines of platelets. (× 175.)

had poor tone and were weak and moderately atrophied; there was no position perception in the toes or ankles, and no vibration perception over the sacrum or distal to it. He had severe ataxia (the heel-knee-shin test could not be performed): and there was a questionable decrease in the tone of the anal sphincter.

Gastric analyses showed no free hydrochloric acid even after histamine stimulation. Bone-marrow showed maturation arrest at the megaloblastic level. Red-cell count 1,930,000 per c.mm.; Hb 7·8 g. per 100 c.cm. (50%); reticulocytes 0·6%.

Despite the fact that he received no therapy for the first 4 days while baseline studies were being made, he appeared less fatigued and much less disturbed by paræsthesiæ than when he was admitted. On the fifth day, however, all his symptoms returned, urinary retention developed, and he lost his appetite. At this time therapy with 20 mg. of folic acid daily by mouth was begun. Five days later the reticulocytes had risen to 7·5%, and a peak of 36·6% was reached on the eighth day of therapy.

As the reticulocytosis developed his appetite improved and his symptoms in general appeared to subside somewhat. Between the thirteenth and sixteenth days of therapy, however, there was an exacerbation of all the neurological symptoms. Fæcal and urinary incontinence and severe weakness and ataxia of the upper extremities developed. He could no longer feed himself or attend to any of his personal needs. Mental dullness became more severe.

By the sixteenth day on folic-acid therapy the red-cell count was 2,800,000 per c.mm.; Hb 10·4 g. per 100 c.cm. (68%). By this time it was apparent that the progress of his neurological symptoms was not being arrested. Accordingly the folic acid was discontinued, and he was given 2 c.cm. of liver extract intramuscularly for 13 days, then 1 c.cm. daily for 17 days, and then 1 c.cm. on alternate days for 39 days. Within 4 days after liver-extract therapy was started the superficial pain and tenderness in his trunk were completely relieved. By the eighth day he had improved generally: he was more alert mentally and appeared less fatigued; the paræsthesiæ and abdominal and urinary symptoms were less severe; and his appetite had improved.

From this time on his improvement was progressive. By the thirty-first day of liver therapy he was sitting up, able to write and to care for many of his personal needs. He no longer had urinary or fæcal incontinence. Severe ataxia and weakness of the lower extremities persisted, however, and the knee-jerks were hyperactive, the Babinski was positive bilaterally, and the muscles of the lower extremities were moderately spastic. Numbness persisted only in his hands, legs, and feet. Strength and coördination of the upper extremities were very much improved. By 38 days after liver-extract therapy was started he could support his weight in a standing position, and he soon began to walk with the assistance of the ward attendants.

On his discharge after 59 days on liver extract he felt well in general but still complained of some numbness and increased sensitivity of the hands and lower portions of the legs and feet. Severe ataxia and impairment of position and vibratory sensation of the lower extremities persisted, and the Babinski tests were still positive. The red-cell count was 4,450,000 per c.mm.; Hb 13·6 g. per 100 c.cm.; white cells 3100 per c.mm. Since his discharge he has received 2 c.cm. of liver extract at weekly intervals and is showing continued improvement.

REFINED LIVER EXTRACT

It is well known that refined liver extract administered parenterally in adequate amounts and at suitable intervals will produce a hæmatological remission in persons with addisonian pernicious anæmia in relapse, maintain satisfactory blood-levels, and effectively prevent and treat subacute combined degeneration. In our clinic many patients have been maintained satisfactorily on such therapy for many years. If it is not administered regularly, however, relapses take place, and eventually signs and symptoms of degenerative changes in the nervous system appear. Adequate liver-extract therapy will reverse such changes if they have not progressed too far. This is illustrated in the following case-record.

CASE 4.—A white man, aged 76, was admitted to the Hillman Hospital in September, 1946, primarily because of difficulty in walking and moderately severe pains in the lower extremities.

He was first seen in the nutrition clinic in 1941, when he gave a history of paræsthesiæ of his hands, feet, and legs, and of headache, vertigo, tinnitus, insomnia, blurring vision, soreness of the mouth and tongue, anorexia, constipation, easy fatigability, and moderate loss of weight. Thorough clinical and laboratory studies revealed evidence of severe addisonian pernicious anæmia in relapse. He responded well to liver extract. He lived a long distance from the clinic, however, and could not come for treatment as regularly as it was needed.

He had several relapses, but there was very little neurological involvement until July, 1946, when an acute attack began. He was urged to come into hospital or to come regularly to the clinic for treatment, but his wife was critically ill, and he considered it his duty to return home and care for her.

When he was admitted to hospital in September he had severe disturbance of locomotion, paræsthesiæ, moderately severe paroxysms of pain that spread over the lower trunk and lower extremities, emotional instability, constipation, mild dysuria, and general weakness. He appeared restless, anxious, and emotionally disturbed. The knee-jerks were hyperactive; the plantar responses were consistently extensor. There was hyperæsthesia to painful stimuli over the lower trunk, thighs, and legs; hypæsthesia to touch over the thighs, legs, and feet; and slight tenderness of the thigh and calf muscles. There was spastic weakness, severe ataxia, and impairment of position and vibratory perception of the lower extremities. The Romberg test was positive. There was hypæsthesia and slight motor impairment of the hands up to the wrists.

Repeated gastric analyses showed no free hydrochloric acid even after histamine stimulation. Bone-marrow showed maturation arrest at the megaloblastic level. The red-cell count was 2,590,000 per c.mm.; Hb 7·5 g. per 100 c.cm. (48%); white cells 3150 per c.mm.; hæmatocrit 32%; mean corpuscular volume 128 cμ.

Reticulogen 2 c.cm. was given intramuscularly daily for 5 days, and then 1 c.cm. daily for 8 days. After this he was given 1 c.cm. weekly until he was discharged on the forty-second day of therapy.

The highest reticulocyte count was 5·8% on the eighth day of therapy. On the final day of therapy the red-cell count was 3,930,000 per c.mm.; Hb 12 g. per 100 c.cm. (78%), reticulocytes 2·8%; white cells 8800 per c.mm.

By the fourth day of therapy there was complete relief from pain, and he had become emotionally stable. Within 10 days he could get up and attend to all his personal needs The paræsthesiæ subsided, and his strength improved progressively.

Forty days after treatment was started he complained of slight numbness limited to the feet and hands, stiffness of the lower extremities, and moderate weakness of the knees. He still had slight dysuria but no gastro-intestinal symptoms Neurological examination indicated remarkable improvement in vibratory and position perception. The tendon reflexes were still hyperactive; the plantar response extensor; and the Romberg test positive, the patient having to watch his path while walking.

When he returned to the clinic 14 days after his discharge he had gained 8 lb. in weight and said that the previous day he had worked a half-day as a carpenter for the first time in more than a year. There were no further changes in the physical signs. He is returning regularly to the clinic for liver extract and is showing continued improvement.

SUMMARY

Synthetic folic acid (*L. casei* factor) and synthetic thymine (5-methyl uracil) will neither prevent the development of subacute combined degeneration in addisonian pernicious anæmia nor relieve it once it has developed.

Frequent parenteral injections of a potent liver extract are useful in the prevention of subacute combined degeneration and beneficial in relieving it once it has developed.

These studies were made possible by a grant from Lederle Laboratories, Inc. Valuable assistance was given by Miss Monette Springer, Miss Alice Rogers, Mrs. Mary Koch, and Miss Belle Culver.

ıe extinction of placental function, œstrogenic hormone isappears from the blood more rapidly than does onadotropin from the urine, and they therefore consider nat disappearance of œstrogenic hormone from the lood is reliable evidence of death of the fœtus.

I wish to show here that, in some cases, the placenta an continue to secrete hormones for several weeks after he fœtus has died.

CASE-RECORDS

CASE 1.—The patient consulted me on Oct. 25, 1944, in the ighth month of pregnancy, because she had ceased to feel ny fœtal movements during the past ten days. No fœtal eart sounds were heard, and death of the fœtus was diagnosed. Hormonal tests, however, gave the following results:

Date	*Serum*	*Urine*	
	Œstrogen (M.U./litre)	*Œstrogen (M.U./litre)*	*Gonadotropin (R.U./litre)*
Oct. 29	333	..	..
Nov. 5	500	..	..
„ 11	500	5000	..
„ 12	..	..	10,000 F.S.H. 5000 L.H.
„ 15 (premature stillbirth)	<100	..	1000 F.S H. 500 L H.

Note.—M.U., mouse units; R.U., rat units; F.S.H., follicle-stimulating hormone; L.H., luteinising hormone.

Though the fœtal heart beat had been inaudible for two weeks, on Oct. 29 the urine pregnancy reaction was positive, and the level of œstrogenic hormone in the serum corresponded to that of a normal pregnancy (333 M.U./litre).

A week later (Nov. 5) the blood-œstrogen level actually rose (500 M.U./litre), suggesting that the fœtus was alive. The gonadotropin level of the urine was also very high (F.S.H. 10,000 R.U./litre and L.H. 5000 R.U./litre) on Nov. 12.

A positive pregnancy reaction can generally be elicited with 1 or 2 c.cm. of pregnancy urine. Thus pregnancy is diagnosed if the urine contains gonadotropin 500 R.U./litre. However, ten times this amount was present in this patient.

The gonadotropin level of the urine fell considerably (about 90%) only after the expulsion of the dead fœtus on Nov. 15.

The placenta of this patient, who for four weeks had not experienced any fœtal movements, was free from any maceration and histologically revealed no sign of degeneration. The fœtus, however, was in an advanced stage of maceration, which fully confirmed the clinical diagnosis made a month earlier.

The placenta, analysed for œstrogenic and gonadotropic hormones (Zondek 1930, 1931, 1937), gave the following results: 2 R.U. (1 M.U.) of F S.H. and less than 1 M.U. of œstrogenic hormone per g. of placental tissue. These values are low in comparison with the findings in the placenta of a living fœtus—namely, 10 M.U. of œstrogenic hormone and 10 M.U. of F.S.H. and L.H. per g. of placental tissue (Zondek 1930, 1931).

CASE 2.—The fœtus died in the eighth month of pregnancy. No fœtal heart heard. The serum œstrone level was nevertheless high (500 M.U./litre), suggesting that the fœtus was alive. The results of the hormonal tests were thus at variance with the clinical findings.

Three days later the patient expelled a fœtus in an advanced state of maceration, showing that the fœtus had died two or three weeks earlier. In this case also the placenta showed no degeneration.

DISCUSSION

These cases show that, even if the fœtus dies, the placenta can sometimes function normally and remain anatomically intact and in communication with the maternal circulation for as long as four weeks. In case 1 the placental hormones were taken up by the maternal circulation in large amounts. This placenta, though apparently healthy and showing no degeneration, contained less hormone than normal. The probable explanation is that, whereas in a normal pregnancy the placenta supplies part of its hormones to the fœtus, with a dead fœtus the entire hormone output of the placenta is taken up by the maternal circulation. An analogous situation is observed in thyrotoxicosis, in which the overproduction and secretion of hormone into the blood is accompanied by a low hormone level in the thyroid gland.

SUMMARY

A placenta can sometimes remain functional despite death of the fœtus and can then continue to produce hormones in a normal way for several weeks after the fœtus has died.

In such cases the hormone levels in blood and urine can be higher than in normal pregnancy, because the entire output of placental hormones is taken up by the maternal circulation, none going to the fœtus.

These observations indicate that death of the fœtus may be either primary—i.e., independent of the placenta —or secondary, due to death of the placenta.

Whereas in secondary death of the fœtus the hormone levels in blood and urine fall rapidly, in primary death of the fœtus there is no such immediate fall and the levels may even rise temporarily.

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New Inventions

PERSPEX SPECIMEN-BOXES

DURING the war, when glass specimen-jars became difficult to obtain, a method was evolved at this hospital of mounting specimens in 'Perspex' boxes made to measure. The result has been very satisfactory, such boxes being lighter in weight, clearer, and smaller than the corresponding glass jar. These boxes are more durable than glass, unspillable, and do not leak, though they have been carried about in all positions and submitted to various strains, including falls.

The perspex sheet, $^1/_8$–$^3/_{16}$ in. thick, according to the size of the specimen, is sawn to the required size and shape with a dovetail-saw; the sides are glued together with 'Diakon' cement no. 2 and allowed to dry under light pressure. The sixth side is not put on until the specimen has been fixed in Wentworth's solution; meanwhile perspex struts are glued into the box, and silk threads attached to them in suitable places for anchoring the specimen. The fixed specimen is placed in the box and anchored, and the sixth side is glued on operation. The four cases reviewed by Keele and Keele (1942) and the one reported by Valentin (1914) were diagnosed as ruptured viscus, and at laparotomy nothing abnormal was found. Keele and Keele believe that the condition can be diagnosed clinically, and urge that, when the history suggests rupture of a viscus and no lesion is found at operation, the adrenals should be examined.

Abdominal pain similar to that in the present case has been reported by Keele and Keele (1942), Altschule (1939), and others. The segmental nerve-supply of the adrenal has not been definitely established but is probably T5–T10. The fibres travel by the splanchnic nerves through the cœliac and renal plexuses to reach the medulla. An afferent nerve-supply has not been demonstrated in animals or man (Swinyard 1937, MacFarland and Davenport 1941), but the pain associated with adrenal apoplexy is strong presumptive evidence of a visceral afferent pathway with sensory endings in the capsule. Stretching of the capsule would cause pain in the same way as distension of the gall-bladder does. The pain in adrenal apoplexy is felt over the region supplied by T5–T10, which is compatible with the probable segmental supply of the gland. Abdominal pain is of variable occurrence in the Friderichsen-Waterhouse syndrome (Lindsay et al. 1941). Vomiting is often present and is probably of reflex origin.

Death is caused by acute adrenal cortical insufficiency, leading to circulatory collapse, characterised by increasing shock, falling blood-pressure, and cyanosis.

The mechanism of adrenal apoplexy is obscure, but a hypothetical approach can be made through the consideration of four factors. The first is the tissue of the gland supporting the blood-vessels. As mentioned previously, the vessels lie in intimate contact with cortical and medullary cells. The destruction of these cells would remove support from the vessels, the walls would burst, and hæmorrhage would occur. After birth the adrenal cortex undergoes rapid involution, and the melting away of cortical cells, coincident with birth trauma, might well lead to rupture of the vessel walls. Levinson (1935) reports eight cases of fatal adrenal hæmorrhage in the newborn. The adrenal cortex undergoes hypertrophy during pregnancy, and involution takes place during the puerperium. Adrenal apoplexy at this time has been reported by Keele and Keele (1942) and Dodds (1945). The mechanism may be regarded as similar to that in the newborn, although it is reported much less frequently. This is to be expected, however, since the involution following pregnancy is much less extensive than at birth. Hæmorrhage also occurs in adrenal glands invaded by secondary tumours.

The second factor is the state of the vessel wall. The wall may be damaged by trauma (Thorstad 1942); toxæmia, as in burns (Harris 1929, Snelling and Erb 1935, Weiskotten 1917); septicæmia; or the degenerative changes of arteriosclerosis. In the Friderichsen-Waterhouse syndrome generalised purpuric hæmorrhages occur owing to damage to the vessels either by toxæmia or by bacterial emboli. The adrenal hæmorrhage is merely part of the general picture, but, owing to the peculiar structure of the organ, the hæmorrhage becomes extensive and causes cortical insufficiency. In a patient with essential hypertension the vessels are weakened by hyaline and necrotic changes.

The third factor is the pressure of the blood in the vessels. Hypertension increases the strain on the vessel walls and thus predisposes to hæmorrhage.

The last factor is a general hæmorrhagic tendency. Hall and Hemken (1936) reported a case of adrenal hæmorrhage in a patient with leukæmia. Lewis (1921) reported a case in an infant where multiple hæmorrhages were found in other organs. Many cases of hæmorrhagic disease of the newborn are now known to be caused by a deficiency of vitamin K.

These four factors may act alone or in combination. For example, in the newborn infant involution, trauma, and a deficiency of vitamin K may all be important contributory causes. The present case can best be explained by rupture of a sclerotic vessel under the strain of hypertension.

Keele and Keele (1942) and Pearl and Brunn (1928) considered that in their cases the primary lesion was a thrombosis of the suprarenal vein, with resulting infarction. Leone (1941) remarks that thrombosis of the veins is merely evidence of a circulatory disturbance, and, instead of being the cause of the hæmorrhage, may be the result of parenchymal congestion. This latter view best explains the venous thrombosis observed microscopically in the present case.

SUMMARY

A case of bilateral adrenal hæmorrhage in a hypertensive patient is reported, and it is suggested that adrenal hæmorrhage may be classified under four headings:

(1) Associated with involution or destruction of gland substance in (*a*) the newborn; (*b*) pregnancy; (*c*) cases of invasion by tumour.

(2) Caused by damage to blood-vessel walls by (*a*) toxæmia (burns); (*b*) trauma; (*c*) septicæmia (Friderichsen-Waterhouse syndrome); (*d*) arteriosclerotic change.

(3) Associated with hypertension.

(4) Associated with a generalised hæmorrhagic tendency, as in leukæmia and in vitamin-K deficiency in the newborn.

I wish to thank Prof. William Boyd for his assistance in the preparation of this report.

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PLACENTAL HORMONES AFTER DEATH OF FŒTUS WITH VIABLE PLACENTA

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AFTER expulsion of the placenta the pregnancy reaction of the urine normally remains positive for eight days (Aschheim and Zondek 1928), the time taken by the body to eliminate its store of placental hormones. Hormonal excretion can persist longer if chorionic fragments remain in the uterus in communication with the maternal circulation (Zondek 1931). The findings in hydatidiform mole without a fœtus show that the persistence of a positive pregnancy reaction need not necessarily signify the presence of a living fœtus.

When a positive pregnancy reaction becomes repeatedly negative, it is clear that placental function has ceased, and it can be inferred that the fœtus, if not yet expelled, is dead. But it is insufficient, in diagnosing death of the fœtus, to rely on the negative result of only one pregnancy test, especially in the later months of pregnancy, when the excretion of gonadotropin decreases and becomes less regular than in the early months of pregnancy (Zondek 1931). Spielman et al. (1933) have shown that, after

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under moderate pressure in a vice or under a weight, without mounting fluid. The glue will stick to wood; so this part of the manufacture is done on a sheet of glass, which is easily separated.

A small hole $^1/_{16}$ in. in diameter is made near one corner of the box, either with a drill or a red-hot needle; through this hole the mounting fluid is injected with a 20 c.cm. syringe and needle, and air is sucked out as the pressure rises. Small gaps can be recognised by the fact that bubbles are produced on the exertion of a negative pressure with the syringe, and the gaps can be sealed with the cement, but this is a tedious business and spoils the neat finish. The puncture hole is kept open a few days to allow air to bubble out of the specimen; the box is then completely filled with the fluid, and the puncture is sealed with cement. A little pressure on the box will cause the cement to be sucked into the hole as the pressure is released. The edges are rounded with a file and fine sandpaper, and the box is polished with metal polish. The carpentry of the box must be accurate, as a minimum of cement is used to avoid roughness. No leakage has taken place with changes of temperature as the cement is very strong and all the seals are permanent.

Waterproof white drawing-ink is used instead of a label and is covered with a very thin layer of cement. The box can subsequently be opened, if required, by running a dovetail-saw along the seams.

I am greatly indebted to Mr. John Carr, pathologists' assistant, Hillingdon County Hospital, who has become an adept at this type of mounting and takes about an hour to make the box, anchor the specimen, seal, and label. He has mounted seventy specimens for various members of the hospital in the last two years.

The perspex sheets and diakon cement no. 2 have been obtained from Imperial Chemical Industries Ltd.

Hillingdon County Hospital. L. FATTI, F.R.C.S.

Reviews of Books

Eye Surgery

H. B. STALLARD, M.B.E., M.D. Camb., F.R.C.S., assistant eye surgeon, St. Bartholomew's Hospital, London; eye surgeon, Radium Institute and Mount Vernon Hospital. Bristol: John Wright. Pp. 444. 50*s*.

THE first new English book on eye surgery for nine or ten years is something of an event. This one was written during the war, and naturally it gives more space to war surgery than the subject now merits: thus the reconstruction of the eyelids occupies more than a quarter of the book. Mr. Stallard is an individualist, and the techniques described are those he practises. This is as it should be, and it is absorbing to follow him through the details of his careful surgery. Not all his dogmatic statements can be accepted whole, but in general his methods will find support among eye surgeons, and any changes he suggests are well thought out and worthy of adoption. He feels that eye surgeons need to give more time to the study of plastic work on the eyelids, and they will find here all they want to know of this branch of eye surgery, though it is doubtful whether many will follow his advice and delve among the abdominal recti for shavings of costal cartilage. This is a stimulating book by an expert whose teaching on the gentle handling of delicate tissues should be a lesson to all. It includes many excellent illustrations by the author, and describes not a few new instruments.

The Psycho-analytical Treatment of Children

Parts I and II. ANNA FREUD. Translated by NANCY PROCTER-GREGG. London: Imago Publishing Co. Pp. 93. 10*s*. 6*d*.

To quote the author's own words, "child analysis as a therapeutic method has had a stormy and much chequered career." It is therefore useful to be able to turn to this collection of essays and lectures and to trace the development of the method in the hands of an expert. None of the material is new; the four lectures on technique were delivered in 1926 before the Vienna Institute of Psycho-Analysis; the paper on the theory of child analysis was read at an International Congress in Innsbruck in 1927; the final essay on indications for child analysis, first published in 1945, summarises advances made in the understanding and evaluation of infantile neurosis in the intervening years. Whatever views may be held regarding the value of psychoanalysis as a practical therapeutic measure, the contribution that it has made to the understanding of children's emotional lives and hence to their upbringing and education cannot be disregarded. The material contained in this book speaks for itself. The evidence of exact observation, the honest presentation of facts, the freedom from exaggeration or false deduction, and the lucid writing reveal the truly scientific mind at work.

Patients and Appendicitis

SIR CRISP ENGLISH, K.C.M.G., F.R.C.S., consulting surgeon, St. George's Hospital, London. London: J. & A. Churchill. Pp. 155. 10*s*. 6*d*.

IN writing this book, Sir Crisp English seems to have two purposes which do not completely integrate: he has put down his thoughts on the doctor's—and more particularly, perhaps, on the surgeon's—approach to the patient; and he has summarised and commented on modern methods of treatment of appendicitis. The section on patients is for the student and the newly qualified doctor; the remaining chapters deal exhaustively with appendicitis. The doctor to whom appendicitis is one of the most important illnesses which can afflict his patients will find here much to guide his judgment and make sure his diagnosis. In country districts the actual operation may be done by the general practitioner; and the detailed instructions given on when and how to operate should help him. He will also value the section on postoperative care. The practising surgeon evolves his own methods; and little exception will be taken to those described here. There are one or two contradictions. the postoperative enema is condemned as a routine measure on p. 77, while on p. 82 an aperient or enema on the third day is advised; and despite an instruction to give nothing by mouth or rectum in the Ochsner treatment for cases of peritonitis, a later page recommends that "fluids, including champagne . . . should be given in sips."

It is encouraging to see so much care taken with the section on non-acute appendicitis, that common cause of indecision among general practitioners and surgeons. In Sir Crisp's experience the condition found on opening the abdomen nearly always justifies operation for chronic appendicitis.

Manual of Diagnostic Testing

Part II, *Diagnostic Testing of Personality and Ideational Content.* D. RAPAPORT, M.D.; R. SCHAFER, B.S.; M. GILL. New York: Josiah Macy jun. Foundation. Pp. 100. $0.75.

MANY of the *projection tests* used by psychologists for studying the temperamental and emotional differences between people yield extremely interesting raw material. But the problems which arise in sorting and classifying the material and relating it to observed differences in human behaviour remain mostly unsolved. One has still hopefully to await the development of standard terms of assessment. The literature abounds in statements which are neither axiomatic nor sustained by adequate evidence. The terms in use are often ill defined.

In this manual the projection tests discussed are a word-association test, the Rorschach test, and the thematic apperception test. The last two are well known and so is the general form of word-association tests. (Part I discussed tests of intelligence and concept formation.) The authors explain in detail the interpretation they place on the responses they have observed, but it is impossible to judge from the evidence they present whether their interpretations are valid. Responses are not related to their context in the case-histories of the subjects from which they were obtained—in fact, no case histories are given. The statistical evidence is not satisfactorily presented; for example, average reaction times for different groups on the word-association test are recorded without the numbers in the groups or the amount of variation about the averages. These are faults which might have been avoided even if others may be excused as inevitable. It is difficult to believe that this manual will be of much interest except to readers anxious to study all work published on projection tests.

THE LANCET

LONDON: SATURDAY, FEB. 1, 1947

The Nursing Crisis

THROUGH lack of nurses many of our hospitals are now in dire straits. In London the L.C.C. is reduced to less than half its pre-war complement of beds, and all over the country local authorities are in a similar plight. As more and more beds are closed, all talk of expansion of the hospital services becomes meaningless, and we are rudely reminded that without enough nurses all our schemes will fail. To a large extent, however, the immediate crisis is a crisis of distribution. In recent years the number of nurses entering and qualifying has risen steadily (though not sufficiently), and the great majority of voluntary hospitals have managed to increase their intake so as to provide for the higher nurse-patient ratios demanded by the 96-hour fortnight and other measures accepted as necessary if nursing is to come into line with current ideas. Many voluntary-hospitals indeed still have waiting-lists of candidates. Almost the whole weight of the crisis, therefore, has fallen on local-authority hospitals. For these the special recruitment campaigns have proved of little avail; and direction, or anything like direction, of nurses from voluntary to local-authority units is out of the question—if only because it would promptly defeat its own end. What then can be done to promote distribution according to need?

In many places, such as inner London, the arrival of the "appointed day" will mean that units now belonging to local authorities will come under the wing of large voluntary units. Here the nursing staffs will be merged; and we may expect that the teaching hospitals at any rate will be able to find enough nurses for the institutions in their charge. They will be able still further to increase their intake of student nurses, and the double unit may well prove a satisfactory solution wherever there is a strong voluntary training school on which the new staff can be grafted. From this angle it is nothing but a misfortune that there are still fourteen months to go before April 1, 1948. If the situation remains as bad as it is today, the Ministry of Health may be compelled in London to anticipate the "appointed day" by associating some of the county-council hospitals with the larger voluntary hospitals. In the less popular and more remote areas, however, there will be many hospital management committees without any thriving school of nurses on which to build—their chief unit being perhaps a local-authority hospital already suffering from an acute shortage. How are these to manage?

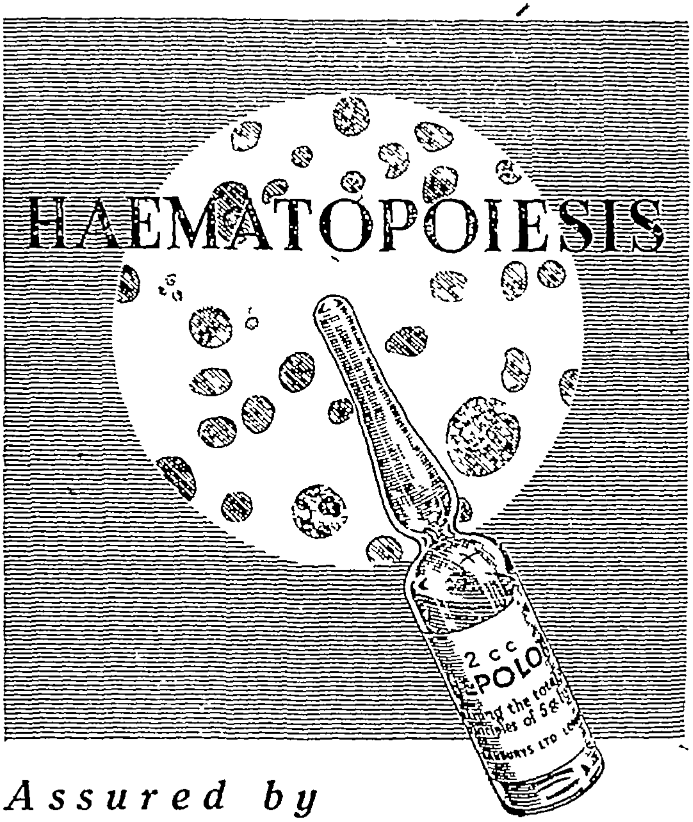
Looking back to the days before the late war it is obvious that the stress and shortage was much more evenly balanced, and the question arises whether the present acute maldistribution is not caused by some factor which has only lately come into play. In hospital circles it is fashionable nowadays to suppose that the factor of pay can be ruled out—has not the Rushcliffe Committee done all that is necessary? In an article on another page a correspondent challenges the reasoning whereby the Rushcliffe Committee has been led to keep the remuneration of the student nurse on a level which to many outsiders still seems unduly low. But there is another factor also which deserves much more attention than it has hitherto received One of the first actions of the Rushcliffe Committee was to equalise the rates of pay offered in voluntary and local-authority hospitals. Whereas before the advent of Rushcliffe there were wide differences between hospitals, some asking fees for training and others paying salaries of varying amounts, the position today is quite different. In deference to the idea of placing everybody on an equal footing all this varied range of remuneration was swept away. What has been the result? Some hospitals are much more happily placed than others and have not had any real difficulty in attracting recruits; others, for reasons quite beyond their control, suffer sadly by comparison. Their obsolete buildings, their isolated position, and the type of illness treated—these and other features of their work operate against them. The policy of uniformity has made it impossible for them to offer any compensatory advantage. And why ever should a sensible girl choose to go to one of the less attractive hospitals if she can get exactly the same terms at one which offers an old and valued name into the bargain?

It is high time that this policy was reversed, and latitude was allowed to hospitals—and in future to hospital management committees—to offer real compensatory monetary advantages to girls to whom money is a consideration. There is nothing new or vicious in the principle: the London and Middlesex county councils and many others did it before the war; it is inherent in the award of higher rates for mental and certain other categories of nurses; and it applies to the salaries offered to resident medical officers. The more attractive the hospital the less the remuneration offered. If hospitals which could establish a case for so doing were authorised to offer a substantially higher remuneration for student nurses, the present tendency of candidates to flock to the larger and better-known voluntary hospitals could be, to some extent at least, controlled.

The Rushcliffe Committee ought to think again. Its policy of uniformity is certainly one of the major factors in the present crisis, and has undone much of the good work of the committee in other directions. Unless this policy is promptly and wholly abandoned, the incidence of shortage will continue to bear most heavily on those hospitals whose need for new recruits is most insistent.

Surgery for Deafness

FOR suppuration associated with deafness surgery is nowadays commonplace and routine. Its primary object is the removal of carious and unhealthy bone, and though improvement in hearing is an expected sequel in acute disease it is a pleasant surprise in chronic cases. Deafness in the absence of suppuration is quite a different problem. Broadly speaking, it is due to lesions of the conduction apparatus, or of the end-organ of perception (with or without its central connexions), or occasionally, as in otosclerosis, of both. The essential pathological feature of otosclerosis is the appearance of islands of absorption and new bone in the labyrinth capsule. So far as is known, this process continues throughout life in all parts of the labyrinth, but its special predilection for



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omment on the difficulty of distinguishing between ernicious anæmia, sprue, and nutritional macroytic anæmia. Their rule was to label as pernicious næmia those patients with histamine-fast achlorydria; as sprue those with acid steatorrhœa; and as nutritional macrocytic anæmia those with neither. But the borderlines were not clear, and one patient could present different pictures on different occasions.

In this climate the problem is not quite the same. Here the presenting conditions are pernicious anæmia, non-tropical sprue or idiopathic steatorrhœa, and cœliac disease; pernicious anæmia is clinically distinct from the other two. The value of folic acid in the treatment of pernicious anæmia can be regarded as established, but at the present price (1*s.* 2*d.* for 10 mg.) it is so much more expensive than parenteral liver treatment that it is likely to be reserved for difficult cases. In non-tropical sprue results have been irregular: some patients have responded well, others only partially or slowly; some have improved so far with folic acid and then further progress has been obtained with proteolysed or ordinary oral liver treatment, while others have shown the reverse. The preliminary results in cœliac disease, which are all we yet have to go on, suggest that the response is slow and that perseverance in treatment is necessary before failure is conceded. That some patients with non-tropical sprue or cœliac disease and a normoblastic marrow would not respond was to be expected, because it is reasonably clear that folic acid is effective only where megaloblastic erythropoiesis is present.

In this issue SPIES and STONE report an observation which, if confirmed, will establish a serious limitation in the value of folic acid in pernicious anæmia; for they find that folic acid has no effect on the degeneration of the posterolateral tracts of the spinal cord commonly associated with the disease. Not only has folic acid failed to relieve this syndrome but the neurological signs have worsened while the patient was receiving it; and similar results are reported with thymine. All the patients recovered when given an ordinary concentrated parenteral liver extract. It will be recalled that DOAN[3] noted a remission of minor neurological signs—presumably due to peripheral neuritis—in his cases of pernicious anæmia given folic acid, and none of his patients had developed neurological changes while on treatment; so far this has also been the experience in this country, but there has probably not been sufficient time for any such complications to appear. The findings of SPIES and STONE have practical and theoretical implications. The practical ones are that cases of pernicious anæmia on regular folic acid must be carefully watched for the onset of posterolateral cord signs and promptly put on liver extract if these appear; and when such signs are already present the patients are best treated with liver. On the theoretical side this report would have delighted ARTHUR HURST, who contended that the hæmopoietic factor was distinct from the neurotrophic factor. It fits in too with other evidence suggesting that folic acid cannot in every case of pernicious anæmia completely meet the deficiency that is filled by a liver extract—that some cases are also suffering from the lack of an unidentified factor.

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[3] Doan, C. A. *Amer. J. med. Sci.* 1946, 212, 257.

Annotations

WORLD FOOD PLAN

LAST September the Food and Agriculture Organisation received from Sir John Boyd Orr, F.R.S., its director-general, a plan for a World Food Board[1] which was to dispose of the funds necessary to stabilise prices and to establish a world reserve for emergencies. That plan was rejected, the United States voicing a preference for multilateral agreements covering specific commodities[2]; and it has since become evident that many countries would have been unable, or unwilling, to subscribe the large capital needed to keep the board in business.

For the last three months the preparatory commission of the F.A.O. has been trying to work out an acceptable alternative. Its proposals, published last week, though less ambitious in design than those of Sir John Orr, have the same end. The idea of a World Food Board has been abandoned; instead, a World Food Council will be established. The council will, however, not be a marketing concern, nor will it have mandatory powers: for the attainment of stabilisation it will rely entirely on good will and international consultation. Producer countries will be expected to establish buffer stocks to keep prices within agreed limits: to sell to needy countries at prices they can afford; and, under certain conditions, to establish national reserves for world use in the event of famine. The report—looking some way ahead—emphasises that stabilisation must ultimately depend on greater consumption rather than on reduced production; and to increase their purchasing-power undeveloped regions are urged to set about the task of industrial development, seeking credits, if necessary, from the World Bank.

The virtue of these proposals is the chance that they may be generally accepted; indeed for success they must be universally accepted, since one country standing apart could wreck the accord between those loyal to the plan—for example, by undercutting for quick returns in a year of plenty. The nations may yet have to return to the Orr plan, if experience shows that nothing less will serve the world's purpose.

CONTROL OF MUMPS

NO writer on mumps can refrain from quoting its description in the Hippocratic corpus; indeed, until recently it was not easy to say that there had been any advances in our knowledge of an ailment which, however painful or embarrassing, gave no reason for anxiety except in its involvement of the genitals and its rarer neurological manifestations. In the years before the war the most noteworthy innovation was the surgical treatment of orchitis which gave promise of the immediate relief of pain and the prevention of testicular atrophy at the cost of simple incision of the tunica albuginea. Soldiers and schoolboys have provided much data in the past, and it is not surprising that the opportunities provided by mobilisation turned the attention of the epidemiological board of the U.S. Army to some of the problems presented by mumps. Johnson and Goodpasture,[1] in 1934, had shown that the "cause" was a filtrable virus which would produce a transmissible parotitis in the rhesus monkey. The team headed by J. Stokes jun. and J. F. Enders[2] have been investigating the possibilities of inducing an active or passive immunity in man which would either prevent an infection or modify one already established. It cannot be said that the attempt has as yet been *entirely* successful. From the neighbourhood of the oval window often leads, at an early stage, to bony ankylosis between the stapes footplate and the margins of the window. This ankylosis impairs hearing because it damps perilymph movements in the cochlea, and further progress of the disease results in destruction of intracochlear structures by bony overgrowth, with degeneration of the organ of Corti and demyelinisation in the auditory nerve. Some regard the degeneration of the end-organ and its central connexions as a consequence of stapedial fixation, while others attribute all the changes to a single disease process. Certainly it is difficult to see why ankylosis of the stapes should cause the organ of Corti to degenerate, since there is no evidence that it interferes with the blood-supply of that structure. Moreover, the fact that a stimulus is not received at the cortical level does not necessarily mean that it has not got through to the organ of Corti.

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[1] See *Lancet*, 1946, ii, 463.
[2] *Ibid*, p. 683.

[1] Johnson, C. D., Goodpasture, E. W. *J. exp. Med.* 1934, 59, 1.
[2] *Ibid*, 1945, 81, 93, 119, 137; 1946, 84, 323, 341, 407.

Nearly a hundred years ago TOYNBEE tried to remedy the deafness by removal of the footplate of the stapes, and following him other otologists made similar attempts. Most of these were technically unsuccessful, but recently it has been shown that even technical success does not bring improved hearing. However, it now seems to be established that if an opening is made in the bony labyrinth of these patients, hearing is restored in greater or less degree, and it has been further claimed that the benefit persists as long as the opening remains patent. This latter contention seems to ignore the progressiveness of the disease; and there is no obvious reason why the presence of an artificial hole in the bone should prevent further deposition of bony deposits: moreover, those who take this view must necessarily accept the hypothesis that the neural changes are secondary to disuse. Nevertheless, even if the rationale appears assailable, the surgeons who have interested themselves in the operation seem to be convinced of its efficacy. Judging by the reports of Mr. GARNETT PASSE in our present issue, of Mr. SIMSON HALL,[1] and of other workers (mostly American) whom they quote, it is sometimes almost dramatically successful in restoring hearing to a useful level, and this level is more or less maintained for several years. With an operation so new, and a disease so subject to unpredictable remissions, we must postpone further judgment. Material for this judgment will no doubt be forthcoming, for the technique is now fairly well standardised and should not present too many difficulties to the experienced otologist who is willing to spend time in acquiring it.

In selecting cases of otosclerosis for fenestration those with neural damage must be excluded. When bone conduction—the capacity of the cochlea to receive sound through the overlying bone—is within certain limits it can be assumed that the end-organ and nerve connexions are intact. But although the plotted results of such tests give a picture which conveys verisimilitude, one must remember that each point on the graph is obtained by asking the patient whether he can hear a pure tone being attenuated or amplified; and a partially deaf person, often with tinnitus, does not find these end-points easy. There are other possible sources of error—notably the mental attitude of the patient at the time, his general health, and fatigue, physical or mental. In short, these graphs or audiograms should be regarded as useful guides rather than objective data. At a conservative estimate there could easily be an experimental error of 10%, and in deciding to operate there is corresponding danger in relying too closely on apparently small losses of bone conduction. In reaching such a decision the age of the patient and the duration of his deafness are both important. As Sir ARTHUR HURST used to say, "in order to hear you must listen," and many middle-aged or elderly people who have been deaf for some years will be unable to regain this faculty, even if their bone conduction with pure tones is apparently good. The best results, therefore, are to be expected with young patients—preferably under thirty—who have not yet lost the habit of listening and in whom no neural damage has yet occurred. This is just the type of patient, however, to whom lip-reading can most readily be taught, the difficulty of doing so increasing steadily with age. Maintenance of hearing at the postoperative level cannot be promised, and careful management is necessary in order not to lose the opportunity of providing the patient with a lifelong accomplishment of priceless value. In addition, the modern valve-amplifying hearing-aid is an efficient and unobtrusive instrument. Incorporation of the mercury low-tension battery and miniature valves, together with plastic earpieces, has produced an instrument less noticeable than a pair of spectacles,[2] and there is little doubt that it will soon be even smaller.

In the natural desire to secure suitable cases for operation other methods of treatment must not be overlooked. Most patients expect the operation to do everything, but if this attitude can be overcome all these methods can be complementary. Surgery is offering a new approach, but to get the best from it we shall need to preserve a critical outlook.

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[1] *Brit. med. J.* 1946, ii, 647.

[2] See, for example, *Lancet*, 1946, ii, 776.

Limitations of Folic Acid

SINCE progress with folic-acid treatment was last reviewed in these columns three months ago[1] some further information has appeared, not all favourable. We now know that folic acid is effective in the early stages of pernicious anæmia and sprue, but less is known about its use over longer periods. LOPEZ, SPIES, and others,[2] reporting on 18 cases of tropical sprue in Cuba, studied for some months, say that the doses previously given were too large and now recommend 5–10 mg. daily. It is noteworthy that, though all these patients had some megaloblasts in the marrow smears, the proportion was much less than in pernicious anæmia, 3–4% being representative figures. The 18 patients were treated with folic acid alone; and of the 5 women all returned to their usual housework. Of the 13 men, 9 returned to work, 1 was a cripple, and 3 were over seventy-five years old; but these last 4 men, who had previously been bedridden and helpless, were enabled to look after themselves. Two cases are described in detail, and these patients are reported as remaining well after two months without treatment. LOPEZ and colleagues

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[1] *Lancet*, 1946, ii, 680.

[2] Lopez, G. G., Spies, T. D., Menendez, J. A., Toca, R. L. *J. Amer. med. Ass.* 1946, 132, 906.

TO LORD HORDER

WE in this country have never made a habit of celebrating the 70th and 80th birthdays of our teachers. The more significance therefore attaches to our occasional spontaneous expressions of affection and thanks. On Jan. 7, which was supposed to be his 75th anniversary but was really his 76th, Lord Horder found himself the subject of a symposium at Claridges, in which various speakers endeavoured to explain his remarkable case and its influence on us all.

Sir Alfred Webb-Johnson, P.R.C.S., who presided, spoke of Lord Horder as the man who brought the laboratory to the bedside and revolutionised clinical teaching. When he began his career, said Prof. Henry Cohen, the recognition of disease depended on the unaided senses; yet in more than half a century of great change he has remained an outstanding clinician, bringing to diagnosis a capacity for rapid and accurate perception and assessment, both of persons and situations, an extensive knowledge, common sense, and balanced judgment. He has withal that simple humility which is the surest shield against intellectual arrogance, and nobody has been more liberal in his help and encouragement of younger colleagues. Nor can many physicians equal his record of public service: "he claims the right of the doctor to help in advancing human welfare—a modest and unselfish claim when many creeds claim only the right to hinder." Mr. Aneurin Bevan as Minister of Health tendered the Government's thanks for the help Lord Horder has given to successive holders of that office. Dr. Geoffrey Bourne spoke as a colleague at Barts, and Dr. D. M. Lloyd-Jones as one of the first of his house-physicians there—one of many who owed him an incalculable debt.

> "Since ceasing to be a full-time practitioner of the art of medicine," said Dr. Lloyd-Jones, "I have had time to consider the elements which conspired together to make Lord Horder so unique as a clinician. I would place them in the following order. First, an unusually clear, penetrating, and logical brain. Second, a prodigious memory leading to encyclopædic knowledge. But perhaps above all is his clear grasp of, and his rigid adherence to, the principles of medicine. I never agreed with those who felt that there was something almost magical or dæmonic in his brilliant diagnoses: it always seemed to me to be the inevitable result of the exercise of the above qualities. It was essentially the result of close observation which missed nothing, the careful collecting and collating of facts, and then the relentless process of reasoning it all out. It was truly scientific.
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> "As a man, what has impressed me is his humanity, kindness, and understanding. He is utterly unaffected and entirely unspoilt. Perhaps the greatest tribute that one can pay him is to point out that, in spite of phenomenal success, he has never degenerated into a merely fashionable physician."

"The judgment of Harold Nicolson was right," said Professor Cohen, "when he placed Horder among the most impressive of contemporary figures." But he is impressive with an endearing lightness which was evident once again in his reply to all this. We are happy to publish his remarks on another page.

REACTIONS TO INSECT BITES

THERE is a widespread belief that blood-sucking insects attack some people much more readily than others. Almost every entomologist has heard stories beginning "When my wife and I were sleeping in a room in . . ." and recounting how the mosquitoes (or bugs, or fleas) ignored one person while the other was covered with bites. It is true that some insect parasites exhibit sufficient preferences to restrict them to one host species; but until recently there has been no scientific evidence for distinction between individuals. It seems that mosquitoes do in fact prefer to bite some people, though probably none are entirely avoided.[1] A more common explanation of the unequal sufferings of two sleeping partners is a difference in their reactions to the insect bites.[2] It is easily demonstrable that some people are unaffected by bites which cause large weals, erythema, and pruritus in others. Mellanby[3] has lately demonstrated that people usually pass through different stages of sensitivity if they continue to be exposed to bites of certain mosquitoes. When a person unused to the mosquito is bitten there is no immediate objective effect, but a severe reaction about 24 hours later. When his experience is more extensive an immediate transitory weal is also observed. If the person is still further exposed to bites the secondary reaction on the day after the bite does not occur, and a final state may be reached in which no reaction whatever is experienced.

	Immediate reaction	*Delayed reaction*
1st stage	—	+
2nd „	+	+
3rd „	+	—
4th „	—	—

It is the delayed reaction experienced in the early stages of exposure that causes great discomfort and may persist for several days, waxing and waning in intensity. The immediate reaction causes some itching, but all symptoms disappear within two hours.

These results were obtained with the mosquitoes *Aëdes ægypti* and *Anopheles maculipennis atroparvus*. The sensitisation and immunity seemed to be quite specific, so that a man may be in stage 1 in regard to anopheles and stage 2 for aëdes.

BACK TO NEGOTIATION

NEITHER public nor press have appreciated the reasons which made many doctors object to negotiation with the Minister of Health on the regulations to be made under the National Health Service Act. It seemed to them improper that organised medicine should reject participation in the scheme before it was fully revealed, and that the experts should refuse aid in making it as good as possible. These arguments could have been rebutted more easily if the plebiscite had shown a larger proportion of the profession against negotiation; but a majority of 8% of those voting was insufficient backing for action which outsiders would interpret as extreme. The special representative meeting of the British Medical Association has been wise therefore to accept the council's recommendation that negotiation should be resumed, though with conditions. To resume it in such a manner that it is bound to fail would be merely a manœuvre for position; and we trust that instead a serious and sincere effort will now be made to reach agreement with the Minister. As the *British Medical Journal* said last week, the first of the fundamental issues before us, "and one which at the moment there is a tendency to lose sight of, is the need for a reorganisation of the medical services in this country so as to provide the people with the best possible Health Service."

SIR JOHN FLETT, F.R.S., a director of the Geological Survey of Great Britain from 1920 to 1935, died on Jan. 26 at the age of 77. He graduated M.B. at the University of Edinburgh in 1894, but almost at once his interests turned to geology.

THE Goulstonian lectures of the Royal College of Physicians of London will be delivered at the college on Tuesday and Thursday, March 18 and 20, at 5 P.M., by Dr. F. Avery Jones. His subject is Hæmatemesis and Melæna.

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1. Ribbands, C. R. *Nature, Lond.* 1946, 158, 912.
2. Bristowe, W. S. *Ibid*, p. 750. Mellanby, K. *Ibid*, p. 751.
3. Mellanby, K. *Ibid*, p. 554.

the evidence so far published it would not be safe to say that convalescent serum or the gamma-globulin derived from it has any dramatic effect on the incidence of orchitis as a complication. Formol-inactivated mumps virus gave only a 50% protection to a group of children who were later infected with active virus by having a suspension injected into the parotid duct, though the attack was modified in nearly all the vaccinated children.[3] A promising method of stimulating an active immunity is suggested by the observation[4] that passage of the mumps virus on the developing egg reduces its virulence while leaving the antigenicity unimpaired. So far the experimental data have been obtained in monkeys, but a single human trial was successful enough to encourage further research.

One useful fact that has emerged is that past infection (and every old wife knows that this is equivalent to a high degree of active immunity) may be detected in a human subject either by a complement-fixation test, or, more simply and effectively, by an intradermal reaction to the injection of heat-inactivated material from the infected parotid of a monkey. Testing of the population at large by the latter method gives reason to suppose that about 30% of young Americans suffer from mumps without any clinical symptoms and that the newborn child derives some immunity from its mother.

The infectiousness of mumps appears to be extreme but capricious. In every outbreak some children enjoy what appear to be miraculous escapes from infection. Not long ago a small outbreak of mumps in a rural community involved an old lady (76) with pancreatitis, a farmer and his wife with parotitis, a retired major R.A.M.C. (64) with orchitis, and the attendant doctor with parotitis and orchitis; at least 7 children under the age of ten were exposed intimately and none showed any evidence of infection. Our knowledge of the mode of spread is still slender. What is needed is some studies of the type made familiar by Dr. W. N. Pickles, of Aysgarth.

FROM SCHOOL TO INDUSTRY

THE abruptness of the change from school to industry was emphasised by Dr. A. A. E. Newth and Dr. T. A. Lloyd Davies at a joint meeting of the Society of Medical Officers of Health and the Association of Industrial Medical Officers on Jan. 24. At school, work is done in short periods and is arranged in an interesting manner; free dinners and milk are provided; and medical supervision is continuous. In industry, on the other hand, work is in long periods; for the entrant it is often uninteresting and monotonous, and its purpose is seldom explained to the child. Canteens are now regarded as an industrial asset; but, except in a few specified jobs, such as night work, there may be no further medical supervision after the inspection (often under difficult conditions) by the examining surgeon on the child's entry to employment. Greater use should be made by examining surgeons of the reports they can obtain on the medical record of the school-child, but the actual placement of the child in industry must be made by an *industrial medical officer* who has an intimate knowledge of work and industrial conditions. The child's early months in industry should be regarded as a period of training rather than of production.

This change takes place at a time when the child is undergoing the profound physical and psychological changes of adolescence, and it is important that the young person should be influenced for good. That is the great opportunity of the county colleges set up by the Education Act of 1944 for young people up to the age of eighteen—in place of selfseeking and irresponsibility, to instil a sense of service and purpose. Education for citizenship must be their fundamental object. County colleges provide the student of social medicine with a magnificent opportunity of exploring the neglected field of the development of the normal adolescent. Except in a few highly selected groups, such as boys at Eton and university students, even the most elementary anthropological measurements are lacking. Valentine[1] has shown that the psychological characteristic of the adolescent is intensification of emotional experience and a sense of uniqueness, but much further study of the normal is needed. In county colleges the educationist and industrialist will meet on common ground, for what benefits the child will in the long run benefit industry.

SULPHONAMIDES FOR INJECTION

A RECENT letter by Dr. Stanley Banks[1] directs attention to a sulphonamide preparation of which more might have been heard had penicillin not gained the field so completely. 'Soluthiazole' (May and Baker) is the disodium cinnamylidene dibisulphite derivative of sulphathiazole. It dissolves readily in water, giving a colourless solution of pH about 7. It is therefore free from the drawbacks of local irritation and tissue necrosis which tend to develop when the highly alkaline sodium salts of sulphathiazole, sulphapyridine, and sulphadiazine are used parenterally. Its pharmacology was recorded in 1945 by Wien and his colleagues.[2] A gramme of soluthiazole contains 0·442 g. of sulphathiazole. *Absorption* after injection by any route is rapid and satisfactory. It is not possible to say how much of the circulating drug is unchanged soluthiazole; but very little is conjugated, presumably because rapid elimination gives the liver insufficient time for acetylation. Therapeutically soluthiazole is as effective against streptococcal infections as the sodium salt of sulphathiazole, but it is distinctly less effective, in vitro and in vivo, against the staphylococcus. Dosage can, of course, be adjusted accordingly, and the advantages of this drug in initiating sulphonamide therapy quickly, or in administering it to the vomiting or unconscious patient, are obvious. Moreover, experiments with mice have shown that toxicity is less than with either the parent substance or its sodium salt, and that urinary crystallisation in particular occurs much less readily.

CHANGE OF ADDRESS

IN 1936 an International Bureau of Human Heredity was established in London to collect the world literature on human genetics and inform inquirers, lay and scientific. When the war began in 1939 the bureau already had a unique collection of data; four times this narrowly escaped destruction by enemy action before it was safely housed in the caves at Chislehurst.

The aim has been not only to collect but to correlate reports; but unfortunately endowments to cover the cost of the trained staff essential for this purpose have not been obtained, so that the bureau has had to be transferred to another country with better prospects. *It has now been opened in Denmark, under the* direction of Prof. Tage Kemp, at the University Institute for Human Genetics, 14, Tagensvej, Copenhagen, N.; and its future will be decided next year at Stockholm by the International Congress of Genetics. Mrs. C. B. S. Hodson, who has had charge of the bureau since it was opened here, can congratulate herself that, since the international *nomenclature* has been used throughout, the work will continue without interruption.

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[3] Stokes, J. jun., Enders, J. F., Maris, E. P., Kane, L. W. *Amer. J. Dis. Child.* 1945, 69, 327.

[4] Enders, J. F., et al. *J. Immunol.* 1946, 54, 283. Habel, K. *Publ. Hlth Rep., Wash.* 1945, 60, 201; 1946, 61, 1655.

[1] Valentine, C. W. *Nature, Lond.* 1943, 152, 122.

[1] Banks, H. S. *Lancet*, Jan. 4, p. 45.

[2] Wien, R., Harrison, J., Freeman, W. A., Phillips, G. E. *J. Pharmacol.* 1945, 84, 203; Wien, R., Hampton, J. W. F. *Ibid*, p. 211.

A BIRTHDAY SPEECH

LORD HORDER THANKS HIS HOSTS*

My dear ALFRED—or WEBB as we affectionately call you—MINISTER, and MY OTHER FRIENDS,—to say that this moment is embarrassing is to understate my feeling. I really cannot believe, as I look round this table, that I have ever done anything for any of you that justifies such overwhelming kindness. Whereas, if I tried to recite half of what you have done for, and meant to, me I should keep you here all night. Why, there is a man here who actually let me take delivery of a new car before he did, though his name was above mine on the list. Can friendship go further than that? . . .

If I tell you that I am here under false pretences, being a year older than you think I am, it would suggest that you have "missed the bus", and that would sound like ingratitude. Actually, the position is much worse, for it is apparently my ghost that you are entertaining so pleasantly: this is a posthumous birthday-party. For my secretary was rung up a few days ago and a sombre voice said "I suppose you know that Lord Horder is dead"? Fortunately, I was in the next room, engaged in animated conversation with a patient, a fact which was told to the person telephoning, who, not in the least perturbed, said "then he has come back". On inquiry the speaker said "we are the *Psychic News*". And, sure enough, the next issue of the paper contained the information that "Cardinal Vaughan and Lord Horder purported to return at a recent seance". (You see, I am in good company.) I think all this must explain a telegram from the police this morning which told me that a summons which I was due to attend tomorrow at Kingston for "speeding" was deferred,—no doubt for further inquiries. I shall be able to see how long the arm of the law really is. . . .

All this illustrates the kind of difficulty that catches a man if he—not outstays his welcome, for your presence reassures me on that point—lives longer than the reputed limit. I remember reading an article about Sir Thomas Barlow; it was written while he was still alive, but the author couldn't have known this because the photograph which accompanied the text was that of Sir Thomas's son. . . .

PITFALLS OF AGE

I want to assure you that I am watching this business of getting old as carefully as I can, but there are all manner of pitfalls, and in the last resort a man is more and more dependent upon his friends. I pray to be saved from vanity first of all. An old fellow came into my room the other day, obviously got up to look much younger than he was,—moustache waxed, tie, handkerchief and socks all matching, &c. After getting a few symptoms I asked his age. "Well, doctor",—with an air of confidence,—"what age do you *think* I am?" "That's a challenge", I said. "Well", said the patient, "what age?" "Eighty", I said. "No" said the old chap, terribly crestfallen, "not till next week". Then there was another who used to come to see me yearly, on his birthday. There was never anything the matter, and it was an easy job for me. After telling me how well this organ worked and how fit another was, and so on, he used to conclude by saying, "Ah, doctor, but that's not the best: all my faculties unimpaired, eh what?" I shouted my congratulations, for he was very deaf, and the interview ended. . . .

Then there's inanity; that must be watched too. I remember the shock it gave me many years ago when I saw one of my old teachers walking slowly and aimlessly down Harley Street, stopping anon at some open area and watching the boy delivering the milk and the cat lapping some that had been spilt: shocking, as I said. . . .

But I suppose unawareness is the most subtle of all the old man's troubles, and for that I doubt if there is anything to be done. And I can't decide if it is good to be aware or not. Is it better to feel with Andrew Marvell:

> "And at my back I always hear
> Time's winged chariot hurrying near",

or to be like the old man whom I vetted on his 90th birthday and who, when I said "it's all right, your bronchitis has cleared up, you can go downstairs", said, "but that's not what's worrying me, Sir Thomas". "What *is* worrying you?" I asked. "This" he said, pointing to a truss he was wearing. "Why, doesn't it fit?" I said. "Yes, it fits alright" said the old fellow, "but what do you think the doctor says? He says I've got to wear the damned thing for the rest of my life". . . .

I am afraid awareness is my lot, after all,—awareness of a fearful lot of things that go to make up old age, physical things that never get into the text books, and in the moral sphere, things that Cicero never experienced, perhaps because he wrote his famous essay at the relatively youthful age of 63! But how to adjust one's behaviour is very difficult, so ingrained are people's notions about age. . . . I have to smile and seem to appreciate the deference of others,—some of whom are not very young either,—and all the time I'd willingly exchange it for that experience I thought so odd many years ago, when a pupil of mine signalised his passing his final fellowship by calling me Horder for the first time. The old man is reported to be testy, irascible, intolerant; but if he warns himself against these things and observes a bland and generous demeanour folk speak of it as the fatuous benevolence of old age! It really is very difficult. . . .

PAST, PRESENT, AND FUTURE

The all too kind things that you have said just now make an apology for my life unnecessary. Years ago I was accused of forsaking the bench for the bedside. But that was a limited view of what I was doing; what I was really doing was taking the bench *to* the bedside. I don't apologise for that. Then, later on, I have been accused of engaging in too many, and too diverse, activities that are not, strictly speaking, Medicine itself. Fun has often been made in after-dinner speeches about my interest in Birth Control and Eugenics on the one hand and Cremation on the other. But there are scenes in between these ends of the play which, looked at intelligently, surely reveal a thread of consistency. The amenities are the handmaidens of Medicine and I have done my best to help them, believing with Virchow, that "Medicine is a social science." Medicine was made for man, not man for Medicine, and what do they know of Medicine who only Medicine know? . . .

This table speaks more eloquently than I can possibly do of the many contacts upon which I have depended for getting my own job done. If it has, on the whole, not been a bad job you have the credit; if it has lacked any merit, yours is partly the blame. For, individualist as I am, I could only make my contribution by keeping step with the rest of you. Apart from a genius here and there who blazes a trail, this is the case with all of us, —the advance is made by the army as a whole, not by the soldier singly.

And what of the future,—*my* future? I am watching it rather closely, as I have already said it behoves the elderly to do. I am trying to unload, but it isn't easy, without letting folk down. And there isn't that avidity to do the spade work in relation to many affairs which the injunction to get "new blood" should carry with it. But time will settle this as it settles all things. . . .

Is it egregious to hint that the fact that "knowledge comes but wisdom lingers" suggests that the old may still retain a function? "Men must endure their going

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* The congratulatory dinner at which these remarks were made is described on p. 185.

Special Articles

NEGOTIATION OR NOT?

B.M.A. REPRESENTATIVE BODY DECIDES

A SPECIAL representative meeting of the British Medical Association was held on Jan. 28 to consider the council's resolution that:

"The British Medical Association, having considered the final results of the plebiscite and the Minister's letter of Jan. 6 to the Presidents of the Royal Colleges, and desiring to secure for the people the best possible health service, is willing that discussions be entered into with the Minister to that end, provided that such discussions are comprehensive in their scope, and that the possibility that they may lead to further legislation is not excluded; and that after the conclusion of these discussions a second plebiscite of the profession be taken on the issue of entering the Service."

Dr. GUY DAIN, chairman of council, said that after the recent interchange of letters between the presidents of the three Royal Colleges and the Minister of Health the council met, and, noting his more conciliatory tone and his offer, made for the first time, to negotiate, decided on this form of words. The council's opposition to the Act as it stands is, said Dr. Dain, unaltered. But the Minister, having offered to negotiate on his terms, it was up to the association to offer to negotiate on its terms. The council was willing to negotiate on the basis of a comprehensive health service; its resolution was so framed as to make it clear that the association would not negotiate on regulations alone; but it had been expressed in as conciliatory a way as possible so that the Minister might accept it. No action would be taken at the expense of principles; if the Minister refused to negotiate, the association had still done no harm and had shown its desire for the best service. If the Minister accepted there was still a possibility of further legislation.

DISCUSSION OF AMENDMENTS

Dr. F. C. COZENS (East Kent) held that the council's resolution was not sufficiently precise. Only amendments to the Act should be discussed. With later speakers, he objected to the action by the presidents of the three Royal Colleges in writing independently to the Minister. He moved an amendment to refuse negotiation on the grounds that the Act violated the principles set out by the council as fundamental. This amendment was supported by Mr. C. E. BEARE (Reigate) and Dr. W. GUNN (Greenwich) who found no change of heart in the Minister's reply to the presidents. Dr. A. SMITH POOL (Glasgow) thought the resolution suggested a retreat by the B.M.A., whereas the Minister was not retreating.

Dr. J. A. PRIDHAM (council) recalled that the Act was on the statute book. If the association was to obtain alterations it must discuss the Act with the Minister; to adopt a wholly negative attitude would be to get nowhere: "do not let us be led away into an untenable position." Dr. G. DE SWIET (Paddington) also supported the resolution. The plebiscite minority, he said, was less vocal than most minorities but knew its mind; and he thought it had now become a substantial majority. Reckless action would split the profession and the association, and would not prevent the Act coming into force. A new Negotiating Committee, representing more fully the plebiscite minority, should be elected.

Dr. H. S. PASMORE (Kensington) said that the Minister did not feel himself beaten and was therefore unwilling to bring in an amending Act. The need now was for a constructive policy. Dr. O. C. CARTER (Bournemouth) saw an off-chance that by negotiation an unsatisfactory Act might be made into a workable Act. An attempt should be made to resolve difficulties round the council-table. Dr. W. B. A. LEWIS (Shropshire and Mid-Wales) believed that amendment of the motion would alienate public opinion and might deprive the association of the chance of negotiating. Dr. G. H. BARENDT (Southampton) argued that the amendments showed inability to face the real situation in the profession. Matters of policy should be decided by a majority of two-thirds or three-quarters, and the plebiscite had not given the council that majority.

Dr. W. N. LEAK (Mid-Cheshire) contended that the wording of the amendment was not strong enough. There was no guarantee that consultation with the Minister would be of any use. Dr. J. A. IRELAND (council) also opposed the council's resolution, because there was no guarantee of the Act being amended. The Minister would, however, amend it if he were forced to do so.

Dr. R. W. COCKSHUT (council) said that a straight fight was out of the question for 9–12 months. This lead from the council was a lead from strength; it was up to the association to see how far the Minister would go. Prof. R. S. AITKEN (Aberdeen) reasoned that ultimatum and boycott were not suitable means of removing blemishes and dangers in an Act much of which was good. The resolution should go forward without any concealed ultimatum to the Minister. Dr. DAIN said that the attitude must be firm and friendly. The negotiators would have a chance to see whether amendment were possible; if not, they should withdraw. The council, he said, had not weakened in its adherence to principles, and the association was in a strong position. Up till now the Minister's method of consulting had been eyewash and a waste of time.

The amendment was rejected by a very large majority.

Lord HORDER (Marylebone), moving a further amendment calling for new legislation, said he did not find the reasons for the council's motion very cogent. There were, he thought, two weak points: (1) reference to correspondence between the Minister and the colleges, since it was agreed that this did not alter the main issue; and (2) the use of the word "possibility," since it was certain that some change in the present Act must be accepted. Discussion with the Minister should first be on principles. Dr. DAIN replied with a plea that the negotiators should be given full authority; it would be wrong to tell them at what point they must come back. The amendment was lost.

Further amendments seeking to make alteration of the Act a prerequisite for negotiation were then discussed. Dr. S. WAND (Birmingham) contended that the next round should be fought at the conference-table; it would be unwise to alter the council's resolution. The proposed amendments were impracticable; the Minister could not be expected to take unconstitutional action. Dr. J. A. BROWN (council) also thought that if the council's resolution was amended any chance of discussions would be thrown away.

The amendment, and others that followed, was lost by a substantial majority, and the council's original resolution was carried without amendment by 252 votes to 17.

NEGOTIATING COMMITTEE

In reply to a motion Dr. DAIN agreed that a fresh election for the B.M.A. members of the Negotiating Committee should be held; and the meeting accepted the suggestion of Dr. Charles Hill, the secretary, that 8 members should be appointed by the council, that representatives should be informed by post, and that they should vote by post to elect a further 8 members. A further motion by Dr. J. A. L. JOHNSTON (Londonderry) that the committee should be reconstituted so that the B.M.A. had a majority was carried, with the rider that ex-Service practitioners should be adequately represented on the committee.

Further business was ended by the house being counted out.

Health Centres of Tomorrow

V—IN THE COUNTRY

For some years the country doctor has watched medicine advancing into technicalities which he cannot hope to master, and his own facilities have become proportionately antiquated and inadequate.

A National Health Service should give the country a chance to become an equal partner with the towns; but it will have to pay attention to the essential differences between rural and urban ways of life. Time and distance provide the greatest contrasts. For example, when acute appendicitis develops in an isolated cottage there may be hesitation or difficulty in sending a message to a doctor several miles away, and the message may arrive when the doctor is out on a long round or is committed to other work. Further time may be wasted in reaching a telephone, in securing admission to a distant hospital, and in ambulance travel both ways—not to mention many other vicissitudes arising in a thinly populated country district with doctors and nurses sprinkled wide apart, or coming out from neighbouring towns.

Putting all this right is a simple affair, on paper. Given enough trained professional men and women, and the building material and labour to house and equip them, there is no great difficulty in mapping out an efficient service. And we should certainly have such an ideal in our minds, even if the means at our present disposal will only suffice for a beginning.

AN IDEAL

In our ideal service the small market towns and larger villages, which are the natural centres of life, should serve the neighbourhood from medical centres reaching the level of the outpatient department of a hospital. General practitioners should work from these centres in comfort and privacy, and in numbers sufficient to allow careful unhurried work and a reasonable choice of doctor by the patient. The centre should be in constant and rapid communication with the parent hospital, which should regard it as an outpost enabling the patient to have specialist attention without travelling long distances.

The essence of the health centre is that it shall be a real advance on the doctor's consulting-room as we now know it: a mere communal surgery would be a step backwards rather than forwards. Whatever may be the requirements in town, the rural centre situated at any great distance from a hospital will need portable radiographic equipment, a pathological service, and a theatre for minor operations. Further, it should be self-contained, to the extent that the patients, and the doctors, once arrived, need not go outside it for anything. So it must cater for the needs of patient, doctor, nurse, dispenser, secretary, domestic, and transport, over the whole twenty-four hours.

That is what we should aim at; but it cannot be achieved without far more doctors, nurses, and ancillary staff than are available today. While they are (we hope) being attracted and trained, we had better come down to earth and consider what can be done as a beginning.

A BEGINNING

The services which exist at present must be collected together and organised to work as a whole, preferably under the same roof. This means bringing together the practitioner, the local authority's various clinics (antenatal, child-welfare, school, orthopædic, dental, and ophthalmic), the district nurse, the local dentist, the pharmacist or dispenser, and the optician. To do so would obviate the present round of visits which a mother may have to pay in order that her family shall benefit from these various services, which at present may be scattered haphazardly within a radius of anything up to twenty miles.

The local ambulance service should be attached, and some form of canteen included, so that patients with a long wait can at least get a cup of tea and a bun.

This heterogeneous collection will have to shake itself down to work harmoniously as a team, and must come under some form of management. Perhaps this will be most successful if it is constituted from inside—e.g., by a small committee of four or five—while the purely medical problems (roster of duty, holidays, vacations, courses for the doctors) would be dealt with by all the doctors together forming the medical staff committee of the centre.

By what is virtually a continuation of the old apprenticeship, the young doctor usually enters practice by becoming first a locum tenens, then an assistant, and finally a junior partner. There is much to be said in favour of this, and it would be a good plan to have a young man attached to each health centre on the footing of house-physician or casualty officer. Before joining a health centre he would have to spend a year in it as a regular member, and this would give him a chance to test his suitability for a particular neighbourhood, and to learn how medicine is applied in general practice: in fact a compulsory year in a health centre would be an invaluable experience for everybody, including the future consultant and teacher. At the same time, he would provide the necessary extra man in the unit, a constant locum for whoever is ill or on holiday.

The next problem is that of liaison with the parent hospital. The choice lies between the weekly visit of the hospital physician and surgeon—and possibly the other specialists at intervals—and the daily collection from the health centre, by a hospital bus, of the various cases that the centre practitioners want to refer to specialists. Both systems are open to abuse. At present the country doctor is less likely than his city colleague to be a mere signpost to the different hospital outpatient departments. And he would be less likely to become one if it were a rule that he must be present at any consultation with a specialist at the health centre. This rule would not involve the loss of so much time as its opponents aver, and it would have big advantages over the present system of consultation through notes and letters. It would also keep the country doctor in close touch with consultant medicine.

BUILDINGS

The housing of the country health centre needs careful thought. The Act makes this the responsibility of the county council, whose knowledge of local conditions may be less than its interest in economy. Nothing would discourage the country doctor more than to have to work in some patched-up derelict white elephant instead of his own comfortable house. Nothing would discredit the scheme more in the eyes of the public than that the centre should lack amenities and have a poor appearance. There are places where the buildings of the local cottage hospital might be suitable; but as a rule these have been deliberately placed outside the towns and away from traffic, whereas the first essential of the health centre is that it should be central. Probably the best solution, until new centres can be built specially for the purpose, and until experiment has found the best layout, would be to house them in the most suitable of the doctors' houses which they will render redundant.

The cottage hospitals, as such, will of course belong to the regional hospital board. But if it is decided that general practitioners shall retain their beds in them, it would be well that these should be visited at least once hence, even as their coming hither: Ripeness is all." When a colleague recently said he would like to discuss a case with me the patient's doctor, querying the good of it, asked what contribution I could possibly make to the solution of the problem; "only judgment, old man, only judgment" was my colleague's reply.

Ripeness is bound up with prestige, which also comes at last. But that, like some of the other happenings to which I referred just now, isn't an unmixed blessing. It brings a certain amount of publicity, for which, quite unfairly, blame is attached,—not infrequently by those who haven't got prestige themselves. I have more than once said that you cannot have prestige without a certain amount of publicity, but you can have a large amount of publicity with very little prestige. . . . Then, again, if you have prestige you must watch your step; there are, for example, certain jokes which you mustn't make. I was introduced to a plethoric-looking man recently, a fellow guest at a small dinner-party. Patting an expansive chest he said "well you see *I* don't need you, doctor". To which I replied "what makes you think you are as well as you feel?" And we sat down to dinner. That was Monday evening. On Wednesday he came to see me, looking, I thought, much older. It seemed an odd coincidence. When I told him that his doctor, in a brief letter, said that he didn't know why I was being consulted, my friend said, "but surely you noticed something the other evening? I haven't had a moment's peace since you said what you did. I tried to get this appointment yesterday". I tried to reassure him and apologised for my feeble joke, but only a careful overhaul would convince him, and, as I couldn't take a fee without risking a charge of touting for patients, I had wasted 40 minutes because of a thoughtless remark. . . .

ANOTHER TOAST

I mustn't continue these meanderings. I once heard Almroth Wright congratulate himself that his friends had never found him out. I am in an even luckier position: you, my friends, have found me out but have forgiven me. I said that this evening was for me very embarrassing. But it is also extraordinarily pleasant. For there is a better thing even than Medicine,—yes, MINISTER, even than Politics,—and that is Friendship. Without it life is a barren tree; with it there is "Wine which never grew in the belly of the grape". It is not without significance that Cicero wrote his essay on *Friendship* in the same year that saw his *Old Age*. . . .

GENTLEMEN, I also have a toast; it is "Blessed be Friendship, world without end".

FEEDING THE OLD AND AILING

MANY people admitted to hospital need only rest, good food, and medical supervision, which could be given at home if their circumstances permitted.

Dr. F. AVERY JONES, speaking on Jan. 18 at a conference on special forms of catering for the aged, invalid, and infirm, arranged by the London Council of Social Service, put the proportion as high as 10% of all admissions to a general hospital. Most of these people are old and—because they have no-one to help them prepare meals and look after themselves—neglected. Home helps are scarce and shopping difficulties great in many parts of the country. He suggested that a delivery service of cooked meals should be provided in every borough, and that feeding-centres should be set up for those in need of special diets: a preliminary survey in London factories, he said, showed that over half the men working in them have, or have had, gastric or duodenal ulcer. The Invalid Kitchens of London will advise works' canteens on the feeding of those who need special diets.

This is not such a difficult feat as might be supposed, for, as Miss ROSE SIMMONDS, dietitian to the British Postgraduate Medical School, pointed out, light fare can be prepared from the food served to ordinary customers—the meat being minced, the vegetables sieved, and the steamed pudding served with sauce instead of fruit. Simple adjustments can also be made, she claimed, to suit the needs of diabetics, the old, and the obese. She made several other practical suggestions: communal restaurants might, for example, pack up snack lunches for young people short of time and money; and pleasant rest-rooms might be provided where old and lonely people could meet and rest after their meal. Infirm or convalescent people with no help in the home could be helped in two ways. Specially equipped coffee-stalls might serve hot meals in side-streets near the homes of such people; and school buses, after delivering the children at school in the mornings, might be used at lunch-time to take old and infirm people to communal restaurants. Vans equipped with thermostatic containers might take meals daily from the communal centres to maternity cases, convalescents, and the chronic sick in their own homes.

At present the costs of such services where they exist are borne by voluntary bodies. The Invalid Kitchens of London, for example, serve meals in six London boroughs, in only one of which the local authority gives help. The Council of Social Service, the Old People's Welfare Committee, the Red Cross, and the Women's Voluntary Services provide mobile services in eight other boroughs. Miss KATHLEEN PROUD, assistant secretary of the London Council of Social Service, said that in one borough where the council runs a mobile service two-course meals are sold for 8*d.*; but the cost of maintaining the vans and the drivers' wages come to more than the cost of providing the meals themselves. The van can only serve 25–30 lunches daily and the rest of the time it is idle. At least one metropolitan borough is providing a mobile meals' service under its domestic and home-help scheme, and she suggested that if powers were more clearly defined others would follow.

Mr. FRED MESSER, M.P., agreed that the expense of these services should be borne by local authorities, though he was in favour of keeping the valuable personal services of voluntary workers as well.

Lord AMULREE, who took the chair, remarked on the great shortage of hospital beds; any arrangement which helps to keep people out of the hospitals just now, he said, is a valuable service to the community.

Medicine and the Law

Overdose of Paraldehyde

ANOTHER fatal accident has occurred through an overdose of paraldehyde administered as a sedative to patients in a mental hospital. Misunderstanding apparently arose because the dispensing department had issued a bottle filled with pure paraldehyde and no instructions were contained on the label or were otherwise issued to indicate that the bottle did not contain a dilute solution. A medical officer was informed that 4 drachms had been inadvertently given to two of the patients. It later transpired, however, that the message had been wrongly delivered: 2 fl. oz. had been given; and, despite gastric lavage, artificial respiration, and oxygen, both patients died.

The accident took place at a Lanarkshire hospital. At the inquiry, which is the Scottish equivalent to the English inquest, the fiscal said that by accident the two patients had been given a dose 16 or 17 times larger than the normal diluted dose. From the evidence it was difficult, he said, to decide whether the bottle was properly labelled or not. The sheriff gave a formal verdict that death was due to accidental poisoning; he agreed that the evidence was insufficient to establish whether or no anyone had been at fault.

A somewhat similar fatality from the use of paraldehyde occurred at a hospital in the west of England not many weeks ago. There is no need to reiterate that accidents of this kind can be averted only by constant care and properly enforced system.

as pay it must be looked upon as a maintenance allowance, which, in conjunction with board and lodging, enables the student nurse to be self-supporting and independent of her parents.

Independent of her parents? This will be challenged. It will be pointed out, as we noticed above, that in other professions the student is not independent of her parents. The masseuse for instance costs her parents money while in training—quite a lot of money. But let us look the facts squarely in the face. Quantitatively there is an all-important difference Other professions such as physiotherapy are at a stage where there is an ample supply of candidates coming from families able to find the wherewithal for fees. Nursing is not nowadays in this position.

The demand for nurses is such that a substantial proportion of the candidates (we are not thinking of the well-known teaching hospitals) must and do come from the publicly provided primary schools as well as from the secondary schools. Statistics have been adduced to show that the numbers of girls leaving secondary schools cannot possibly provide nursing with a sufficient intake. Many preliminary nursing courses for girls from primary schools are being organised. The truth is that among the large numbers now coming into nursing there are a substantial proportion to whom the possibility of independence of support from the home is an important factor in the choice of a career. It is not wise to shut one's eyes to the fact that in many homes—where the family income is low, where there is perhaps no father and only a pension to support a family of brothers and sisters, where there may be dependent relatives—a girl is materially and rightly influenced by the desire if not to contribute a little to the family income at least to relieve the family of any charge upon them. With the demand for nurses as it is today—the crucial factor in the whole expansion of the hospital service—it is not intelligent to allow a financial consideration of this kind to deter even a proportion of potential candidates.

The case for an allowance while in training sufficient to enable a girl to be independent of her parents is overwhelming. Indeed it is often by inference accepted, and the statement made that the nurse has this independence.

REQUIREMENTS FOR INDEPENDENCE

If the need for independence be agreed, it remains only to determine what is the minimum allowance, in addition to board and lodging, which in present conditions does enable a girl to be independent of her parents, and to ask whether the present rates achieve this object. There is only one way to arrive at an answer and that is to set out a budget of necessary expenses.

Three simple and necessary items occur at once. One may set down a modest £20 a year for essential clothing other than uniform—this has to cover underwear, stockings, shoes, and shoe repairs, besides some occasional items of outdoor wear. One may set down 10*s.* a week, or £25 a year, for expenses while off duty and on the day out once a week. Most nurses on their day out go some distance to see friends; the alternative is to spend the day by oneself or with friends, which probably involves meals in restaurants, a visit to the cinema, &c. An allowance of 10*s.* is not extravagant if a girl is to get real recreation. It may strike the older generation as excessive: but let those who think so make careful inquiry among the student nurses of today, and they will soon revise such an opinion. One must set down something between £5 and £10 per annum for deductions from pay—pension and National Health Insurance contributions which are obligatory, and so on.

These items already amount to £50 to £55 per annum. They make no allowance whatever for the purely personal expenditure which falls upon every individual: visits to the hairdresser; the unending series of petty items such as toothpaste; provision for the cost of minor mishaps, such as repairs to a watch or the broken strings of a tennis-racket; the obligation to give birthday and Christmas presents to her family; the textbooks she ought to buy. These are essential items of expense and in present conditions they rapidly mount up. On her initial salary of £55 a year the student nurse has no means of meeting this range of petty personal expense except by skimping on the major items first set out, or by trading on her family.

Nothing has been said here of the little luxuries, the cigarettes, and the occasional small purchases and consolations that mean to young people so much more than they do to their more experienced seniors. To a girl of 17 or 18 the three or four years of her training loom ahead as almost an eternity. Ought the student nurse, we must ask, be required during these years to forgo the little things which can do so much to make her now increased leisure from her exacting duties something of a pleasure rather than merely so much time off duty?

£100 A YEAR

The case is surely convincing. It points to a flat-rate allowance of £100 a year for the student nurse from the start. There is no longer any sense in the petty variations of £10 per annum in the second and third years. The differentiation and the scale of increase are relics which remain unaltered from the days of long ago. In what other profession, it may more properly be asked, do increases proceed on such a petty scale? The holder of a scholarship to the university does not receive an emolument which increases as the years go by. The true parallel with the student in other careers has been ignored, and it is high time that the student nurse was brought into line at any rate with university conditions.

There is no sufficient ground for supposing that such a flat-rate allowance of £100 a year throughout training would in fact attract to the profession girls whose only interest is in the pay; to argue thus is to betray an ignorance of the rates now current in alternative occupations. The girl who wants to make money can do far better for herself than that—£100 is less than the rate offered to an untrained girl taking up domestic work in an institution.

Living in hospital necessarily involves restrictions, and these must be accepted. But the scale of allowance paid to the student nurse should not be such as to exacerbate these restrictions and impose a rigid limit upon her real freedom while off duty.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED JAN. 18

Notifications.—Smallpox, 0; scarlet fever, 1226; whooping-cough, 2192; diphtheria, 256; paratyphoid, 6; typhoid, 4; measles (excluding rubella), 11,087; pneumonia (primary or influenzal), 1223; cerebrospinal fever, 58; poliomyelitis, 9; polioencephalitis, 1; encephalitis lethargica, 1; dysentery, 72; puerperal pyrexia, 153; ophthalmia neonatorum, 69. No case of cholera, plague, or typhus was notified during the week.

Deaths.—In 126 great towns there were no deaths from scarlet fever, 1 (0) from an enteric fever, 5 (0) from diphtheria, 15 (0) from measles, 18 (0) from whooping-cough, 98 (13) from diarrhœa and enteritis under two years, and 85 (13) from influenza. The figures in parentheses are those for London itself.

Leeds reported the fatal case of an enteric fever. Birmingham had 6 deaths from influenza. There were 12 deaths from diarrhœa and enteritis at Manchester and 7 at Birmingham.

The number of stillbirths notified during the week was 291 (corresponding to a rate of 27 per thousand total births), including 32 in London.

a week by a senior consultant, to whom the general practitioner would stand in the relation of registrar. This suggestion may give offence to some very able general practitioners who are, for example, experienced surgeons; but it would ensure a higher standard of care for the inpatient than is universal in many of the smaller hospitals.

THINLY POPULATED AREAS

To concentrate all country doctors in health centres might be tidy but is clearly impracticable. In scattered areas it would often mean a journey of many miles to a consultation, while it would, of course, be equally inconvenient to the doctor making a visit; in remote villages, as for example in parts of central Wales, there is no alternative to continuing the present one-man or two-man practices.

It may be hoped, however, that the start of the new service will be the occasion for improving conditions for both doctor and patient in these isolated parts. Wherever possible, doctors should practise at least in pairs. The absence of the man practising alone while answering a distant call or through taking a half-holiday may mean that no other doctor is readily accessible in an emergency. Where practice in twos is out of the question, the junior man at the nearest health centre might act as relief.

For patients in outlying parts a visit to hospital for consultation is a heavy undertaking, involving often a full day's travel and sometimes a night's stay at the other end. The hardship can be, but too seldom has been, mitigated by giving priority to country patients at the hours best suiting them, and by grouping outpatient days so as to ease the arrangement of communal transport. Where the nearest health centre is much closer or more easily reached than the hospital, specialists should, wherever possible, themselves travel there to see patients.

OTHER CONSIDERATIONS

Because distance plays so important a part in his work, the country doctor cannot conscientiously look after as many patients as his urban counterpart; yet his travelling expenses are much greater. This financial handicap might be offset, for example, by ruling that the patient three to six miles away should count as $1^{1}/_{2}$ patients, and the patient six or more miles away as 2 patients—this applying both to capitation payments and to the maximum numbers on the list. This would mean that the practitioner would be given the chance of earning the same maximum either in town or country, but the greater the distances the smaller would be his list. If transport were to be supplied by the Ministry of Health the question of car expenses would not arise; but if the doctor continues to provide his own car there will have to be a basic salary or allowance, and this again could be varied according to the proportion of patients living at a distance.

Country practice has always been a very arduous profession. Many of its former amenities have disappeared with improvement of telephone communications, and the single-handed doctor has literally to run a 24-hour service. Organisation in health centres is the logical answer, but it must not be achieved at the cost of what are still the outstanding characteristics of the country doctor—his close personal relationship with his patient, his self-reliance, and his sense of responsibility. If these were to disappear in a standardised form of penny-in-the-slot medicine, the health centre, for all its advantages, would still be to the disadvantage of the patient. The country doctor must be allowed to retain his individuality, and to "run the local show" for the benefit of what used to be his own practice, without having to keep an eye all the time on powers-that-be who know nothing of local conditions.

Reconstruction

THE PAY OF STUDENT NURSES

CASE FOR AN INCREASE

FROM A CORRESPONDENT

It is now some six years since the Rushcliffe Committee was set up to reconsider the rates of pay for nurses. The committee is composed of two panels, one comprising representatives of the employing committees—members of voluntary-hospital boards, of local authorities, and of other bodies—and the other representatives of the nurses, who are for the most part matrons. The committee's recommendations reflect the opinion prevalent in authoritative nursing circles that the student nurse should still be content with low remuneration during her training provided her financial prospects after qualification are improved.

The rates for student nurses have quite recently been revised and now stand at £55 for the first year, £65 for the second, £75 for the third, and £95 for the fourth year. Ex-Service candidates get an additional £25 in the first year, £20 in the second, and £15 in the third. But even so the rates remain low, and the case for raising them demands consideration.

ARGUMENTS AGAINST CHANGE

The view that no further increases are desirable in the rates of pay of the student nurse is based on two main arguments which to some extent overlap.

1. It is contended by the nursing authorities, and indeed by many nurses, that the emoluments of the student nurse should not be regarded as *pay* at all. One is reminded of the fact that at many of the well-known hospitals the student nurse used to be called upon to pay fees—with the inference that she is very fortunate to receive any allowance whatever. In what other profession, one is asked, is the student paid while training for a qualification? Where else does she get her board, lodging, uniform, and laundry free?

The answer to these questions is, of course, "In no other profession"; which seems to lead to a logical conclusion that the student nurse is, compared to her friends in training elsewhere, very fortunately placed. But the argument depends on a comparison of professions, and actually there is no comparable profession in which a girl both receives pay while in training and is asked to undertake such exacting responsibilities. This fact so weakens the argument that it becomes negligible unless confused with the one which follows below. Indeed these rhetorical questions do a great deal of harm by obscuring the issue.

2. Much more important is the contention that a high rate of pay would detract from the student status of the nurse. If further funds are available, it is said, let them be devoted to much-needed improvements in the educational facilities rather than to increasing the small salary paid while a nurse is *in statu pupillari*.

There is a good deal of force in this argument when used against any attempt to raise the salary to a level at which it could be deemed attractive; but though it establishes an upper limit, it does not really help us to decide whether the present scales are high enough. It may be, and sometimes is, used to discourage efforts to adjust the current "small salary" to modern social conditions. When it is allowed to dominate discussion, as it has apparently done in the deliberations of the Rushcliffe Committee, it prevents examination of the factors which ought to govern the actual amount to be paid.

PURPOSE OF THE STUDENT'S SALARY

What is the purpose of granting a "small salary" while in training? If it is not primarily to be regarded

Letters to the Editor

CORONARY DISEASE

SIR.—Professor Ryle's contention (Nov. 9) that ental and emotional strain are potent factors in causing ronary thrombosis in professional men. so sceptically ceived by Sir Henry Bashford (Nov. 23), gets a certain nomy support from the obituary columns of the *urnal of the American Medical Association* (September–ovember, 1944).

I find that in 1000 consecutive notices where the cause as given—and very rarely was it not—22% of the eaths were ascribed to coronary thrombosis. The really teresting observation, however. was that of a select % whose worldly fame merited an obituary of over fteen lines no less than 41% died of coronary disease—ouble the number among their less conspicuous olleagues.

	1000 *obituaries*	72 "*famous*" *men*
verage length of life	67·6 years	67·1 years
ied of coronary thrombosis ..	22·3%	40·7%
ied of other cardiovascular disease	32·7%	38·6%
Total	55·0%	79·3%

The above figures show that the greater incidence of coronary disease among the "famous" men cannot be accounted for by their being older than the less famous. There seems. then. to be a definite relation between "greatness" in the profession and susceptibility to coronary disease. Moreover the relation does not apply to other forms of cardiovascular diseases, for the difference observed on the samples taken is not significant.

The "greater" the man the poorer the arteries seems to be the rule; but whether this is due to a greater burden of work and responsibility is conjecture only.

London, S.W.3. DONOUGH O'BRIEN.

FATAL USE OF A DANGEROUS UNIVERSAL DONOR

SIR,—Major Sevitt (Dec. 28) has rightly observed that there is slender evidence for the conclusion by Dr. Morgan and Dr. Lumb (Dec. 14) that their patient died as the result of a transfusion of blood containing high-titre incompatible anti-A agglutinins.

This conclusion can be established with certainty only when it has been demonstrated that the patient's own cells have been hæmolysed, and that the cells of the transfused blood are showing a normal survival-time in the recipient's circulation. Morgan and Lumb's paper is of value. however. in reminding us of one of the dangers associated with the routine transfusion of group-O blood. They recommend that group-O blood should be accepted as "universal donor blood" only if the titre of the anti-A and anti-B agglutinins in the plasma is below 256. This is a wise precaution, but their paper would have still further assisted in combating the hazards of blood-transfusion had it contained a warning that the phrase "universal donor blood" is a grave misnomer which should be deleted from medical terminology.

The term "universal donor" was introduced when it was thought there were only two corpuscular agglutinogens—those we now call A and B. When neither of these could be demonstrated in certain red-blood corpuscles it was concluded that blood of this type was free from all potentially dangerous reactors. This conclusion has been proved false. Corpuscles lacking A and B contain an agglutinogen O; 80% contain a factor M and a similar number a factor P. The plasma of some potential recipients contains natural antibodies incompatible with one or more of these agglutinogens. Group-O blood will be accepted as "universal donor blood" by none of these recipients. In addition, all corpuscles of group O contain a minimum of three Rh and/or rh factors. Women who have had stillborn or jaundiced babies, and patients who have had previous blood-transfusions, may have formed immune antibodies to one or more of these factors, and may react fatally if transfused with "universal donor" corpuscles containing the corresponding antigen. 85% of corpuscles of group O contain an Rh agglutinogen D. Levine has demonstrated that the indiscriminate transfusion of females with corpuscles containing this antigen may result in the recipient giving birth to a stillborn baby at a subsequent pregnancy. Our so-called "universal donor" corpuscles are still further complicated by antigens described as Kell. Lutheran. and Lewis.

It is very evident, therefore. that there can be no such thing as "universal donor blood." The term should be assiduously avoided and the fact faced that, before transfusion, all blood to be given must be tested for direct compatibility against the potential recipient's serum or plasma. The only exception to this rule should be the case where urgency is too extreme to permit of such a test.

At a first transfusion incompatible reactions from natural antibodies in the plasma of the recipient can be excluded by the simple type of slide-compatibility test well known to all pathologists—a test which all practitioners giving transfusions should be prepared to undertake. More elaborate tests are required when the patient has received a previous transfusion, and especial caution is necessary when these transfusions have been accompanied by reactions, or the recipient is a woman who has given birth to a child affected with hæmolytic disease. All such cases should be referred to a blood-group laboratory whenever practicable. The serious consequences resulting from sensitisation to the D antigen will be prevented only when it becomes possible never to give D-negative females blood containing the D antigen.

"Group-to-group" transfusion will prevent the type of reaction described by Morgan and Lumb. There is an even more urgent reason, however, for the immediate adoption of this practice. The giving of group-O blood to patients other than group O is placing a great and unnecessary strain upon the group-O blood-donor panels. It behoves all clinicians therefore not only to test for compatibility before transfusion but to make every effort to ensure that recipients are given blood of homologous group. More blood will then be available, and there will not be the same risk that the group-O donor may suffer such a surfeit of bleeding that his appetite for blood donation may "sicken and so die."

GEOFFREY H. TOVEY
South-West Regional Transfusion Centre, Southmead, Bristol. Regional Transfusion Officer.

ACUTE PORPHYRIA

SIR.—The article by Jorgensen and With in your issue of Jan. 11 serves a valuable purpose in drawing attention to the syndrome of acute porphyria, but we feel that a number of statements may prove misleading.

In reference to lead poisoning, the authors state that the condition encountered is a porphyria and that the only porphyrin excreted is coproporphyrin I. According to Waldenström's[1] classification, to which the authors refer, the term *porphyria* is reserved for two familial diseases of unknown ætiology; increased excretion of coproporphyrin following poisoning by lead, &c., is regarded as symptomatic and is referred to as *porphyrinuria*. Whereas the porphyrin of normal urine[2] and that of patients with hæmolytic anæmia[3] is predominantly coproporphyrin I, that excreted in large amounts in lead poisoning has definitely been identified as coproporphyrin III,[4] a fact which may be of value in the diagnosis of the condition.

Secondly. whereas Jorgensen and With do not make any reference to the simple and effective test for porphobilinogen devised by Watson and Schwartz,[5] we would point out that whenever routine examination of a urine reveals a positive Ehrlich aldehyde reaction but a negative Schlesinger test, the presence of porphobilinogen should be suspected, since this material, unlike urobilinogen, does not give a green fluorescence when alcoholic zinc acetate is added to urine containing it. Watson and Schwartz's modification of the aldehyde reaction may then be applied for confirmation.

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1. Waldenström. J. *Acta. med. scand.* 1937. suppl. 82.
2. Grotepass. W. *Z. physiol. Chem.* 1938, 253, 276.
3. Dobriner, K. *J. biol. Chem.* 1936, 113, 1.
4. Grotepass. W. *Z. physiol. Chem.* 1932. 205. 193. Vigliani, E. C., Waldenström, J. *Dtsch. Arch. klin. Med.* 1937, 180, 182.
5. Watson, C. J., Schwartz, S. *Proc. Soc. exp. Biol., N.Y.* 1941. 47, 393.

In England Now

A Running Commentary by Peripatetic Correspondents

ONE of two motives underlies the questions students ask their lecturers—a genuine desire to know, and a hope of tripping up the speaker with cunningly framed questions, the answers having been boned up by the questioner the previous night. The former motive I appreciate; the latter I abhor. One sinister smirking character has quizzed me this week as follows: Monday, the formula of Warburg's yellow enzyme; Tuesday, some obscure mathematical point about Donnan equilibrium; Wednesday—ah, revenge is indeed sweet. Our studies on gastric juice demanded a volunteer on whom to demonstrate the passage of a Ryle's tube. Yes, you've guessed it; eager hands propelled my bête noire to the front of the class. There have been no more questions since.

* * *

The medical entomologist sees many people with delusions that insects are crawling over them—what the public calls "ants in the pants." It is very uncommon to find insects in such cases, even where there was originally some actual parasitic infestation which gave rise to the delusions, for these people have usually been practically bathing in every known insecticide and disinfectant. But the entomologist can never convince them that the small pieces of scurf or stick which they produce are not dangerous parasitic insects, and all one's colleagues in turn are usually pestered with no better success. I hope that the psychiatrist has more luck; anyhow he will probably get a fee for his pains.

* * *

The whistle blows, my wife waves, and the train slides out of the station. Over to the right stands Table Mountain with the evening sun pouring over Kloof Nek, and a few wisps of cloud driven along the face by the south-easter. The masts and funnels of ships in the harbour can be glimpsed on the left. I settle down and look at my stable companions, colleagues for 36 hours in the run to Johannesburg. For I am off on my annual visit as an external examiner, and have before me 1000 miles of travel.

The compartments in the train hold either two or four passengers. If one is lucky one gets a small compartment to oneself, but since the war began such good fortune is rare. A large compartment with four is a definite squash. Tonight we are three. We look with interest at each other and introduce ourselves. One is a traveller for a large pharmaceutical firm with whom I am able to do good business before the end of the journey. The other is an elderly Afrikaans farmer, very interested in politics judging from the periodicals he has provided himself with. We are all actuated by the same conditionèd reflex as we make our way to the dining-car.

The thirty-odd miles of the Cape Flats slide by. This is a sandy but fertile area where vines are cultivated and market gardens raised. Presumably it must once have been under the sea, the Cape peninsula being an island. We soon reach the mountains. The railway runs up one valley, through a gorge, and then in another valley. The scenery here is as fine as any I have seen anywhere, not excluding Switzerland. The valleys are planted with vines, fruit orchards, and cereals. The picturesque old white Dutch homesteads can be seen peeping out from plantations of oaks. When it is too dark to see any more we retire to our compartment. Luckily I sleep well on trains and hear little of what has been happening during the night. The train has been nosing its way among the mountains. Finally, realising that a frontal attack is best, it boldly climbs up to the top through the Hex River pass. This fine piece of engineering takes the line up 1300 feet in 36 miles. The railroad winds up the side of the mountains, often with a sheer drop of several hundred feet on one side, and great care has to be exercised in taking trains down.

On waking we find ourselves in the karroo. At first sight one cannot imagine a scene of greater desolation—the prospect is almost frightening. It is as if the Almighty, having several million tons of rock over after the Creation, hurled them here in indiscriminate piles. Low hills, covered with a few thin straggly bushes, alternate with dried watercourses. The karroo is an acquired taste certainly, but it has an austere beauty which grows on one. There is no doubt it could be made productive if water were available. As the train draws up at a wayside station one sees green areas of cultivation, with windmills pumping water from bore-holes. The station-master exchanges staffs with the engine-driver, some passengers are met by farmers from the district, the engine gets a fresh supply of water, and we are off again.

Gradually the terrain becomes flatter, punctuated with conical hills, some with the top cut off. We stop every hour or so to let a Cape Town train pass, or at a karroo town, where often the entire population seems to have come to the station. As the sun climbs, it gets hotter and hotter. Little puffs of wind make whirlwinds of dust on the plains, and the sun shimmers in the distance and produces mirages. We go with relief to lunch and consume large volumes of beer, returning to sleep on our beds till tea-time. By now it has cooled. As the sun sets, one sees the karroo at its best; the colours of sunset light up the landscape, ending with a deep purple which fades finally into night. In the evening we reach Kimberley, *no longer a wild mining town*, but a sedate and respectable city. The farmer has taken us to his bosom, for after we leave Kimberley he produces a bottle of special van der Hum, made by a neighbour, and we drink his health. Thus fortified we again turn in.

Next day we must be early astir, for the train arrives at 7 o'clock. Too soon the waiter has brought our early coffee. The Transvaal scenery is streaming by. There has been rain, and the rolling plains are green, a contrast to the karroo. Before long one sees a mine dump, a large and unsightly pile of yellowish-white earth. Then comes the succession of Rand towns with mines and mine dumps more and more frequent. Finally we run into Johannesburg. My stable companions and I bid each other farewell; my co-examiner is waiting on the platform; now for a bath and breakfast, and then for grappling with the examination candidates.

* * *

Cautionary Tale.—I was very much on my mettle. To begin with she was exceptionally charming. Then her disability excited my warmest sympathy. And finally I represented, however imperfectly, the profession against unorthodox practice.

One of our most successful comedy actresses, she had suffered for some weeks from paroxysmal sternutation or—if you prefer the more homely equivalent—obstinate attacks of sneezing; naturally a serious inconvenience in her professional activity. Failing to secure relief from her own doctor and the specialists to whom she had been referred, she consulted a West End chiropractor who attacked the problem by a somewhat ungentle manipulation of her nose, not the least attractive of her features. That was on a Friday morning. There followed twenty-four hours of nasal tranquillity which took her back to her benefactor with words of gratitude and admiration and appropriate uncomplimentary observations on orthodox practitioners. But alas! Sunday saw a resumption of her affliction, this time in highly aggravated fashion.

My question was not in the least malicious. "Did you go back and tell him?" She did not. Thus, I reflected, are reputations made. All that Saturday she had sung the praises of the chiropractor all over London, and emphasised the ineptitude of the medical profession. Even the manipulator had a perfect right to believe in his efficiency. "D—n it all," he must have said to himself, "the patient came unsolicited to tell me of my success. What better proof could there be?"

We may smile indulgently at the gullibility of the public. We may find an easy explanation on orthodox grounds—that in this instance any manipulation might through shock or the production of adrenaline be responsible for the temporary improvement. But it is well to face facts. Should we be any better than our unqualified competitors if we heard only of our successes and were denied the chastening influence of confrontation with our failures?

oth adrenals were removed in rabbits, seemed, however, produce fibrinolysis. The phenomenon may in some ay be related to the adrenal cortex.

British Postgraduate Medical School. A. L. LATNER.

PSYCHOGENESIS OF RHEUMATISM

SIR,—The solution of the problem which has hitherto een presented by the rheumatic diseases should not ass unnoticed, and Mr. Le Vay is to be congratulated n this achievement (Jan. 25, p. 125). Like most great iscoveries it is after all quite simple:

1. "At least three-quarters of rheumatic disease is non-rticular, producing aches and pains many of which are sychogenic. Fibrositis as an explanation for these has no athological basis and is discredited as a clinical entity."

2. "It is less easy to fit rheumatoid polyarthritis into the psychosomatic pattern." (Nevertheless Mr. Le Vay manages o do so satisfactorily.)

3. Ankylosing spondylitis "seems to fit certain personality situations . . . and the time of onset and recurrences is often related to stress or frustration in daily life."

Osteo-arthritis remains the only important member of this group not specifically accounted for, but it seems likely that this is included, along with Paget's disease (osteitis deformans), under the heading of osseous neurosis.

London, W.1. W. S. C. COPEMAN.

INFECTIVE HEPATITIS FOLLOWING MUMPS

SIR,—I was recently interested to observe two cases of infective hepatitis following epidemic parotitis. The first occurred in a boy of 4 years within a week of the onset of the illness and while the parotid swelling was still present. The second occurred in an adult five weeks after the onset of the parotitis.

Both patients had considerable jaundice and hepatic enlargement and recovered within a reasonable time; they were unfortunately observed in a district where technical investigations were not possible. I have not so far found any reference in the literature to this combination, and wonder whether the virus of epidemic parotitis can be held responsible for both conditions, or is capable of the necessary mutation.

London, W.C.1. B. MCNICHOLL.

HEALTH CENTRES OF TOMORROW

SIR,—Your articles on the health centre are excellent, and if the new health service were to develop along lines such as you lay out in this series 90% of general practitioners would in the end come to look upon the new service as the salvation of the family doctor.

It was however with great misgiving that I read Dr. Stark Murray's letter of Jan. 18 in which he maintains that ten general practitioners could not keep a laboratory technician fully occupied and that the proper solution was a central laboratory. I maintain, Sir, that if five doctors were working as a group and using regularly the ordinary routine laboratory tests they could fully employ one technician. To get a specimen to a central laboratory and wait days for a result is a very great deterrent to the use of the laboratory. To be able to have the specimen dealt with on the premises and to receive the result in 24 hours would encourage the appeal to clinical pathology.

Dr. Stark Murray's experience of the volume of work sent to a central laboratory is no criterion of the amount which would be done in a properly equipped health centre. The present generation of family doctor has had to allow clinical pathology to become largely the prerogative of the hospital and specialist. If he had it easily available he would come to use it more frequently. The younger doctor coming out of hospital will expect its free provision in a comprehensive service and will use it if it is there. It is the younger generation we have to keep in mind.

With regard to X rays the general provision *at present* is debatable, since the apparatus is scarce and costly. But the general practitioner should have easy access to radiography and be able to hold the radiograph for his records just as he does now in the case of his private patients. He should also be able to be present to see his patients screened if he wishes.

In my twenty years' experience in private practice I have looked forward to the advent of a national service where the full means would be readily at hand for the family doctor to give every patient all that his training fitted him to give. It behoves the keen advocates of such a service to strive to ensure that all ordinary aids are available to the family doctor and his patient.

I realise that Dr. Stark Murray is keen on such a service, but he should widen his horizon beyond a central laboratory, which has its own definite functions, and give the laboratory help where it is needed—in the health centre.

Newcastle-upon-Tyne. H. B. PORTEOUS.

AIDS TO DEFÆCATION

SIR,—When the rectum is loaded and defæcation difficult, one of the simplest aids to defæcation is to press gently on the rectum with the fingers of the left hand between the left tuber ischii and the anus.

This manœuvre expresses the lower and most constipated mass of fæces, and the remainder follows through induced action of the bowel. The anal canal and anus should first be lubricated with soft paraffin or surgical jelly.

RECTUM.

SUPRASPINATUS SYNDROME

SIR,—In his interesting article (Jan. 18), Mr. J. R. Armstrong draws attention to the almost uniform failure of ordinary conservative measures in cases with calcified deposits in the region of the supraspinatus tendon.

In 1943 my attention was drawn by Dr. M. Weinbren, of Johannesburg, to the beneficial effects of deep X-ray therapy in this condition; and since my return to this country I have learned that similar treatment has been given at various departments of radiotherapy over here, though it has received little publicity.

From the limited experience of 3 patients submitted to this treatment I can testify to its efficacy. Each noted an abatement of pain after a short course of deep therapy, during which the arm was rested in a sling. Each regained a full range of painless movement after three or four weeks of graduated active exercises. In one case the calcified deposit, ill defined in the first radiograph, "hardened up" and became more sharply outlined during the period of observation; but the other two, with deposits already sharply defined at their first attendance, showed no radiological changes during the course of treatment.

County Hospital, Pembury,
nr. Tunbridge Wells. J. H. MAYER.

A MORAL PROBLEM

SIR,—Surely there is some æsthetic content in the way knowledge is acquired? After all, truth and beauty are said to go hand in hand.

In his approach to the problem of the Nazi experiments each of us tends to be governed by his own feelings. Unfortunately, in this present age, when moral standards have partly crumbled away, we shall have to make up our own minds on this and allied problems, such as euthanasia. Otherwise we may find ourselves in the position of the "experimenters" in the concentration camps, whose minds were made up for them.

Calcutta F. B. CHARATAN.

PERITONEAL DIALYSIS

SIR,—In connexion with your editorial (Jan. 18), and the article by Mr. Reid and his colleagues (Nov. 23, p. 749), we would like to raise one point. This is that the flow across the peritoneal membrane is two-way. If an isotonic crystalloid solution is used for irrigation, then a large quantity of water is absorbed (in one of our cases 14,000 c.cm. of fluid was used for irrigation in 24 hours and 5000 c.cm. was absorbed in spite of efficient drainage by suction throughout); the danger is pulmonary œdema, because the patient may be waterlogged before irrigation commences. Conversely, if a hypertonic colloid solution is used, water will be removed from the blood, and great care must be taken to avoid hæmoconcentration.

We have avoided the danger of peritonitis in the 4 patients subjected by us to peritoneal irrigation, but every precaution is necessary.

St. Thomas's Hospital, London,
S.E.1.
C. G. ROB
J. S. RICHARDSON.

We consider it dangerous to advise that if, in a suspected case of acute porphyria, porphobilinogen be absent from the specimen examined, any examination for increased amount of porphyrin may be dispensed with. The conversion of porphobilinogen to porphyrin and porphobilin takes place with some speed in these acid urines and might have occurred to completion before the specimen was examined. Direct spectroscopic examination of a suspected urine before and after the addition of a few drops of concentrated hydrochloric acid is extremely easy to perform and in our hands has proved very informative and reliable. Confusion of the absorption spectra of porphyrin metal complexes, frequently seen in these urines, with the bands of oxyhæmoglobin is readily avoided if the shift in position on addition of the acid is watched for. There is no justification for describing the test, performed in this way, as useless or misleading.

Should a quantitative determination of uroporphyrin be desired, a technique based on adsorption behaviour is available.[6]

We feel that too little attention is paid by Jorgensen and With in their article to the work of Watson and his collaborators[7, 8] on the nature of the uroporphyrin III fraction, in which the porphyrin hitherto accepted as uroporphyrin III is alleged to be in reality a mixture of at least two porphyrins. It is clear that further work is necessary before one can dogmatise on the significance of structural differences in the realm of porphyrin metabolism.

We would also like to draw attention to the fact that the structure for porphobilinogen proposed by Waldenström[9] and quoted by Jorgensen and With is unsatisfactory in that consideration is not given to the necessary introduction of two carbon atoms (as methine bridges) when porphobilinogen is transformed into uroporphyrin, or of one such carbon atom during the formation of porphobilin.

C. H. GRAY
C. RIMINGTON.

London.

THE CRUX

SIR,—Your leader of Jan. 25 makes good reading; but surely the crux of the matter is implicit not so much in that article, or in the admirable letter by Mr. H. Taylor, as in the other letter, entitled Rescue of General Practice, by Mr. Wilfrid Adams. Though, in order to uncover its final meaning, one has to ask the question as to why this rescue is necessary. The answer then comes out—because the new Act plans to abolish the private patient who is in fact the crux.

The private patient is the crux because he provides the *fee*. Now I know it is fashionable to deprecate money, especially money freely earned. The very young often despise it; those who lack it hate it; and the B.B.C. discussion groups, together with those who talk unctuously of "the community," try to cry it down.

Yet in reality the private fee is an inestimable boon; for it gives more than anything else to the general practitioner his *chance* to excel: to become proficient in minor surgery; in modern therapeutics, psychology, anæsthetics, X rays, &c.; and here I can see the medical purist raising his eyes in horror at the thought of these crafts being handled by anyone but the appropriate specialist. I am aware also that the quack, whether medically qualified or not, may at times cash in on the fee system; which is a pity, but we live in an imperfect world.

I long to discover, but so far without success, how the 100% capitation system or the whole-time salary can operate in general practice with anything approaching the efficiency of the private fee as a stimulant to good work on the part of the doctor. I am therefore compelled to visualise the new health service as a great leveller (which one must admit is what some socialists seem to want). One in which the slacker or the nincompoop will find himself on equal financial terms with the born doctor; and wherein the needs of the patient will be met by a closely knit trinity—the district nurse, the relieving officer, and the domiciliary health (alias G.P.). And I draw the inevitable conclusion that only way for a vigorous medico to escape from embrace is by getting himself "upgraded" into ranks of the petty specialists.

And what of the residuum, the "backbone" of profession, to whom the high-ups still pay lip service?

Time runs short. The new Act (axe I nearly by mistake) will soon be upon us. We must speak out our fears. We must make them known not only to authority but also to the students who so far don't know. For if these problems are neglected the new service, however imposing its machinery, will bring disillusionment all round.

Buxted, Sussex. W. R. E. HARRISON.

ANXIETY AS A CAUSE OF FIBRINOLYSIS

SIR,—The following experiments, carried out between 1939 and 1945, seem to find support in the observations of Dr. Macfarlane and Dr. Biggs (*Lancet*, 1946, ii, 862) on the relationship between emotional upset and fibrinolysis.

1. *Fibrinolysis After Anæsthesia but Before Operation.*—Blood was collected from three patients who had just received a general anæsthetic and were about to undergo a major operation. A further sample of blood was also collected after the operation. The phenomenon of fibrinolysis was studied in each case according to the technique of Macfarlane.[1] The results are tabulated below.

Expected operation	Sex	Fibrinolysis	
		Postanæsthetic	Postoperative
Repair of femoral hernia and varicocele	M	Complete in 3 days	Complete in 10 hr.
Gastrectomy	M	Almost complete in 3 days	Complete in 24 hr.
Thyroidectomy ..	F	Almost complete in 3 days	Almost complete in 3 days

Immediately after the anæsthetic we have the combined psychological trauma of the expected operation and the general anæsthetic. The actual trauma of operation seems to make the fibrinolysis more pronounced.

2. *Fibrinolysis in Emotional Upsets not Associated with Operation.*—Blood was examined after collection from patients in various conditions of anxiety. Two had just heard their first air-raid warning, two were suffering from thyrotoxicosis, and three were diagnosed as anxiety states. The results were as follows:

Condition	Sex	Fibrinolysis
First air-raid warning ..	M	Complete in 24 hr.
First air-raid warning ..	M	Complete in 24 hr.
Thyrotoxicosis	F	Complete in 3 days
Thyrotoxicosis	F	Complete in 3 days
Anxiety state	M	Complete in 24 hr.
Anxiety state	M	Almost complete in 24 hr
Anxiety state	M	Almost complete in 24 hr

3. *Control Experiments.*—Samples of blood from fifteen transfusion donors were studied. None of these showed any fibrinolysis, even after a period of some weeks.

The number of cases studied is somewhat small and the test employed was of a qualitative nature. Nevertheless it would seem a fairly clear-cut observation that various conditions of anxiety can produce fibrinolysis.

The mechanism whereby anxiety leads to an increased content of blood fibrinolysin has also been under study. So far it has been shown that the addition of adrenaline to blood does not lead to fibrinolysis.

It is also interesting to note that fibrinolysis could not as a rule be reproduced in rabbits by operation or by violent death produced by a sharp blow on the back of the neck. A limited number of experiments, in which

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6. Rimington, C. *Biochem. J.* 1943, 37, 443.
7. Grinstein, M., Schwartz, S., Watson, C. J. *J. biol. Chem.* 1945, 157, 323.
8. Watson, C. J., Schwartz, S., Hawkinson, V. *Ibid*, 1945, 157, 323, 345.
9. Waldenström, J., Vahlquist, B. *Z. physiol. Chem.* 1939, 260, 189.

[1] Macfarlane, R. G. *Lancet*, 1937, i, 10.

gent matters which arise in practical instances in dinary life?

Mr. Strachey: If there were any reflection on the ork which this committee is doing, or on the assiduity ith which they are performing their functions. I should sent it very much indeed, because I think they have erformed these functions over a number of years—ery arduous and often invidious functions—and they ave done so voluntarily and in an honorary capacity. certainly think they have performed them as well as hey could be performed. I was most careful to find out he average time which appeals made to the committee ake, and it turned out to be nine days, which seems to ne to be not unreasonable.

Mr. D. G. Logan said he hoped the Minister would give power to medical men to give prescriptions for extras to be given to their patients. In the poorer areas t was absolutely essential that the medical man's advice should be taken: lives were saved by medical men and not by committees.—Mr. Strachey: I could not possibly change the system. (Cries of "Why not?") For reasons which all my predecessors appreciated, I do not wish to use any but the most moderate language, but from the amount of milk given on medical prescriptions it certainly appears that there must be some eminent and independent medical authority to review these cases.

Mr. Churchill: Yes, but might not the process be conducted in reverse—namely, that if a medical man, a doctor attending a patient, certifies that the matter is urgent, the diet should be given within the approved limits, pending reconsideration by higher authority?—Mr. Strachey: That would be very good if it could be done. The medical committee has laid down the categories of illnesses, ailments, and conditions which qualify for the extra ration.

Mr. Churchill: The point is that the doctor attending a patient should have the responsibility of saying that special patients should be allowed to have the extra rations until the matter is dealt with by the higher authority.—Mr. Strachey: If the doctor certifies that the patient is suffering from a condition which on the scales laid down by this committee carries with it the extra ration, then he does automatically and immediately receive that extra ration. Lieut.-Commander G. Braithwaite: The patient has to have the right disease before he can have it.

Mr. Strachey was pressed further on the subject, but he maintained his ground that the system could not be changed.

SOME CASES

Sir E. Graham-Little asked the Minister in how many cases in the last six months his medical advisers had overruled advice as to dietetic and other requirements given by medical practitioners in actual charge of the patients concerned whom his advisers had not themselves seen at any time.—Mr. Strachey replied: During the six months to Dec. 31, 1946, 235 applications which had been referred to the medical advisers were refused extra supplies of rationed foods as a result of the advice which was tendered.

Sir E. Graham-Little asked the Minister whether he would review the case of a patient discharged from hospital after a severe operation before convalescence, owing to shortage of beds, and placed under the care of a general practitioner, who applied for special dietetic allowances and was refused by his department; and if he would now grant these allowances.—Mr. Strachey replied: In this case a doctor asked that a patient who was discharged from hospital after operations for general peritonitis, and already receiving extra milk and eggs, should also receive extra meat, cheese, sugar, butter, bacon, and bread. The application was refused as the committee recommended that the ordinary rations of foods other than milk and eggs are sufficient for convalescence from any illness. A review now would be inappropriate as the doctor recommended the additional rations for six weeks from July 25, 1946.

Sir E. Graham-Little asked the Minister if he would review the decision in a case of a radiologist who, to carry out a test for bile function on one of his patients, required to give a diet of eggs beaten up with milk, and was refused the grant of the eggs by the medical advisers of his department who had no knowledge of the case; and if he would now authorise the required allocation.—Mr. Strachey replied: An application was made in June, 1945, by a doctor for supplies of eggs for six unnamed patients to determine the function of the gall-bladder. The application was rejected because the Ministry's medical advisers considered that the same purpose would be served by other fats.

Sir E. Graham-Little asked the Minister how many members of the committee were under 40 years of age; were in active practice as consultants and as general practitioners; and at what date the schedule of ailments with recommendations to deal with each was last revised. —Mr. Strachey replied: One member is under 40. Six members are in active practice as consultants. There are no general practitioners. The schedule of ailments is constantly under their review.

EXTRA MILK

Asked by Mr. Churchill whether there was any reason to believe that doctors had been abusing the right of giving advice as to extra diet to their patients in the past few years, Mr. Strachey replied: I should not like to accuse the medical profession of abuse in the matter, but the amount of extra milk given on medical priority grounds has caused concern to myself, and, on other occasions, to my predecessors and to this medical committee, and we have asked doctors, through the medical press, to have regard to the need, in the case of milk, for restricting the extra amount which is granted on medical grounds.

Mr. S. Hastings asked the Minister if he would give figures to compare the amount of priority milk ordered by doctors in residential areas such as Bath, Bournemouth, Hove, or Hampstead with that in industrial areas like Tyneside or South Wales.—Mr. Strachey: In December, 1946, the number of domestic consumers obtaining priority milk on medical grounds per thousand of population was Bath and Bathaven, 31; Bournemouth and Christchurch, 38; Hove and Brighton, 33; Hampstead, 47; Tyneside, 15; S. Wales, 15.

QUESTION TIME

Composition of the National Loaf

Sir E. Graham-Little asked the Minister what was the present composition of the national loaf, with special reference to the measure of extraction in the flour supplied, the proportion of that flour derived from home-grown wheat and imported wheat respectively, and the extraneous items incorporated not derived from wheat; and what proportion of the flour used had been treated with agene, which had been shown recently by animal experiments to be noxious to life.—Mr. Strachey replied: The national loaf is at present composed of wheat flour of 85% extraction. The proportion of the flour derived from home-grown wheat is approximately 25%. The remainder is derived from imported wheat. Imported white flour is mixed to the 85% extraction flour in mills in England and Wales at the rate of 5% of the output and in Scotland and Northern Ireland at the rate of 10%. To each 280-lb. sack of flour 14 oz. of creta preparata are added. The proportion of the flour used which has been treated with agene is approximately 90%. This substance has been used by millers as an improver for more than 20 years, and there is no evidence to show that it is harmful to human beings. My department is studying the implications of the work recently published showing its effect on dogs.

German Trials

Mr. Hastings asked the Chancellor of the Duchy of Lancaster whether permission was given to Mr. Kenneth Mellanby, D.SC., to travel to Germany in the uniform of a British press correspondent to talk to German doctors now on trial at Nuremberg about their experiments on human beings; and what use would be made of his report.—Mr. J. Hynd replied: Dr. Mellanby travelled as an accredited representative of the *British Medical Journal*, and was given the usual facilities afforded to a press correspondent. The use which is made of his report is a matter for the editor of the publication concerned.

Parliament

FROM THE PRESS GALLERY

Gloomy Food Outlook

IN the House of Lords on Jan. 22 Lord DE L'ISLE AND DUDLEY called attention to the food situation. There never was a time, he said, when the country stood in greater need of both physical and mental stimulus. More food now would mean greater production, and the administration should concentrate not on exhortations but on securing the food we so badly needed.

Lord HENDERSON, replying for the Government, foresaw continued shortages in the world supply of major foodstuffs throughout the crop year 1946–47; in spite of great improvements in the expected harvests the quantities for international allocation fell short of the claims made on them. Last year the gap was partly bridged, but reserves were not now available, and although the wheat harvests of the four main wheat-producing countries were 7 million tons higher than last year, the quantities for export would be some 6 million tons lower. The outlook for meat threatened a deterioration on last year. Some improvement was expected in oils and fats, but the United States was expected to be a net importer, in which case exports to deficit countries were expected to be lower than last year. Production of sugar had advanced substantially, though the pre-war output had not yet been restored. The Cuban surplus would go to the deficit countries if sugar control was maintained; otherwise it would go to the U.S.A. In Europe domestic food production was much improved, but on the Continent as a whole the production of grain, potatoes, and sugar was only 75% and meat only 55% of pre-war. The unfavourable outlook was further aggravated by the expected deterioration in the machinery of international food allocation resulting from the decontrol policy and rise in food prices in the U.S.A. Food levels in almost all countries except the major producers would continue to be restricted, in many cases severely so.

In spite of international difficulties we had maintained our high consumption during 1946, and for the first half of 1947 we could not expect to do more than that. No startling changes were likely in output from home food production, but recent changes in methods would increase production later on. There was some prospect that world cereal supplies would become easier in the second half of 1947, but such expansion would not largely increase output until mid-1948. A reduction in the bread ration might yet be inescapable. There was a good chance that we should distribute this year as many eggs as we did in 1946. Dried egg supplies would almost certainly be maintained during 1947. There was practically no hope of restoring the bacon ration to 3 oz. in 1947; indeed it might be difficult to maintain the 2 oz. ration. There would be a small increase in the total supplies of butter in 1947, but we were still a long way from having anything like pre-war quantities. It was now hoped that no further cuts would be necessary in the rations of soap and edible fats.

Lord CHERWELL pointed to the stark incontrovertible fact that in the first year of peace we had less to eat than in the last year of war; now, half-way through the second year of peace, in spite of bumper harvests in practically every exporting country, we were told we would have to put up with even more meagre rations. At any rate their Lordships had been spared the statement that thanks to rationing the people were better fed than they had ever been before. That was sheer nonsense, and every housewife knew it. A few people were better fed than before the war because they were no longer unemployed, but that had nothing to do with rationing. There was also every reason to doubt that the people were healthier than ever before. In 1945 absenteeism due to minor ailments increased constantly. All the mortality figures proved was that the diet was not lethal. If the tale of a world food shortage was to be maintained it should be supported by proper facts and figures. He had little confidence in the case presented for more food to the International Emergency Food Committee. The United Kingdom had been extremely ill served.

Lord WOOLTON asked whether the time had not come for a change in the war-time practices reg. the obtaining and distribution of food. The continued stringency of food was hindering production and causing harassing unhappiness to housewives. The Minister of Food should lighten the housewife's burden by reducing the extent of his control and abandoning some of the practices of rationing and control of commodities on points. The time had come to think more of recovery than of doctrine. Rationing should be confined to those foods which the traders of the country could not get in adequate supplies. It was high time that the people had a break in this debilitating austerity; we needed more meat and more fats.

Special Diets for Invalids

Sir ERNEST GRAHAM-LITTLE asked the Minister of Food if he was aware that the withdrawal from a patient in the care of certain doctors in Birmingham, of an allowance of fat essential to the maintenance of the patient's life was followed by his death within a few days and if he would take steps to prevent a recurrence of this overriding of the opinion of doctors in actual charge of a patient.—Mr. J. STRACHEY replied: In the very sad case referred to the patient died of inoperable cancer. My medical advisers inform me that the grant or refusal of an extra fat ration can have had no influence whatever upon the course of this tragic disease. Extra milk and eggs were granted on medical grounds to this patient, and an allowance of butter was in fact granted, after being discontinued for only two days, on compassionate grounds.

Describing the system under which these special allowances of rationed foods are given, Mr. Strachey said: In 1940 the then Minister of Food obtained the help of the Medical Research Council, who set up a Food Rationing (Special Diets) Advisory Committee * to advise the Minister how best to dispose of the limited amount of extra food available for invalids. This independent, honorary, and authoritative committee advises the Minister of Food what categories of illness require special rations and establishes scales of the additional foodstuffs needed for each category. A list of these categories was circulated to every doctor in the country. The doctor's certification that the patient is suffering from the illness specified is always accepted without question. It was so accepted in this case, and the official concerned had to inform the doctor that in such cases two pints of milk daily and three eggs a week were allowed, but not additional butter. The lay official transmitted an incorrect reason for refusing the butter. The doctor then appealed, but there being no reason given for regarding this case as in any way different from others in this category the committee confirmed the refusal, giving the correct medical reasons for doing so. The committee also considers applications from doctors for additional food for patients who would be excluded on a strict application of the scales of allowances for each type of illness. The committee therefore acts as a court of appeal on borderline cases.

Colonel M. STODDART-SCOTT: Will the Minister tell us how frequently this distinguished committee meets and why it took from August 3 to Dec. 20 to get them to agree to provide white flour for a man for whom it was too late, as he died on the 23rd?—Mr. STRACHEY replied: I cannot say without notice whether the committee meets weekly or whether their meetings are arranged in relation to the business before them.

Mr. CHURCHILL: The Minister has read out a long and impressive list of all these great authorities whose high standing is supposed to flatten out all criticism of their work, but has the right hon. gentleman not taken the opportunity when examining all their credentials and qualifications to find out how often they meet and how long it takes them to get a borderline case dealt with? Is he now sure, as we all recognise the intelligence which he is giving to his task, that this impressive apparatus at the top is effectively dealing with the many

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* The members of the committee are now as follows: Sir Edward Mellanby, F.R.S. (chairman), Prof. L. S. P. Davidson, Sir Francis Fraser, Lord Horder, Dr. R. D. Lawrence, Prof. R. A. McCance, Dr. M. L. Rosenheim, Dr. Norman Smith, Prof. J. C. Spence, Prof. H. P. Himsworth (secretary).

Notes and News

BIRTHS IN 1946

The birth-rate in 1946 was 19·1 per 1000 population, which 3·0 above that for 1945 and the highest rate in any year ice 1923. These figures are given by the Registrar-General r England and Wales,[1] who reports that the number of ve births registered during the year was 820,268—the ghest figure since 1921. The following table compares the tal rates for live births, stillbirths, and deaths in 1946 with e corresponding figures for 1945 and 1938 :

Year	Live births		Stillbirths		Deaths	
	Total no.	Rate	Total no.	Rate	Total no.	Rate
1938	621,204	15·1	24,729	0·60	478,996	11·6
1945	685,273	16·1	19,451	0·46	488,108	11·4
1946	820,268	19·1	22,844	0·53	491,759	11·5

INTERNATIONAL SOCIETY OF SURGERY

At the 12th congress, to be held in London from Sept. 14 o 20, discussions will be opened as follows : Rôle of Penicillin n Surgical Practice, Sir Alexander Fleming, F.R.S., London ; Recent Advances in Arteriography and Venography, Prof. Dos Santos, Lisbon ; Recent Advances in Vascular Surgery, Prof. Rene Leriche, Paris ; Surgical Treatment of Pulmonary Stenosis, Professor Blalock, Baltimore ; Operative Treatment of Fractures, Professor Danis, Brussels ; Results of Early Operation in War Wounds of the Lungs, Dr. Bastos Ansart, Barcelona ; Results of Heparin in Surgery, Dr. Crafoord, Stockholm ; Rôle of Vasodilatation in Arterial Disease, Dr. Diez, Buenos Aires ; Skin Defects—their Repair by Flaps and Free Skin Grafts, Prof. T. Pomfret Kilner, Oxford ; and Recent Progress in the Treatment of Burns, by a Russian surgeon. Members who wish to take part in these discussions should send their names to the secretary, Mr. H. W. S. Wright, 9, Weymouth Street, London, W.1, or to the general secretary, Dr. Leo Dejardin, 141, Rue Belliard, Brussels.

Surgeons of consultant standing who wish to join the society are invited to apply to the secretary as soon as possible. Junior surgeons who are not eligible for full membership may be accepted as associate members with all the privileges of membership except that of voting at general meetings. The entrance fee is 400 Belgian francs, and the subscription, payable every three years, is 1000 Belgian francs. Applications for membership should be addressed to the local secretary, Mr. H. W. S. Wright, and subscriptions from present members should be sent to the British treasurer, Mr. Victor Riddell, 68, Chester Square, London, S.W.1.

QUARTERS FOR NURSES

At the West Middlesex Hospital, it seems, recruitment of nurses is mainly hindered by lack of a suitable nurses' home.[1] This has offered a good opportunity for allowing senior staff to sleep out ; but the experiment has not proved successful for two reasons : comfortable lodgings are scarce in the district, and those obliged to be non-resident are inevitably penalised financially. Under the Rushcliffe scale non-resident nurses do not receive a living-out allowance sufficient to put them on an equal footing with those who live in : on the contrary, they get less than the value of a resident's emoluments, and must in addition pay income-tax on the sum they receive. In these circumstances an experiment in non-residence cannot but fail.

The council now find themselves in great difficulties. The patients waiting for admission have increased from 1000 in 1945 to nearly 3000 ; and the hospital cannot house more than 210 nurses except by converting wards. Out of a full bed complement of 1532 beds, 184 have been closed to provide other types of accommodation, and a further 174 by reason of shortage of nursing staff.

In November, 1945, the council approved, as a long-term policy, the building of a new nurses' home to take 500 nurses, at a cost of £300,000 ; but when plans were sent to the Ministry of Health the council were advised to revise the plans to provide quarters for only 346 nurses. Authority for building the home was not granted, and last February the council decided to convert and equip three of the closed wards to accommodate 70 nurses. The Minister seems likely to agree to this, and possibly the work may soon be begun. At present 283 nurses are living in scattered quarters within the hospital, and 300 are living out. This makes up two-thirds of the authorised complement of nurses ; and it is to their credit that, despite their depleted numbers, they dealt with far more cases in 1945 than the full staff did in 1939.

The council have decided to draw the attention of the Government to their plight, through the Middlesex members of Parliament, in the hope of getting the necessary authority to proceed with their schemes for providing nurses' quarters.

A RHEUMATISM UNIT

The British Legion unit of rheumatology is housed in the Three Counties Emergency Hospital at Arlesey, Bedfordshire, and consists of two hutted wards, each with 25 beds, and a hutment for treatment by physical and occupational methods. The patients, who are Service and ex-Service men, also make use of the facilities of the Emergency Hospital, which is closely associated with the Royal Free Hospital in London.

A party of doctors visited the unit on Jan. 21, when Lord Horder, as consultant observer, made a teaching round. Dr. C. B. Heald, as consultant to the unit, summarising the lesson of Arlesey, said that such a unit should have some 40 beds and should be part of a general (and preferably a teaching) hospital, in close touch with a consultant staff and special departments. Other needs included rest and good food on sanatorium lines ; absence of hurry ; a long stay if needed, in contrast to the short three weeks' visit usual at a spa ; detailed diagnosis ; special medical and physical treatment when required ; surgical appliances and boots available on demand ; careful selection of patients ; and rapid disposal of those who cannot be helped. Each patient should be seen as an individual who can be made happier and more useful by returning him to his own job or retraining him for other and more suitable work as quickly as possible.

The British Legion has evidently been able to overcome some of the difficulties encountered in getting the pensioner back to a full and active life. Of 104 patients so far discharged from the unit, 71 were said to show clinical improvement ; and of the 68 who had not worked—in some cases as long as twelve years—35 were considered fit for some employment.

EXTRA MEAT IN LIVER DISEASE

People suffering from infective hepatitis (catarrhal jaundice), toxic jaundice, or chronic hepatitis (cirrhosis of the liver) are now allowed two extra rations of meat a week, in addition to the household milk powder already granted. The procedure is the same as for extra milk and eggs—the doctor issues a certificate for the local food office, which sanctions supplies from the retailer. The qualifying conditions are in two categories. (1) Cases of infective hepatitis or toxic jaundice may be granted the extra rations for a month, renewable on production of further medical certificates at monthly intervals for a maximum period of four months. (2) In cases of chronic hepatitis the rations may be granted for three months, renewable on production of further medical certificates at three-monthly intervals for an unlimited period.

University of Birmingham

Dr. W. Trevor Cooke has been appointed first assistant to Prof. W. Melville Arnott in the department of medicine.

Dr. Cooke, who is 34 years of age, studied medicine at Cambridge and Birmingham, qualifying in 1935, and becoming M.R.C.P. After holding appointments at Wolverhampton Royal Hospital and the Children's and Queen's Hospitals, Birmingham, he was awarded the Walter Myer travelling studentship and a research fellowship in medicine at Harvard University, where he worked under Dr. Paul D. White in 1938 and 1939. He graduated M.D. at Cambridge in 1940, and from then until 1945 he was at the Birmingham United Hospital as medical registrar to the professors of medicine. Last year he was made assistant director of research in the department of medicine, and was elected F.R.C.P. His published work includes reports of clinical observations on cardiovascular disease, clostridial infection, the steatorrhœa syndromes and other metabolic disorders, and on the physiology of the kidney.

Royal College of Surgeons of England

The Hunterian oration will be delivered at the college on Friday, Feb. 14, at 5 P.M., by Sir James Walton, whose subject is to be Hunterian Ideals Today.

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[1] Registrar-General's Weekly Return of Births, Deaths and Infectious Diseases for the week ended Jan. 18, 1947. H.M. Stationery Office. 6d.

[1] Report of the public-health committee, presented to the Middlesex County Council on Jan. 1, p. 247.

Obituary

ARNOLD LAWSON

K.B.E., M.D. BRUX., F.R.C.S.

FOR a son to follow a distinguished father in his own specialty is always difficult, and that Arnold Lawson established a reputation as an ophthalmologist in his own right is proof of his ability and energy. The fourth son of George Lawson, surgeon oculist to Queen Victoria, he was educated at the Merchant Taylors School in London and entered the Middlesex Hospital, where his father was surgeon, as senior entrance scholar in 1886. After winning the Hetley and senior Broderip scholarships he qualified in 1891 and took his M.D. Brux. in the same year. After a period as clinical assistant to Sir John Tweedy at Moorfields, he joined his father in consultant practice, becoming in 1896 ophthalmic surgeon to the Paddington Green Children's Hospital; and it was perhaps his experience there that made him afterwards so sympathetic and successful with his younger patients. Four years later he was appointed to the staff of Moorfields. A few months before George Lawson's death in 1903 the sixth edition of his *Diseases of the Eye* appeared, edited and revised by his son.

Shortly before the outbreak of war in 1914 Arnold Lawson became ophthalmic surgeon and lecturer in ophthalmology at the Middlesex, to whose staff he had been appointed in 1910, and this was almost the only appointment which he did not resign to free himself for work among blinded soldiers and sailors. For his services as consultant ophthalmic surgeon to the Navy he would accept no fee, saying "it was his contribution to the Service in which his son was also serving at sea." He was also on the staff of the King Edward VII and Park Lane hospitals. But it is by his work for St. Dunstan's that he will chiefly be remembered, and for this he was appointed K.B.E. in 1920. Senior ophthalmic surgeon till 1920, he remained chairman of the ophthalmic advisory committee until his death. Of his contribution to its beginnings Sir Ian Fraser, M.P., chairman of St. Dunstan's, writes: "Mr. Lawson, as he then was, was Sir Arthur Pearson's principal ophthalmic adviser, and much of the policy of St. Dunstan's was made after taking his advice into account. It was on his advice, too, that representations were made to the Ministry of Pensions, which led to the recognition of cases which were said to be 'aggravated' by war service. Indeed, I believe the use of this word 'aggravated,' now so commonly understood, first arose out of the acceptance of these recommendations.

"Sir Arnold Lawson was a very warm-hearted man as well as an eminent ophthalmic surgeon, and St. Dunstan's benefited greatly by his long period of service and wise advice. Until a few weeks before his death he was still seeing some of his old patients from the first war who came from all over the country to consult him about the little glimmer of sight which remained to them or about the condition of an eye socket. Though there is so little that the ophthalmic surgeon can do, what little he does is of such enormous importance, and the way he handles you and comforts you is perhaps more important still. Thus it is that the successful ophthalmic surgeon of St. Dunstan's must be a first-class psychologist. He must know when to encourage hope, and when it is better for the patient's recovery to tell him the hard facts about his case, and to be successful he must be believed. Sir Arnold was good at all these jobs, and there are hundreds of blinded soldiers all over the world who will mourn his passing and feel that they have lost a real friend."

"A good operator and a careful and experienced diagnostician," a colleague writes, "Lawson brought to his specialty a wide knowledge of medicine. But his outstanding characteristic was the intense and human interest which he took in all his patients. many years up to his death he was treasurer of Ophthalmological Society of the United Kingdom, those who met him at the meetings of the council and the editorial committee recognised his acute sense and his regard for the interests of the veiled but not really concealed by the slightly air which was natural to him. I well remember prominent part which he took with Paton, Treacher Collins, and Lister in assuring the social well as the scientific, success of the jubilee con Middlesex men will also recall his quiet and persist efforts in maintaining and enhancing the beauty of hospital chapel." With his kindliness went a pride his profession, and together these qualities inspired work for Epsom College and the Royal Medical volent Fund, both of which he served for many years as ophthalmologist and as counsellor. His term of office as president of the R.M.B.F. was a fitting close to life in which he had served his patients and co well.

Sir Arnold died on Jan. 19 at the age of 79. His wife Helen, the daughter of Mr. Andrew Clark, honorary surgeon to King George V and to the Middlesex Hospital predeceased him in 1944, and they leave two sons and daughter.

Diary of the Week

FEB. 2 TO 8

Sunday, 2nd

LONDON JEWISH HOSPITAL MEDICAL SOCIETY
3 P.M. (Woburn House, W.C.1.) Dr. Emanuel Miller. Recent Advances in Psychiatry.

Monday, 3rd

ROYAL SOCIETY OF ARTS, John Adam Street, W.C.1
5 P.M. Mr. A. Dickson Wright: Applications of Recent Physical Discoveries in Medical Diagnosis and Treatment. (Second Cantor lecture.)
MEDICAL STUDENTS' REPRESENTATIVE COUNCIL, Manchester
7 P.M. (University medical school) Dr. Douglas Guthrie Medicine—Art or Science? (Wood Jones lecture)

Tuesday, 4th

UNIVERSITY COLLEGE, Gower Street, W.C.1
5.15 P.M. Mr. F. Bergel, PH.D.: Aspects of Pharmacological Chemistry—(2) Symptomatic Drugs (Synthetic Analgesics Antispasmodics, and Histaminolytics).
ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
8 P.M. *Orthopædics.* Dr. Wilfred Harris, Mr. David Le Vay, Dr. F. A. Elliott: Pain in the Upper Limb Excluding Shoulder Lesions.
LONDON SCHOOL OF DERMATOLOGY, 5, Lisle Street, W.C.2
5 P.M. Dr. R. M. B. MacKenna: Parasitic Infections of the Skin.

Wednesday, 5th

ROYAL SOCIETY OF MEDICINE
2.30 P.M. *History of Medicine.* Dr. W. R. Bett: On Style in Medical Literature—Traditions, Circumstances, Diversions and Lethargies.
8 P.M. *Surgery.* Mr. R. C. Brock, Mr. T. Holmes Sellors: Treatment of Non-tuberculous Empyema.
BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck Street, W.1
5 P.M. Prof. W. V. Mayneord, D.SC.: Applications of Atomic Physics in Medicine. (Last of six lectures.)
LONDON ASSOCIATION OF THE MEDICAL WOMEN'S FEDERATION
8.30 P.M. (B.M.A. House, Tavistock Square, W.C.1.) Miss D. J. Collier: Influence of War Experience on Everyday Ear and Throat Treatment.
ROYAL FACULTY OF PHYSICIANS AND SURGEONS, 242, St Vincent Street, Glasgow
4 P.M. Dr. Sydney M. Laird: Watson prize lecture
ASSOCIATION OF INDUSTRIAL MEDICAL OFFICERS
3 P.M. *Scottish group.* (Royal Infirmary, Glasgow.) Clinical meeting.

Thursday, 6th

ROYAL SOCIETY OF MEDICINE
8 P.M. *Neurology.* (National Hospital, Queen Square W.C.1) Clinical meeting.
MEDICAL SOCIETY OF THE L.C.C. SERVICE
3 P.M. (Sutton Hospital, Brighton Road, Sutton.) Clinical meeting.
LONDON SCHOOL OF DERMATOLOGY
5 P.M. Dr. G. Duckworth: Streptococcal Infections of the Skin.

Friday, 7th

ROYAL SOCIETY OF MEDICINE
10.30 A.M. *Otology.* Mr. A. Tumarkin: Transmeatal Surgery of Attic Antrum and Labyrinth. Cases will be shown at 10 A.M.
2.30 P.M. *Laryngology.* Mr. V. E. Negus: Review of the Treatment of Intrinsic Carcinoma of the Larynx.
LONDON CHEST HOSPITAL, Victoria Park, E.2
5 P.M. Mr. J. W. S. Lindahl: Tuberculosis of the Upper Respiratory Tract.

REVENTION OF ACUTE RESPIRATORY DISEASES

TH PARTICULAR REFERENCE TO INFLUENZA*

C. H. STUART-HARRIS
M.D. Lond., F.R.C.P.
OFESSOR OF MEDICINE IN THE UNIVERSITY OF SHEFFIELD

THE study of morbidity statistics has emphasised th in this country and in America the extraordinary portance of the minor infections of the respiratory act, influenza, and the common cold. Further, both fluenza and the common cold play an important part the causation of fatal pulmonary disease.

Every year in this country a more or less regular ries of events occurs in the population as a whole. here is a cycle of minor illnesses, such as common colds d influenza, and another of fatal illnesses of acute spiratory disease notified by doctors as deaths from nfluenza, which varies from year to year in its general aracter. In fact, three sorts of years have recently een encountered: those with sharp peaks of mortality xceeding 1000 deaths a week in the great towns; those ith an irregular plateau of mortality in excess of 100 nd usually with a maximum between 200 and 400 eekly; and those with weekly numbers throughout the ear never exceeding 100 at any time.

Since the discovery of the influenza viruses A and B, t has been possible to interpret these mortality statistics n terms of pathology. It is clear first, that laboratory vidence of influenza virus activity is not encountered very year, even though, as every practitioner knows, ases of an influenza-like illness are met with annually. Secondly, the years with definite peaks of mortality from influenza have all been associated with activity of either A or B influenza virus. The years with high sharp peaks have all been associated with influenza-A epidemics; the years with minor peaks have been associated with either A or B influenza; and the years without rises in excess of 100 a week have usually been years when no evidence of virus activity has been encountered. In fact, viewed over a period of many years, periodic recrudescences of infection from the two viruses A and B, due perhaps to recruitment of new susceptibles or a loss of immunity on the part of those previously attacked, appear to afford a tolerably good explanation of observed epidemics.

In the U.S.A. the Commission on Acute Respiratory Diseases (1946a) has postulated, on the basis of known experience, that influenza A has a cycle of 2–3 years and influenza B 4–6 years. The experience in this country since 1933, when virus A was first discovered, does not altogether agree with this theory of regular periodicity of occurrence, and further observation is necessary before it can be accepted.

SEMI-ISOLATED COMMUNITIES

In contrast with events in the population as a whole, the behaviour of acute respiratory disease in semi-isolated communities, such as schools and Service establishments, is most puzzling. The heart of the problem may be seen by a glance at events in an Army infantry training centre which gives Army recruits their first introduction to community life and suffers every winter from a greater or lesser outbreak of acute respiratory disease. The accompanying figure shows four years' experience at an infantry training centre, with total figures of weekly new cases of acute respiratory disease, both febrile and afebrile, among recruits. The population was varying intermittently during the whole period, though the total strength remained about the same. Some of the men were stationed at the centre for six weeks, and others for three months, and a few of the permanent staff remained throughout the period.

The various waves of infection could be interpreted on the basis of the known occurrence of the viruses in Great Britain. In 1943 the January wave might have been due to virus B and the February wave to virus A. The November wave was almost certainly influenza A, but the succeeding waves in January, 1944, could not be readily explained in terms of either virus.

The 1945 outbreak, which was one of the sharpest encountered during the war, was the only one in which cases were actually investigated. Among more than 40 cases of febrile respiratory disease tested serologically at Hampstead (Hirst test) no case either of virus A or B infection was found. Yet some of the cases were clinically typical of influenza, though there was some clinical variation, and other cases from the same unit were an exudative non-streptococcal tonsillitis as described by Stuart-Harris et al. in 1938 and more recently by the U.S. Army Commission on Acute Respiratory Diseases (1944).

Separate analysis of the incidence in recruits and seasoned troops indicated that the recruits of less than six weeks' service suffered most heavily; those with more than six weeks' but less than three months' service suffered less; and the permanent staff of soldiers of several years' standing was almost unaffected.

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* Abridged from the Malcolm Morris memorial lecture delivered at St. Mary's Hospital, London, on Dec. 5, 1946.

University of London

Dr. D. W. Smithers has been appointed to the university chair of radiotherapy tenable at the Royal Cancer Hospital, as from Oct. 1, 1946.

Dr. Smithers studied medicine at Cambridge and St. Thomas's Hospital, qualifying M.R.C.S. in 1933 and M.B. in 1934. After qualifying he held clinical assistantships at St. Thomas's and the post of outpatient medical officer at the National Hospital for Diseases of the Heart. In 1937 he graduated M.D. and gained the D.M.R. Since then he has held appointments at the Royal Cancer Hospital, successively as assistant radiologist, X-ray therapist, and, since 1943, director of the radiotherapy department. From 1942 to 1943 he was honorary director of the radiotherapy department at St. Thomas's Hospital. Last year he became M.R.C.P. He is the author of a book, *X-Ray Treatment of Accessible Cancer*, and of numerous papers on radiology and radiotherapy.

Mr. J. J. C. Buckley, D.SC., has been appointed to the William Julien Courtauld chair of helminthology tenable at the London School of Hygiene and Tropical Medicine, as from Oct. 1, 1946.

The title of professor emeritus of morbid anatomy in the university has been conferred on Dr. H. M. Turnbull, F.R.S. At the London Hospital he was director of the Institute of Pathology, later named the Bernhard Baron Institute, from 1906, holding the chair of morbid anatomy from 1919 until his retirement last September.

The title of reader in anatomy in the university has been conferred on Dr. R. W. Haines in respect of the post held by him at St. Thomas's Hospital medical school.

Royal College of Obstetricians and Gynæcologists

At a meeting of the council held on Jan. 25, with Mr. William Gilliatt, the president, in the chair, I. B. Ewart and G. J. St. C. Fisher were admitted in absentia to the membership of the college. The following were also elected to the membership:

Duncan Ballantine, Margaret R. Biggs, W. S. Campbell, J. R. Cochrane, S. J. Cohen, H. V. Corbett, G. L. Daly, Albert Davis, J. R. Dickinson, Bessie Dodd, Morag Dods, Ian Donald, R. C. Gill, Jean L. Hallum, A. J. Hardy, R. F. Lawrence, T. H. Lawton, J. M. McBride, R. A. E. Magee, Eileen C. Miller, J. D. Murdoch, M. K. O'Driscoll, S. S. F. Pooley, L. J. Quinn, Kathleen M. F. Worrall, J. L. Wright.

London County Council

Dr. Reginald Thane Taylor, medical superintendent of St. Matthew's Hospital, retired on Jan. 23 after forty years' service in London hospitals.

In 1907 he was appointed assistant medical officer at the Holborn and Finsbury Infirmary (now Archway Hospital), becoming medical officer at City Road Institution (now St. Matthew's Hospital) in 1911. After transfer to the L.C.C. service in 1930 he became, in 1932, medical officer and acting master-in-charge at that hospital, of which he was appointed medical superintendent in 1937. When the hospital was closed, because of war damage, in 1941, Dr. Taylor acted as medical superintendent of St. Luke's Hospital, Chelsea. In 1942 he was seconded as medical municipal sector representative to sector 3, E.H.S., and since 1943 has acted as medical superintendent at St. John's Hospital and as assistant medical officer at Cedars Lodge Institution. In reporting his retirement the hospital committee speak of Dr. Taylor's exceptionally valuable service rendered during a long career.

Chadwick Public Lectures

The following are among the lectures to be delivered in the next six months: Tuesday, Feb. 18, at 2.30 P.M. (26, Portland Place, W.1), Prof. S. P. Bedson, F.R.S., Laboratory Investigations in the Diagnosis of Virus Infections of Man; Tuesday, March 18, at 2.30 P.M. (Westminster Hospital medical school, S.W.1), Prof. W. M. Frazer, A Medical Pioneer in Sanitation; and Thursday, May 22, at 3 P.M. (Town Hall, Cheltenham), Sir Arthur MacNalty, Advances in Preventive Medicine During the War of 1939–45.

Institute of Child Health, London

Postgraduates wishing to attend at the institute, Hospital for Sick Children, Great Ormond Street, whether for 3–6 months or for shorter periods, are advised to apply as early as possible since vacancies are being filled well in advance.

Biochemical Society

At a meeting of the society to be held at the London School of Hygiene, Keppel Street, W.C.1, at 11 A.M., on Saturday, Feb. 15, there will be a symposium on the Relation of Optical Form to Biological Activity in the Amino-acid Series.

B.C.G. in the United States

The effectiveness of B.C.G. vaccine in the prevention of tuberculosis is to be investigated in the United States by the Public Health Service. A single laboratory will produce the vaccine for use by research groups throughout the country.

Family Relations Group

This group has recently been formed, under the chai ship of Lord Horder, to foster the pooling of expen the exchange of views, and the implementation of agreed policy among those interested in the problems of family l Inquiries should be addressed to the hon. secretary, Mr. Cyril Bibby, M.SC., 69, Manor Road, Chipping Barnet, Herts.

National Coal Board Appointment

Dr. C. L. Cope has been appointed director of research (human problems) under the scientific member of the board Sir Charles Ellis, F.R.S.

Dr. Cope, who is 43 years of age, studied medicine at Oxford and at University College Hospital, London, qualifying in 1927. He held a *Beit research fellowship from 1929 to 1935*, and became assistant to the medical unit, University College Hospital, London, in 1937. In 1938 he was appointed first assistant in the Nuffield department of medicine and lecturer in medicine at the University of Oxford. From 1942 to 1945 he served in the R.A.M.C. as officer-in-charge of medical divisions of military hospitals in Britain and north-west Europe.

Appointments

BEATTIE, P. H., M.B. Aberd., D.O.M.S.: asst. ophthalmic surgeon, Norfolk and Norwich Hospital.

DAVISON, ANNA I., M.B. Edin.: asst. M.O.H. and asst. school M.O., Southport.

DIGNAN, J. F., M.B. Dubl.: consultant surgeon, Llanelly and District General Hospital.

DUGGAN, NORMAN, M.B. Manc., F.R.C.S.: medical referee under Workmen's Compensation Act, 1925, for Birmingham, Worcester, and North Worcestershire.

GORDON, MENDEL, F.R.C.S., D.L.O.: asst. ear, nose, and throat surgeon, National Temperance Hospital, Hampstead.

MACKENZIE, I. F., M.D. Edin., D.P.H., D.T.M. & H.: deputy county M.O.H. and deputy school M.O., Warwickshire.

MAYOU, C. R., M.R.C.S., D.P.H.: senior asst. school M.O., Coventry

ROBSON, W. G., M.B. Edin., M.R.C.P.: examining factory surgeon, Berks and Bucks.

SCHAPS, KATE, M.D. Heidelberg: asst. maternity and child welfare M.O., county of Durham.

SEED, JOHN, M.B. Aberd.: resident medical superintendent, County Hospital, Driffield.

THORNE THORNE, BEZLY, M.B. Camb., M.R.C.P., D.O.: asst. surgeon, Sussex Eye Hospital, Brighton.

Colonial Service:

- ANTONIO, N. M., M.B.: asst. M.O., Jamaica.
- BRYCE, J. C., M.B. Lond.: M.O., Tanganyika.
- COLDHAM, H. J. S., M.R.C.S.: M.O., Kenya.
- MCKENDRICK, A. J., M.B. Glasg.: M.O., Tanganyika.
- ROSS, E. H., M.B.: M.O., Malaya.
- SANG, D. M., L.R.C.P.E.: M.O., grade C, department of health, Trinidad.

Births, Marriages, and Deaths

BIRTHS

BOUSFIELD.—On Jan. 18, the wife of Dr. L. C. Bousfield—a son.

COBB.—On Jan. 18, at Guildford, the wife of Dr. J. H. Cobb—a daughter.

EVANS.—On Jan. 22, in London, the wife of Mr. Briant Evans, F.R.C.S.—a son.

KEELE.—On Jan. 15, in London, the wife of Dr. K. D. Keele—a daughter.

LLOYD.—On Jan. 19, at Frome, Somerset, the wife of Dr. O. G. Lloyd—a son.

MEADOWS.—On Jan. 21, in London, the wife of Dr. S. P. Meadows—a daughter.

O'DONNELL.—On Dec. 2, at New Delhi, the wife of Major J. E. O'Donnell, I.M.S.—a son.

ROBERTS.—On Jan. 19, in London, the wife of Dr. J. A. F. Roberts—a daughter.

SITA-LUMSDEN.—On Jan. 22, at Beaconsfield, the wife of Dr. E. Sita-Lumsden—a son.

SWINSTEAD.—On Jan. 11, at Cardiff, the wife of Dr. P. D. Swinstead—a son.

TRAPPS.—On Jan. 23, the wife of Dr. Norman Trappe—a daughter

MARRIAGES

BENCKER—LLOYD.—On Dec. 23, at Bournemouth, Frederick William Bencker, M.D., to Natalie May Lloyd.

BRIMS—CROSLAND JONES.—On Jan. 22, in London, Donald James Brims, M.R.C.S., to May Jones.

FERRIS—MACDONALD.—On Jan. 22, at Bucklebury, Berks, the Rev. Charles Henry Ferris to Eileen M. M. Macdonald M.B.

WALKER—COLMAN.—On Jan. 18, in London, David Walker, M.B. to Rosemary Colman.

DEATHS

ASHE.—On Jan. 25, at Eastbourne, Frank Ashe, M.R.C.S., colonel R.A.M.C. retd.

HADLEY.—On Jan. 22, at Leicester, Ernest Cutcliffe Hadley, M.D. Lond., F.R.C.S.E.

LEE-MICHELL.—On Jan. 13, at Wellington, Somerset, Robert Lee-Michell, M.R.C.S., D.A., aged 52.

PEARSON.—On Jan. 23, at Edinburgh, Charles Mowbray Pearson, M.B. Edin., F.R.C.P.E., aged 72.

REID.—On Jan. 23, at Witchampton, Dorset, Arthur Lestock Reid, M.R.C.S.

ROUTH.—On Jan. 19, Charles Frederic Routh, M.D. Lond., aged 8

STADDON.—On Jan. 22, Eric John Staddon, M.R.C.S., aged 56.

WOODS.—On Jan. 20, John Francis Woods, M.D. Durh., aged 9

REVENTION OF ACUTE RESPIRATORY DISEASES

TH PARTICULAR REFERENCE TO INFLUENZA *

C. H. STUART-HARRIS
M.D. Lond., F.R.C.P.
OFESSOR OF MEDICINE IN THE UNIVERSITY OF SHEFFIELD

THE study of morbidity statistics has emphasised th in this country and in America the extraordinary portance of the minor infections of the respiratory ict, influenza, and the common cold. Further, both fluenza and the common cold play an important part the causation of fatal pulmonary disease.

Every year in this country a more or less regular ries of events occurs in the population as a whole. iere is a cycle of minor illnesses, such as common colds id influenza, and another of fatal illnesses of acute spiratory disease notified by doctors as deaths from fluenza, which varies from year to year in its general iaracter. In fact, three sorts of years have recently een encountered: those with sharp peaks of mortality xceeding 1000 deaths a week in the great towns; those ith an irregular plateau of mortality in excess of 100 nd usually with a maximum between 200 and 400 eekly; and those with weekly numbers throughout the ear never exceeding 100 at any time.

Since the discovery of the influenza viruses A and B, t has been possible to interpret these mortality statistics n terms of pathology. It is clear first, that laboratory vidence of influenza virus activity is not encountered very year, even though, as every practitioner knows, ases of an influenza-like illness are met with annually. Secondly, the years with definite peaks of mortality from influenza have all been associated with activity of either A or B influenza virus. The years with high sharp peaks have all been associated with influenza-A epidemics; the years with minor peaks have been associated with either A or B influenza; and the years without rises in excess of 100 a week have usually been years when no evidence of virus activity has been encountered. In fact, viewed over a period of many years, periodic recrudescences of infection from the two viruses A and B, due perhaps to recruitment of new susceptibles or a loss of immunity on the part of those previously attacked, appear to afford a tolerably good explanation of observed epidemics.

In the U.S.A. the Commission on Acute Respiratory Diseases (1946a) has postulated, on the basis of known experience, that influenza A has a cycle of 2–3 years and influenza B 4–6 years. The experience in this country since 1933, when virus A was first discovered, does not altogether agree with this theory of regular periodicity of occurrence, and further observation is necessary before it can be accepted.

SEMI-ISOLATED COMMUNITIES

In contrast with events in the population as a whole, the behaviour of acute respiratory disease in semi-isolated communities, such as schools and Service establishments, is most puzzling. The heart of the problem may be seen by a glance at events in an Army infantry training centre which gives Army recruits their first introduction to community life and suffers every winter from a greater or lesser outbreak of acute respiratory disease. The accompanying figure shows four years' experience at an infantry training centre, with total figures of weekly new cases of acute respiratory disease, both febrile and afebrile, among recruits. The population was varying intermittently during the whole period, though the total strength remained about the same. Some of the men were stationed at the centre for six weeks, and others for three months, and a few of the permanent staff remained throughout the period.

The various waves of infection could be interpreted on the basis of the known occurrence of the viruses in Great Britain. In 1943 the January wave might have been due to virus B and the February wave to virus A. The November wave was almost certainly influenza A, but the succeeding waves in January, 1944, could not be readily explained in terms of either virus.

The 1945 outbreak, which was one of the sharpest encountered during the war, was the only one in which cases were actually investigated. Among more than 40 cases of febrile respiratory disease tested serologically at Hampstead (Hirst test) no case either of virus A or B infection was found. Yet some of the cases were clinically typical of influenza, though there was some clinical variation, and other cases from the same unit were an exudative non-streptococcal tonsillitis as described by Stuart-Harris et al. in 1938 and more recently by the U.S. Army Commission on Acute Respiratory Diseases (1944).

Separate analysis of the incidence in recruits and seasoned troops indicated that the recruits of less than six weeks' service suffered most heavily; those with more than six weeks' but less than three months' service suffered less; and the permanent staff of soldiers of several years' standing was almost unaffected.

The prevalence of acute respiratory disease at an American Army recruiting centre (Commission on Acute Respiratory Diseases 1946b) during the same years underwent similar variations. Epidemics occurred every winter, and from 1942 to 1945 only one of the outbreaks was due to an influenza virus—the A epidemic of November, 1943. The outbreaks were essentially among the recruits, and the length of stay of recruits at this centre was sufficiently long (12–16 weeks) for a correlation to be obvious between epidemic waves and the periodic arrival of new batches of recruits. In fact, this influenza-like disease was apparently prevalent during the first four weeks of entry of any particular batch of recruits. No known micro-organism was incriminated by Dingle and his associates at Fort Bragg, but experiments on human volunteers indicated the probability that the disease was a virus infection (Commission on Acute Respiratory Diseases 1946c).

It is therefore clear from these Army studies that localised outbreaks of acute respiratory disease of an influenzal character occur which are not due to either virus A or B. It seems probable that much of the sporadic influenza and influenza-like illnesses in the general population in non-epidemic years is due to the same or similar infections as these Service cases. It is even possible that some of the cases seen during actual epidemics of influenza-virus infection and which cannot be classified serologically or by recovery of virus are due to a like infection.

Meanwhile study of Service outbreaks has led to the recognition of yet another condition of virus ætiology—primary atypical pneumonia. This disease essentially produces morbidity without mortality and is in most cases due apparently to a virus entirely unrelated either to influenza virus or to any of the pneumonia viruses of the psittacosis group.

Evidence is accumulating that the virus described by Eaton et al. (1944) is the causal agent of that variety of atypical pneumonia in which cold red-cell agglutinins develop in the blood. Yet not all cases of primary atypical pneumonia are associated with the development of cold agglutinins. The multiplicity of mild viruses known to be capable of causing pneumonia in the mouse may indicate that the virus pneumonia of man is also of complex ætiology.

It is, however, difficult to estimate the importance of this condition in civil life. In the U.S. Army recruit

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* Abridged from the Malcolm Morris memorial lecture delivered at St. Mary's Hospital, London, on Dec. 5, 1946.

establishment at Fort Bragg atypical pneumonia regularly constituted about 10% of all cases of acute febrile respiratory disease. It seems unlikely that it is as common in England, at any rate in the civil population; but its relative importance may increase in the future because of its resistance to present chemotherapeutic agents.

It is clear that the groups of virus agents responsible for the common cold, influenza, and atypical pneumonia are of great importance in relation to morbidity and to periodic disturbance of the economic life of the community. The activity of the influenza viruses also appears to be related to mortality, presumably from pneumonic complications in which bacterial infection plays a part.

EPIDEMIOLOGY OF PNEUMONIA

Lung infections associated with bacteria, particularly the pneumococcus, cause a set of epidemiological events parallel to those of the virus infections. Most deaths from influenza are undoubtedly due to pneumonic complications of bacterial origin, and the statistical record furnishes some evidence of the behaviour of this form of pneumonia. There is, however, the large group of primary pneumonias which include lobar pneumonia and are not usually regarded as correlated with virus infections.

The statistics of primary pneumonia for England and Wales 1940–46 show every year, usually shortly before or shortly after Christmas, a sharp rise in recorded incidence. The peak was reached some time between January and March, and was followed by a slow subsidence to the summer endemic level. There was admittedly an increased prevalence of pneumonia every winter, whether an influenza epidemic did or did not occur, but certainly, of recent years, the largest peaks of primary pneumonia coincided with periods of known prevalence of virus A or B. This supports the view that there is a correlation between influenza-virus infection and pneumonia of bacterial origin. Yet in the individual case it is difficult to understand how the two micro-organisms—the virus and the pneumococcus—cooperate, for most cases of influenzal pneumonia appear to be post-influenzal.

Some light on the possible mechanism of this interrelationship of pneumonia and influenza may have been shed by the observation of Smillie et al. (1938).

> In a mental hospital an epidemic of influenza in 1937 (probably influenza A) was accompanied by numerous cases of lobar pneumonia. Subsidence of the influenza epidemic did not, however, lead to cessation of the pneumonia wave, which a month after the peak of the influenza was still considerable. Type-I pneumococcus was found in almost every case of pneumonia at this time, and a high type-I-pneumococcus carrier-rate (10%) was found throughout the hospital.
>
> A later wave of pneumonia at an overflow wing of the hospital which had escaped the influenza epidemic was probably due to introduction of type-I pneumococcus by patients transferred from the main part of the hospital.
>
> It seemed probable that the influenza epidemic led to wide dispersal of the type-I pneumococcus, and that the wave of pneumonia was really incidental to this abnormally frequent carriage of a virulent bacterium.

These facts must lead us to regard the virus and bacterial infections of the respiratory tract as being closely related. When we consider the various respiratory-tract infections, other than influenza, which have been mentioned above as due to presumed but as yet unknown viruses, it seems clear that we are still only on the threshold of knowledge concerning the mechanism of pneumonia.

PREVENTION OF ACUTE RESPIRATORY DISEASE

There are two entirely separate methods of attacking the problem of the prevention of acute respiratory disease. Both have been much studied of recent years. The first method is to develop specific prevention against each condition by the use of effective immunising preparations. Raising individual resistance by enhancement of circulating antibodies has abun proved its worth, particularly in diphtheria and fever. The disadvantages of such a method are different vaccines are required for each condition a which protection is desired. There are also drawbacks as the duration of immunity, multiplicity of anti and so on in conditions, such as influenza, which not normally associated with a durable immunity fol ing an attack of the disease. Nevertheless immunis against both influenza and pneumonia has been stu intensively, and encouraging results have been obta

Immunisation against Influenza.—The development knowledge concerning immunisation against influen virus infection, either in animals or man, was review by Stuart-Harris (1945).

Since the successful trial, during the war, of the concentrated and refined vaccine of Francis and Sa (Francis 1945), which involved the use of a subcutaneo vaccine of killed preparations of the two influenz viruses A and B, further studies, such as those of Stanle (1945) and Henle et al. (1946), have merely underlin the importance of the amount of antigenically activ material in connexion with the antibody respon subsequent to injection. However, the occurrence o febrile reactions after inoculation of purified concentrat virus vaccine indicates that there is a definite limit to th amount of antigen tolerated by man. Salk and co workers (1945b) suggest that the duration of the immunit following a single inoculation may be longer than was a first thought. Some sort of protection may still b present a year after immunisation.

INCIDENCE OF INFLUENZA 6–8 WEEKS AFTER INOCULATIO WITH INFLUENZA-VIRUS VACCINE

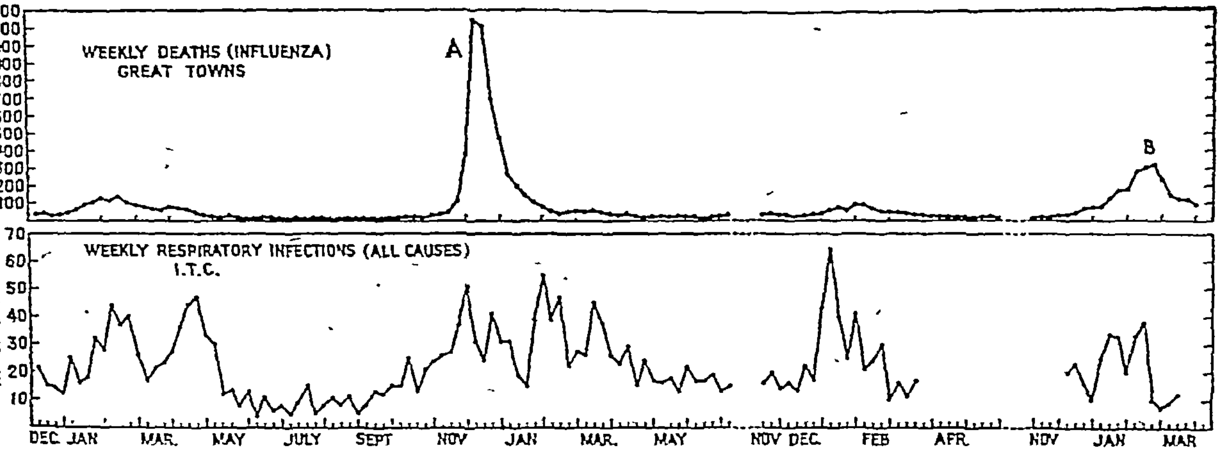
Group	No. of centres	No. under observation	Cases of clinical influenza
University students ..	14	Vaccinated 1934 Controls 2307	28 (1·45%) 40 (1·70%)
Nurses and patients in hospital	13	Vaccinated 1481 Controls 1508	20 (1·35%) 22 (1·45%)
Industrial groups ..	6	Vaccinated 2157 Controls 2173	84 (3·90%) 140 (6·40%)
Total ..	33	Vaccinated 5572 Controls 5988	132 (2·37%) 202 (3·37%)

The possible use of adjuvants to prolong the immu nising action of the vaccine still further has also bee studied by Henle et al. (1946), but the preparatio of Falba used by them produces an undesirable sub cutaneous abscess in a small proportion of inoculate persons. The vaccine described by Salk (1945), which i purified by precipitation with calcium phosphate, h also appeared as a possible rival to Francis and Salk original product. It is clear that there is still room f work on the best type of immunising agent.

The Francis vaccine was originally tried during widespread influenza-A epidemic in the U.S.A., larg groups of students at various centres being utilised for the purpose of the experiment (Commission on Influenza 1944). Francis et al. (1946) have published further observations on the effect of immunisation with a similar preparation of vaccine during the influenza-B epidemic of 1945.

> The group of 600 immunised persons under observation consisted of Army personnel at the University of Michigan who had all been immunised in October, 1945, with U.S. Army vaccine. A group of 1100 other Servicemen, none of whom had been immunised, was housed in an adjacent block. An influenza-B outbreak developed in late November and involved the non-immunised group to an extent nine times as much as it did the Army personnel.

Francis cites these observations as indicating a protective action of the vaccine against influenza B, and



Incidence of acute respiratory disease in infantry training centre (I.T.C.) compared with deaths from influenza in great towns 1942–46.

mphasises the fact that much greater differences in ncidence between immunised and non-immunised groups may be observed if the two groups are separated and do not mix. At the same time, it is obvious that wo such groups are not necessarily comparable from he point of view of living-conditions and composition; hence statistical comparison of the results is impossible.

In 1945, in this country, the organisation of a field trial by the Medical Research Council (Dudgeon et al. 1946) was seriously hampered by the disturbed conditions produced by the sudden collapse of the war in the Far East, and nearly all the arrangements made before Christmas fell through. It became obvious at this time that an influenza outbreak was developing in this country, and therefore arrangements were made, with the cooperation of many of the universities in Great Britain and of medical officers at several hospitals and in charge of industrial groups, whereby 5729 persons were immunised with a mixed A and B vaccine similar to that used by Francis. In each centre an approximately similar number of persons in contact with, and living under similar conditions to those who were immunised, were left unimmunised or given injections of saline to act as controls. Inoculations were also organised on the Continent both by the Army and with the courtesy of UNRRA in the camps for displaced persons in the U.S. zone of Germany. Abroad some 8500 persons were immunised either with an influenza A and B vaccine or with a vaccine of influenza A only. After the inoculations in Europe a mere trickle of sporadic cases of influenza was encountered, and no estimate of the effect of the vaccine could be made. In this country an irregular outbreak of influenza developed early in 1946, but the figures available for estimation of the period of epidemic prevalence indicated that the vaccinations were in general effected almost at the same time as the peak period of incidence of infection. Nevertheless, a follow-up of the experience of acute respiratory infection in each area was organised at the end of March, 1946, to compute the incidence of clinical influenza in the immunised and non-immunised populations. The accompanying table shows the summarised results in the three groups of university students, nurses, and patients in hospital and industrial groups. No centre experienced an epidemic either before or after the completion of immunisation. The only large groups which showed a considerable difference in influenza in the immunised compared with the non-immunised persons were both industrial organisations. Here the follow-up was based on doctors' certificates returned on absentees, but an effort was made to check the diagnosis when each person returned to work.

Clearly no final conclusions about the value of the vaccine emerged from these experiences of our 1945 winter: yet the experiment yielded information in some directions. Thus, we realised the importance of conducting future trials in communities likely to experience a sufficiently intense incidence of influenza during a subsequent outbreak. The outbreak of 1945 winter was exceptionally patchy, and epidemics only occurred in semi-isolated communities.

The second point which emerged from 1945 winter's trials was that some of the really big groups of immunised persons seemed to experience benefit from the vaccine, whereas the small groups of 50–100 persons split up in many different centres gained no obvious benefit from immunisation. This suggested the possibility that the vaccine exerted an effect by raising herd immunity rather than individual resistance. As mentioned above, Francis has indicated that there is evidence that immunisation of a large group does exert an effect on the incidence of influenza in the non-immunised persons because of the effect on the herd immunity level. It seems improbable, however, that the whole of the benefit observed by the American workers has been due to the operation of herd immunity, particularly because individual protection has been demonstrated by direct experimental inoculation of virus after immunisation (Francis et al. 1945, Salk et al. 1945a).

Finally, it must be clear that further trials of influenza vaccine must and should be made. It is not a question of attempting to reproduce the results of other workers but simply that, to gain knowledge of the effect of immunisation under various conditions and during various types of epidemics, more than one or two experiments are necessary. Such basic field experiences are essential for guiding the wider use of the vaccine. Clearly, however, wholesale immunisation with a vaccine whose maximal effect is limited to a few weeks or months is out of the question. It seems necessary to limit the use of such a vaccine to populations where a really significant incidence of the disease is likely. Schools and recruiting centres seem to have suffered particularly in recent epidemics; and, if future experience of influenza A repeats the experience of influenza B in 1945, possibly the importance of children as a group of the community with high susceptibility is greater than has previously been realised. It might be possible to produce more effect on the epidemic prevalence of the disease by concentrating on the immunisation of children rather than adults. Protection of groups of adults, such as industrial workers, nurses, and doctors, might also be undertaken. In any case, however, until more lasting antibody responses can be elicited by influenza-virus vaccine, immunisation will have to be carried out in years when epidemics seem likely, and in any case before and not after the outbreak has begun. Here the usefulness of a reliable method of long-range forecasting of influenza epidemics is apparent.

Immunisation against Pneumonia.—The discovery of effective chemotherapeutic agents for the treatment of pneumonia has tended to overshadow the less spectacular advances made in the attempted control of pneumonia. In the first place, in view of what has been said already concerning the interrelationship of influenza and pneumonia, it is clear that prevention of influenza would exert an effect on the incidence of pneumonia. However, several studies made before the war indicated the possible use of specific bacterial prophylaxis against pneumococcal pneumonia. Thus, Lister et al. (1935) found pneumococcal vaccines of value among native labourers in South Africa. Ekwurzel et al. (1938) carried out studies on prophylaxis with polysaccharide derivatives of pneumococci and obtained encouraging results in the Civilian Conservation Corps camps in the U.S.A. Polysaccharide antigens were also used by MacLeod et al. (1945) under the auspices of the Commission on Pneumonia at a U.S. Army Air Force technical school, which again gave encouraging results.

In spite of the multiplicity of known pneumococcal types it has become obvious, through the many epidemiological studies in the United States (Sutliff and Finland 1933, Finland 1937, Bullowa 1937, Heffron 1939) and some in this country (Anderson et al. 1944), that a relatively few types, including I, II, III, V, VII, and VIII, are together responsible for the bulk of the cases of primary pneumococcal pneumonia. At the Army Air Force School the chief types were I, II, V, and VII in the two winters before the experiment, when pneumonia was exceptionally common; hence a mixed antigen prepared from the polysaccharides of these types was used by MacLeod et al. (1945). The results of this experiment indicated a specific effect of the vaccine in reducing the numbers of cases of pneumonia due to the four types of pneumococci incorporated in the vaccine, whereas no effect was seen in pneumonia due to other types.

MacLeod found that the experiment of immunising half the group of exposed persons had an apparent effect on the incidence of pneumonia in the unimmunised persons besides the immunised. This was shown by the fact that the gross incidence of pneumonia due to types I, II, V, and VII was much lower in the year following the introduction of immunisation, whereas that due to other types, particularly IV and XII, was unchanged.

In view of the fact that we have no experience of this type of pneumonia control in this country it is impossible to do more than mention these American results, which indicate that more interest should certainly be taken in the problem of pneumonia control.

General Preventive Measures.—In the case of diseases of the respiratory tract and others transmitted essentially through air, knowledge of the means of contagion is now considerable, and attempts at control by prevention of dissemination of contagion are passing beyond the experimental stage. The doctrine of droplet infection elaborated by Flügge (1897) was considerably extended by the pioneer work of Wells (1934) and Wells and Wells (1936) on droplet nuclei, which emphasised the importance of the minute droplets which float about in the atmosphere of closed rooms many hours after their initial expulsion by breathing, coughing, and sneezing. These droplets have been demonstrated by flash photography (Jennison 1942), and the contrast between the downward trajectory of the relatively coarse particles and the prolonged suspension of the minute droplets has become obvious (Bourdillon and Lidwell 1941). The importance of dust containing dried particles laden with micro-organisms has also been emphasised by van den Ende et al. (1940). Controversy still reigns about the relative importance of airborne d and contamination by particles of dust in the infections of the respiratory tract.

Knowledge of the relative pollution of the a sphere and of the effect of various control measures depended largely on the development of satisfa techniques for the quantitative measurement of bac in the air. Wells' (1933) air-centrifuge has been extensively in America, whereas the slit-sampler Bourdillon et al. (1941) has been chiefly used in country. Yet simple quantitative estimation of bac in the air is insufficient as an indication of aerial po tion, because pathogens are outnumbered by the ma non-pathogenic organisms also present. Virus part also present difficulties and cannot easily be estima quantitatively. No simple index of air pollution, such as the *Bact. coli* content adopted for water, has yet proved entirely satisfactory; but *Strep. viridans* has been chiefly used. Besides the purely bacteriological problems, the study of the air has necessitated many technical developments, such as methods for measuring ventilation (*Lidwell and Lovelock 1946*).

The methods thus far utilised for reduction of the bacterial content of the air were reviewed by Andrewes (1940) and Mudd (1945). Physical methods include the irradiation of the air with ultraviolet rays and dust-laying by oiling the floors (van den Ende et al. 1940) and oiling the blankets (van den Ende et al. 1941). Chemical methods using antiseptic mists, vapours, and smokes have all been used: propylene and triethylene glycol chiefly in America, and hypochlorites and lactic acid in this country. The importance of aerial filtration and controlled ventilation has also become evident (Bourdillon and Colebrook 1946). Studies thus far carried out with all three methods have been largely confined to experiments in the laboratory and field experiments on confined communities, such as shelterers from air raids, hospital patients, and infants in nurseries. Both in this country and in America notable successes have been recorded in the prevention of cross-infection in hospital (Harris and Stokes 1945, Wright et al. 1944), and it is abundantly clear that, in the case of certain groups of the population living in institutions such as barracks, homes, wards, and so on, practical methods now exist for the reduction of respiratory infections of many varieties to a minimum. It is a far cry from this to the prevention of an epidemic of influenza in the general population, but at any rate a start has been made. It would help matters if a trial of the new methods could be made in industry in advance of anticipated epidemics of influenza, for we do not know how important the day-to-day contacts are in the transmission of influenza. Communities already possessing a high rate of respiratory infection are also suitable for a field trial, and it is greatly to be hoped that schools and institutions will permit an extension of the work thus far begun.

CONCLUSION

We stand today in an era of unprecedented achievement against the micro-organisms responsible for many of mankind's ills. Yet, however great the advances promised by penicillin in the treatment of established infections, I cannot foresee that either it or any other chemotherapeutic weapon holds the key to the control of the acute respiratory diseases. Indeed, we are in danger of allowing the great achievements of chemotherapy to overshadow the urgency of the prevention of the common diseases of the respiratory tract. Certainly mass chemoprophylaxis with any agent thus far described does not appear to be the answer to our question.

If we consider the spectacular achievements in the past ten years in the control of other infections, such as yellow fever, typhus, and diphtheria, it is clear that an understanding of the epidemiology and immunology these infections has been the basis of the measures plied with success by public-health authorities. I have scribed here some of the pieces of the jigsaw puzzle influenza and related infections which seem to fit to place, and I have indicated the large gaps in our nowledge. As with other infections, control measures re in process of formulation along widely different lines. e must hope that the growth of our knowledge will speedy enough for us to be armed to the teeth, if ver we are faced with a return of the deadliest plague all—pandemic influenza.

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"There are insufficient nurses to meet the needs of our civilian population. This is due to several factors, such as the increasing demands of the public for nurses, the requirements of the Government services, and the failure of nurses after discharge from the armed services to return to civilian work. The most important factor is the failure of the profession to attract and to hold young women. This failure is primarily an economic one. The period of preparation is out of proportion to the compensation given graduate nurses. An additional factor that applies only to nurses continuing in their field is the ever increasing boredom of their task. The doctor has three great forces to hold his interest in his work. . . . The average graduate nurse has none of these stimuli to enliven her work. For her the glamor of the uniform soon fades, and she does the same work for the same pay year in and year out. . . . The leaders of the nursing world have not yet devised any method of making the work of the graduate nurse increasingly interesting or increasingly responsible. . . . No method has been developed for relieving the highly trained graduate of that part of her work that can be done by less skilled workers. . . . It seems clear that the kernel of this problem lies in the failure of the directors of nursing to devise ways of passing along part of the nurses' work to subordinates."—Dr. W. M. FIROR, *Surg. Gynec. Obstet.* January, 1947, p. 121.

MALNUTRITION

IN INDIAN PRISONERS-OF-WAR IN THE FAR EAST

A SURVEY OF 2000 CASES

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THIS report briefly summarises the clinical and laboratory observations made on a group of Indian prisoners-of-war immediately after they had been evacuated to India. All such prisoners who were sufficiently ill to require hospital treatment were received in the group of hospitals centred round Jalahalli, near Bangalore. Some 2000 patients were examined, and from a study of these our clinical impressions were formed. In addition a small group of patients was selected, on clinical grounds only, for a more intensive laboratory investigation. This group included typical representatives of each of the major classes of deficiency syndrome encountered. Full details of these findings will be published elsewhere.

Various aspects of the clinical state of Far East prisoners have already been discussed by Gupta (1946), Price (1946), and Pavillard (1946), and the condition of the prison camps has been described by several workers (*Lancet* 1946). The nutritional neuropathy common in Far East prisoners has been discussed by Spillane (1945), Clarke and Sneddon (1946a and b), and Garland (1946a and b), and much has also been written about the ocular signs (Dansey-Browning and Rich 1946, Rich 1946, Goldsmith 1946, Williamson 1946, Durran 1946, and Kirman 1946). "Burning feet" has been described by Simpson (1946) and Harrison (1946). Most of the above observations were made on British prisoners. In this paper the findings on Indian troops only will be discussed.

PREVIOUS DIETARY HISTORY

The standard daily ration issued by the Japanese to Indian prisoners consisted of 12 oz. of rice and about 8 oz. of green vegetables, usually the leaf and stem of sweet potatoes. This was supplemented by a little tea and sugar. If the prisoner were admitted to hospital, this ration was automatically reduced to half. Medical supplies were issued in totally inadequate quantities, antimalarial measures were little practised, and alimentary infections and infestations were widespread. In the absence of even the crudest drugs for their treatment, these diseases imposed a heavy mortality. Minor cruelties and torture added their quota to the heavy burden of suffering these men had to endure.

Patients were received from Bangkok, Singapore, Hong-Kong, Canton, and the Pacific Island bases of New Guinea and New Britain. In some of these areas fairly regular supplies of stale fish were provided by the Japanese, and in others it was possible for the men occasionally to supplement their rations by the secret purchase of food from the local Siamese or Chinese. All the men had been in Japanese hands for about $3^1/_2$ years.

Clinical Features

Clinically the patients could readily be divided into four main groups.

WASTING ONLY

Other than an extremely low body-weight, these patients presented very few abnormal clinical signs.

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Wasting was excessive and in some cases the blood-pressure was low. There was no obvious evidence of hypoproteinæmia or anæmia; and, save for occasional signs of riboflavine deficiency, evidence of vitamin deficiency was not apparent. Laboratory investigation revealed a mild macrocytic anæmia, a slight hypoproteinæmia, chiefly due to a reduction in the albumin fraction, and a slightly reduced blood-volume. Fractional test-meals and glucose and fat absorption tests were within normal limits. Since gastro-intestinal function was but little impaired, these patients recovered rapidly on a diet rich in calories, protein, and vitamins. Patients in whom the condition was most severe were also given transfusions of blood and of plasma.

The incidence of such patients, with wasting and no other gross signs of vitamin deficiency or hypoproteinæmia, was about 60% of the 2000 prisoners studied.

WASTING AND GROSS HYPOPROTEINÆMIA

The patients of this group were gravely ill when admitted to hospital. Gross generalised œdema with massive ascites was common. Wasting was extreme, anæmia severe, and growth of hair scanty on all parts of the body.

Laboratory examination showed a low blood and plasma volume. The anæmia was often severe and always macrocytic and normochromic. The plasma-protein concentration was low. On admission these patients were too ill for fractional test-meals and glucose and fat absorption tests to be done, but during the recovery phase these tests usually gave results within normal limits. An immediate slow transfusion of plasma, generally the plasma from 750–1000 ml. of blood made up to double strength, was given. This was repeated at daily or two-day intervals until the œdema and ascites had subsided. Two or three transfusions were usually sufficient. The response to the transfusion was dramatic and life-saving in many of the more severe cases.

These patients were comparable with those treated at Belsen (Vaughan et al. 1945, Mollison 1946) and the response to concentrated plasma appeared to be as good. No dangerous reactions, such as those mentioned by Lipscomb (1945), followed any of the transfusions. This group comprised about 1% of all patients received.

WASTING AND SIGNS ATTRIBUTED TO B_2-DEFICIENCY

Such cases, the incidence of which was about 10%, could be subdivided into those with riboflavine deficiency and those with nicotinic-acid deficiency.

(a) *Riboflavine Deficiency.*—These patients presented characteristic lesions of the lips, tongue, and mouth, and changes in the production of gastric acid and in gastric mobility.

The commonest lip lesions were cracks radiating from the corners of the mouth. Greyish areas of necrotic epithelium could often be seen on the inner aspect of the lips, and there were often red pinhead papules on the buccal aspect of the lower lip. Indurated red plaques occasionally formed on the palate, and aphthous ulcers were common.

The tongue was characteristically swollen and indented by the teeth and fiery red; in this state it was extremely tender, and the patients usually complained of soreness and burning. In contrast to the picture seen in nicotinic-acid deficiency, there was no atrophy of the fungiform or filiform papillæ: indeed individual fungiform papillæ appeared swollen and mushroom-shaped, while their denuded summits allowed the central capillary loops to appear as permanent red spots (Jones et al. 1944).

A slit-lamp examination of the eyes was not *Fractional test-meals showed that often the pro* of gastric acid and the gastric emptying-time defective. If this were so, the defects appeared to favourably influenced by riboflavine therapy. It be emphasised, however, that the general of the patient and the glucose and fat absorption if impaired, showed absolutely no improvement prolonged treatment with this vitamin, even tho the specific lesions on the lips and in the mouth always be banished within a week, provided ad dosage (9 mg. daily) was used.

(b) *Nicotinic-acid Deficiency.*—In these patients, the other hand, there was complete atrophy of th epithelium of the tongue. The whole organ was sm and pointed; its surface was denuded of papillæ and presented a pale mauve glazed appearance. There w little complaint of soreness, but sometimes was complained of after the ingestion of hot or spiced foods.

Anorexia, tympanites, and diarrhœa were common symptoms. The stools had an abnormally high total fat-content; but the proportion of split fats was not greatly increased. Gastro-intestinal absorption, demonstrated by the glucose and fat tolerance tests was impaired.

Response to specific nicotinic-acid therapy was prompt and complete in most cases, but in some, where the gastro-intestinal disturbance was great, parenteral nicotinic acid had to be given before improvement began.

(c) *Concurrent Deficiencies.*—Naturally riboflavine an nicotinic-acid deficiencies often occurred *concurrently* In such cases the tongue showed *signs of atrophy* of the central *areas*, usually in *a strip to either* side of the median fissure. The margins and the tip were red and showed the characteristic swollen fungiform papillæ.

WASTING AND NEUROLOGICAL SYNDROMES

Neurological abnormalities fell into three types—peripheral neuritis (beriberi), degeneration of the long tracts of the spinal cord ("captivity cord syndrome"), and optic changes ("captivity amblyopia").

(a) *Peripheral Neuritis (Beriberi).*—The neuriti affected, in most instances, both the upper and the lower limbs. Movement and sensation were *impaired*, and the reflexes, if present, were sluggish. Often flexor contractures, especially of the knees, had set in, and bilateral wrist and foot drop was common. After treatment with vitamin B_1 recovery was fairly rapid, except where muscular contractures had developed. The group was large, about 20% of all patients.

(b) "*Captivity Cord Syndrome.*"—Many patients showed signs of degeneration of the long tracts of the spinal cord. In India this condition has been called "captivity cord syndrome." Such patients were of two types: those with a sensory ataxia due to loss of function of the posterior columns (common), and those who presented as a spastic paraplegia due to pyramidal tract degeneration (rare). Very occasionally both types *were seen in the same patient.*

Patients with "captivity cord syndrome" had a normal cerebrospinal fluid, normal fractional test-meal findings, and no constant changes in the blood picture. They were not usually associated with the above-mentioned signs of nicotinic-acid or riboflavine deficiency, or necessarily with gross wasting. A reasonable degree of recovery was seen in cases of the first type (*posterior-column involvement*), *but those showing* spasticity (pyramidal-tract involvement) did not *improv* during three months' observation. Such cases formed approximately 2% of all repatriated prisoners requiring hospital treatment.

TABLE I—HÆMATOLOGICAL FINDINGS IN PATIENTS ON ADMISSION AND ON DISCHARGE AND IN CONTROLS

Findings	Prisoners-of-war					Controls	
	No. of patients	On admission	On discharge	Difference	Significance of difference	No. of patients	Mean ±S.D.
		Mean ±S.D.					
b concentration (g./100 ml.)	27	10·5 ±3·4	14·3 ±1·7	3·7 ±2·2	Less than 0·01	9	15·2 ±1·9
ed-cell count (millions/c.mm.)	27	2·74 ±0·63	4·64 ±0·88	1·9 ±0·62	Less than 0·01	9	5·28 ±0·18
æmatocrit (%)	27	31·9 ±6·0	43·3 ±1·5	11·4 ±5·5	Less than 0·01	9	45·5 ±4·0
.C.V. (cμ)	27	119·0 ±14·8	94·3 ±8·1	−24·7 ±16·1	Less than 0·01	9	86·5 ±8·0
.C.H. (γγ)	27	39·2 ±6·7	31·1 ±2·9	−8·1 ±6·6	Less than 0·01	9	29·1 ±4·3
.C.H.C. (%)	27	32·8 ±2·5	33·0 ±1·5	0·2 ±2·4	Greater than 0·05	9	38·5 ±2·4

TABLE II—BIOCHEMICAL FINDINGS IN PATIENTS ON ADMISSION AND ON DISCHARGE AND IN CONTROLS

Serum protein (g./100 ml.)	27	5·42 ±0·96	6·83 ±0·44	1·41 ±1·15	Less than 0·01	9	6·89 ±0·35
Serum albumin (g./100 ml.)	27	2·63 ±0·62	4·11 ±0·50	1·48 ±0·94	Less than 0·01	9	4·59 ±0·49
Serum globulin (g./100 ml.)	27	2·77 ±0·78	2·72 ±0·72	−0·05 ±0·84	Greater than 0·05	9	2·30 ±0·30
Ratio A./G. (x : 1)	27	1·1 ±0·6	1·6 ±0·4	0·5 ±0·7	Less than 0·01	9	2·0 ±0·5
Serum calcium (mg./100 ml.)	27	8·5 ±1·5	10·8 ±0·8	2·2 ±1·5	Less than 0·01	9	11·4 ±0·5
Serum inorganic phosphorus (mg./100 ml.)	24	3·9 ±1·1	4·4 ±0·6	0·5 ±1·1	Between 0·05 and 0·02	9	4·0 ±0·3
Serum phosphatase (King Armstrong units)	24	16 ±8	20 ±12	4 ±10	Between 0·05 and 0·02	9	16 ±4

(c) "*Captivity Amblyopia*."—Many of the prisoners developed a visual defect during captivity, which condition, while still of uncertain ætiology, has been termed "captivity amblyopia." The commonest finding was a bilateral temporal pallor of the disk, with which was usually associated a crescentic zone of pigmentary disturbance consisting of a reticulated white or pinkish pattern superimposed on a bluish-black background of choroidal pigment. This pigmentary zone, which was adjacent to the temporal margin of the disk, faded into a retina which was somewhat pale and atrophic. Those cases whose visual defect was most marked usually showed total pallor of the disk, while a white "cuff" surrounded the vessels for a considerable distance from the disk margin. However, in only one case was gross attenuation of the vessels observed.

A further type of abnormality consisted in much enlargement of the physiological cup, which was occasionally so gross that its edge reached the disk margin on the temporal side and even seemed to extend beyond it in rare cases. The vessels were seen to plunge abruptly over the edges of the enlarged and deepened pit, thence to be seen indistinctly running over its floor, completely out of focus. It is not claimed that these changes are specific, but they were always associated with pronounced visual and field defects and were never observed among the rest of the 2000 patients examined, who had no visual complaint.

Perimetry showed constantly a marked concentric contraction of the visual fields; but, in contrast with the findings of Spillane and Scott (1945) and Dansey-Browning and Rich (1946), central scotomata could be demonstrated in only one case. This result must be interpreted with caution, however, since the meagre capacity of the part-time ophthalmological unit posted to the hospital was completely overwhelmed by the large numbers of patients, approximately 100, on whom it was desirable to have detailed field information within a short period of time. The patients, for the most part illiterate and understanding only one of several languages, were not generally favourable subjects on which to perform so delicate a subjective test.

This condition was seen in the absence of gross vitamin-deficiency states; it has been observed in association with deficiency of riboflavine and nicotinic acid, and may accompany any of the above-mentioned neurological syndromes. The patients were treated with a high-calorie high-protein diet, and considerable recovery occurred in all but the most severe cases. The incidence was of the order of 9% of all the patients examined.

Special Investigations

HÆMATOLOGICAL FINDINGS

Some of the hæmatological findings are summarised in table I. The patients studied included representatives of each of the clinical groups described above and are therefore typical of the Indian prisoner-of-war who was ill enough to require hospital treatment. For purposes of comparison the findings of a control group of 9 apparently healthy Indian soldiers are also given.

Most of the patients studied were anæmic. The mean hæmoglobin on admission to hospital was 10·5 g./100 ml., compared with 14·3 g./100 ml. when they were discharged, and 15·2 g./100 ml. for the control series. The characteristics of the anæmia were remarkably constant; it was macrocytic and normochromic. The average mean corpuscular volume (M.C.V.) on admission was 119 cμ and 94 cμ on discharge, compared with 86·5 cμ for the control group. Also the mean corpuscular Hb (M.C.H.) was considerably raised, 39γγ on admission and 31γγ on discharge, compared with the control figure of 29γγ. The mean difference between the figure observed on admission and that on discharge for the Hb, red cells, hæmatocrit, M.C.V., and M.C.H. was, in each case, statistically significant. The M.C.H. concentration was, however, never reduced. On admission the M.C.H. concentration was 32·8%, and on discharge it was 33·0%, compared with 33·5% in the control group. Thus there was no suggestion of the dimorphic type of anæmia described by Trowell (1943). It is in fact remarkable that subjects whose diet was as meagre as the patients describe should have no evidence of iron deficiency. In most cases a blood film was made; this showed the picture characteristic of nutritional macrocytic anæmia: macrocytosis, anisocytosis, poikilocytosis, and the usual number of primitive forms.

Treatment was with the Indian liver preparation T.C.F., a sheep-liver extract prepared by the Teddington Chemical Factory, Bombay. It was usually given in doses of 4 ml. every second or third day. The response was invariably good.

SERUM PROTEINS

Serum-protein estimations, done on a representative series of patients, showed that the mean serum-protein concentration was 5·4 g./100 ml. on admission, compared with 6·8 g./100 ml. on discharge and 6·9 g./100 ml. for the control group (table II). The mean serum-albumin level was 2·6 g./100 ml. on admission, compared with 4·1 g./100 ml. on discharge and 4·6 g./100 ml. for the control group, whereas the mean serum-globulin level was 2·8 g./100 ml. on admission, 2·7 g./100 ml. on discharge, and 2·3 g./100 ml. for the controls. Thus the reduction in serum protein was entirely in the albumin fraction. This is shown in the low (1·1/1) albumin/globulin ratio found on admission which was increased to 1·6/1 when the patients were discharged, compared with a normal of 2·0/1.

Relation of Serum-protein Concentration to Œdema.—Mollison (1946), who studied the inmates of Belsen, showed that there was a good, though not absolutely strict, correlation between the serum-protein concentration and the development of œdema. Roughly, œdema developed if the serum-protein concentration fell below 5 g./100 ml. In general this was also true for the Indian prisoners, but the serum-albumin concentration was more closely correlated with the development of œdema than was the total serum-protein concentration. This is well illustrated in table III, which shows that widespread œdema with ascites developed if the serum albumin fell below 2 g./100 ml., and gross generalised œdema with pronounced ascites if it fell below 1 g./100 ml. The figures of Vaughan et al. (1945) are similar to ours. This result is to be expected because of the greater contribution made by the albumin than the globulin to the colloid osmotic pressure of the plasma.

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TABLE III—RELATION OF SERUM-PROTEIN CONCENTRATION TO ŒDEMA

Case	Serum protein	Serum albumin	Serum globulin	Clinical condition
	(g./100 ml.)			
1	2·88	0·75	2·13	Gross generalised œdema and marked ascites
2	4·05	1·01	3·04	
3	4·20	1·46	2·74	Generalised œdema and ascites.
4	4·78	1·20	3·58	
5	5·23	1·67	3·56	
6	5·10	1·98	3·12	
7	3·33	1·96	1·37	
8	4·18	2·00	2·18	
9	4·81	2·44	2·37	No generalised œdema or ascites.
10	4·46	2·40	2·06	
11	5·34	2·10	3·24	
12	5·17	2·48	2·69	
13	5·30	2·75	2·55	
14	5·24	3·75	1·49	
15	5·30	4·07	1·23	
16	5·12	2·56	2·56	

Miscellaneous.—In some of the patients the serum urea, plasma prothrombin, bleeding-time, clotting-time, plasma fibrinogen, vitamin-C saturation test, and plasma bisulphite combining power were investigated. Except in one case, in which there was an impaired vitamin-C saturation, all these tests invariably gave figures well within the normal range. It must be borne in mind, however, that the patients had mostly received treatment, including massive vitamin therapy, immediately after their release and throughout the whole of the time they were in transit to India.

PLASMA VOLUME AND BLOOD VOLUME

The average plasma volume of the prisoners soon after admission to hospital was not significantly different from that of the control series. The plasma volume referred to unit body-weight was, however, increased, with no change when referred to unit surface area, and a decrease when referred to unit body-height. The blood volume, because of the anæmia and consequent low hæmatocrit, was reduced; and it was also reduced when referred to unit body-weight, unit surface area, and unit body-height. There was in consequence a great reduction in the total circulating Hb, total circulating red cells, and total circulating plasma protein, the last being confined to the albumin fraction. Details of the asma-volume findings and the pattern of recovery will rm the subject of a further report (Walters et al. 1947).

FRACTIONAL TEST-MEAL FINDINGS

Of the 21 patients studied, 2 had a histamine-resistant chlorhydria, 5 had no free acid after a gruel meal but esponded to histamine, 1 had a hypochlorhydria, 3 had "delayed" emptying-time, and 10 were normal. After he period of treatment in hospital not one patient ailed to produce free acid even without histamine, 3 had a hypochlorhydria, 1 had a delayed emptying-time, and the remainder were normal. These findings did not significantly differ from those of the control series.

Nicotinic acid had no effect on the fractional test-meal findings, but there was much improvement while the patients were receiving riboflavine. There was also an improvement, in the few cases studied, while the patient was receiving liver extract.

TESTS OF ABSORPTION FROM GASTRO-INTESTINAL TRACT

Only a few (less than 5% of those who were ill enough to require hospital treatment) of the patients had evidence of absorptive defect or complained of diarrhœa when they arrived in India. The following conclusions are based on a study of these patients only and are not representative of all repatriated Indian prisoners. In such patients there was an impairment of the glucose-tolerance test characterised by a low fasting blood-sugar and a low rise in the blood-sugar concentration after 50 g. glucose. By the time the patients were fit for discharge from hospital the glucose-tolerance test had returned to normal.

While the patients were receiving nicotinic acid there was a slight improvement in the glucose-tolerance curve. Riboflavine, on the other hand, had no effect.

In addition, there was an impairment of the fat tolerance as judged by both the height and time of the rise in amount of serum total fat and time of the rise in amount of serum cholesterol. There was also a low fasting serum-cholesterol level, but no change in the amount of fasting serum total fat. Most patients with diarrhœa also had steatorrhœa, which improved during treatment in hospital.

Treatment

The specific treatment used in the several types of deficiency syndrome has been given in the clinical account of each. Patients with peripheral neuritis and "captivity cord syndrome" received physiotherapy and were taught re-educational exercises. Flexor contractures were treated with weight extension. Coincident scabies, epidermophytosis, dysentery, or malaria was treated along the usual lines.

Two diets were used. A low-residue bland diet of 3800 calories was used for those who had little appetite, sore tongues, and impaired digestive function. When appetite and digestion improved, a full diet of 5300 calories was supplied. All the patients received three major meals daily, with extra milk, tea, fruit, sweets, and biscuits. They also received 'Multavite' tablets and an extract of rice-polishings. There seemed to be few periods during the day when their mouths were empty.

Discussion

The findings in the Indian prisoners from the Far East differ from those in prisoners from Europe in three major respects: the type of anæmia, the lesser incidence of diarrhœa, and the great predominance of neurological signs. These facts are significant to those concerned with the ætiology of nutritional macrocytic anæmia, the so-called "starvation diarrhœa," "captivity cord syndrome," and "captivity amblyopia."

Anæmia.—The characteristics of the anæmia in the Far East prisoners are in marked contrast to those of the anæmia of the patients from Belsen described by Mollison (1946) and those from Lamsdorf reported by Edge (1945). In the European camps the anæmia was normochromic and normocytic, while in the Far East the anæmia was normochromic but macrocytic. Thus, in both series, there was no evidence of iron deficiency, but in the Indian prisoners there was evidence of a deficiency of the factor responsible for nutritional macrocytic anæmia not seen in the Europeans imprisoned in Belsen. In other respects the two series are comparable: both showed roughly the same degree of loss of body-weight, both had the same degree of anæmia, both suffered from a comparable degree of protein deprivation as illustrated by the plasma-protein concentration and the degree of œdema. It appears that either the Indian is more susceptible than the European to nutritional macrocytic anæmia, or the inmates of Belsen received some factor in their diet not accessible to the Indian prisoners.

Diarrhœa.—It has generally been believed that starvation is invariably accompanied by a failure of absorption from the gastro-intestinal tract. All the reports of the conditions in Belsen have stressed the prevalence of diarrhœa (e.g., Collis 1945, Lipscomb 1945, Vaughan et al. 1945, Mollison 1946). Diarrhœa was also common in Lamsdorf (Edge 1945), in Auschwitz (Adelsberger 1946), and in Western Holland (Burger et al. 1945). The point we wish to emphasise is that, in Indian troops at any rate, diarrhœa and the accompanying defects of absorption are not necessarily part of the starvation syndrome. These prisoners were suffering from undoubted starvation, and many of them from extreme protein deficiency. Diarrhœa, when it occurred, was usually accompanied by other signs of nicotinic-acid deficiency, though, from the recent observations of Carruthers (1946) and Spies (1946), folic acid may also be implicated. We therefore regard "starvation diarrhœa" as a misleading term, for the diarrhœa is not the result of starvation per se. In fact, in patients susceptible to diarrhœa, an increase in the dietary intake often aggravates the diarrhœa.

"Captivity Cord Syndrome" and "Captivity Amblyopia."—Neuropathies such as those seen in the Far East were almost unknown in Europe. It seems likely that both "captivity cord syndrome" and "captivity amblyopia" have a similar underlying pathology. Though the long tracts of the cord and the optic pathway are the parts of the nervous system most frequently involved, we have, in common with others, also observed nerve deafness and paresis of the vocal cords in a smaller number of patients.

"Captivity cord syndrome" and "captivity amblyopia" were often seen in the same patient, and, together or separately, these conditions have been seen in either the absence or the presence of gross wasting, macrocytic anæmia, nicotinic-acid deficiency, or hyporiboflavinosis. Superficially it seems that the condition is a vitamin deficiency, and deficiencies of vitamin A, vitamin B_1, riboflavine, nicotinic acid, pantothenic acid, and folic acid have been mentioned as possible causes. The results of therapeutic trials have been disappointing. In many cases the patients improved on a high-vitamin high-calorie high-protein diet, but in others little progress was made. Clarke and Sneddon (1946a and b) suggest that the condition is due to a toxin or anti-vitamin. Kirman (1946) suggests that the optic signs are due to a toxic factor, and Goldsmith (1946) that there is "some toxicosis due to lack of good proteins or to certain low-grade proteins." As suggested by Spillane (1945), the condition appears to be similar to that which developed in German prisoners in a Middle East camp and described by Spillane and Scott (1945).

Treatment was with the Indian liver preparation T.C.F., a sheep-liver extract prepared by the Teddington Chemical Factory, Bombay. It was usually given in doses of 4 ml. every second or third day. The response was invariably good.

SERUM PROTEINS

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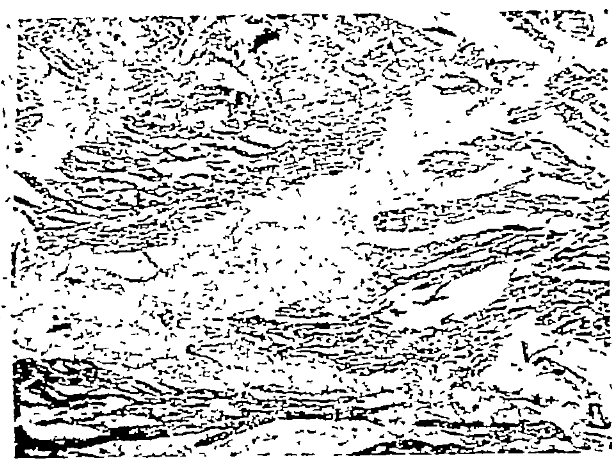

Fig. 4—Section of heart muscle showing amyloid deposits. (× 20.)

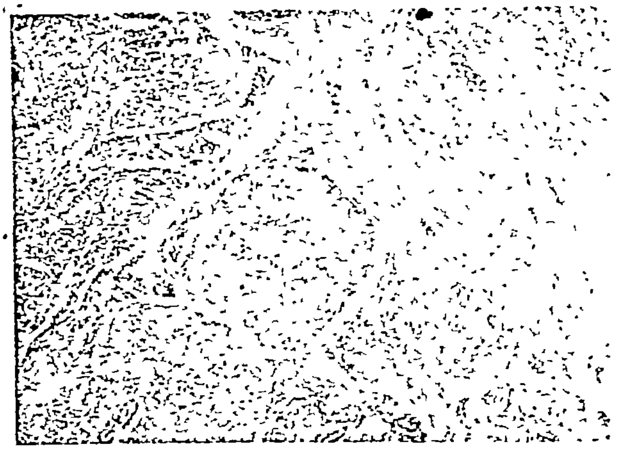

Fig. 5—Section of œsophagus showing deep layer of mucosa on left, small vessel affected by amyloid, and replacement of muscle coat by amyloid. (× 40.)

A diagnosis of amyloidosis of the tongue was considered, but it was felt that a search should be made to exclude a primary new growth. A barium swallow suggested a filling defect in the upper end of the œsophagus, and for this reason œsophagoscopy was attempted. Difficulty was experienced in inserting the œsophagoscope, and a general anæsthetic was given. The attempt was still unsuccessful, owing to rigidity of the tissues, and had to be abandoned. Unfortunately the patient's condition deteriorated, his blood-pressure fell, and he died four hours later without having recovered consciousness.

Necropsy revealed coronary thrombosis as the immediate cause of death. The coronary arteries showed slight atheroma but were not grossly abnormal. The heart was small, pale, and flabby. The tongue was firm, its cut surface pale, and the muscle bundles were not visible. The whole tongue appeared to consist of pale homogeneous tissue, the cut surface of which, when stained with iodine, gave the mahogany colour typical of amyloid disease. The œsophageal wall was thickened in its entire length, being $^1/_3$ in. thick in the upper third and slightly less at the cardia. The œsophagus formed a rigid tube, and its cut surface gave the same reaction with iodine. The other organs were not remarkable, except that the gall-bladder contained "mixed" stones and inspissated pus. The liver, spleen, and kidneys appeared normal macroscopically.

Material was taken for histological section from the tongue, œsophagus, buccal mucosa, sternomastoid, heart, liver, spleen, and kidney. The tongue, œsophagus, buccal mucosa, sternomastoid, and heart showed typical amyloid tissue, staining well with methyl violet. Apart from a few deposits of amyloid material in the glomerular tufts of the kidney, the liver, spleen, and kidney were normal. Atrophy of muscle-fibres and deposition of amyloid material in the interstitial tissues of muscular organs are illustrated in the accompanying photomicrographs. It can scarcely be doubted that this feature of the heart muscle was responsible for the low blood-pressure, which, aggravated by the administration of a general anæsthetic, led to coronary thrombosis and death. The degree of atheroma of the coronary arteries was small, and they appeared normal otherwise. Unfortunately the vessels were not sectioned.

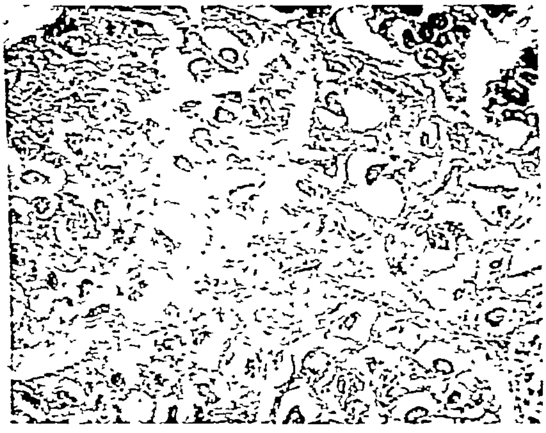

Fig. 6—Section of sternomastoid muscle showing amyloid deposits and atrophic muscle-fibres. (× 88.)

DISCUSSION

Amyloidosis with macroglossia appears to be a different condition from the classical form of amyloid disease due to protracted suppuration, tuberculosis, syphilis, Hodgkin's disease, &c. Unlike the latter, the amyloidosis has no predilection for liver, spleen, kidneys, and intestinal mucosa. On the contrary, these sites are completely spared or only slightly affected, and the main deposits are found in the tongue, skeletal muscles, and heart. Sometimes the skin, lungs, and upper intestinal tract are involved also. None of the acknowledged causes of amyloid disease has been observed in these cases of so-called atypical amyloidosis. In the case described the presence of pus in the gall-bladder is not likely to be relevant, since this is a fairly common lesion not recognised as associated with amyloidosis.

Unfortunately this case throws no light on the obscure ætiology of the condition.

I am indebted to Prof. W. G. Barnard and Dr. Evan Jones for suggestions and help, and to Dr. T. K. Owen for the microscopical sections.

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Weber, F. P., Cade, S., Stott, A. W., Pulvertaft, R. J. V. (1937) *Quart. J. Med.* 6, 181.

"Two obvious steps must . . . be taken if any real progress is to be made in improving the dental health of the nation. One is that we must increase the student output of the existing dental schools and perhaps build new ones. The other is to decide how a very considerable proportion of the new entry to the profession can be attracted to the school service." —Dr. E. W. Fish, in the Founders and Benefactors' lecture, Sutherland Dental School, Newcastle-upon-Tyne, Oct. 7, 1946. (*Brit. dent. J.* Jan. 17, p. 35.)

"Ideals may not, and usually do not, make for security or immediate advancement—often indeed, they have an opposite effect—but in spite of what the realists may say to the contrary, ideals are not illusions, and without them life is a poor thing. They may be elusive, but to those who keep them they are over and over again the 'flaming realities' of Keats. Even if they do bring to practitioners who try to live up to them some material loss, they bring at the same time something which is infinitely worth while—independence and freedom of thought and action. And these are priceless possessions."—"Ex-editor," *Manchr med. Sch. Gaz.* 1946, 26, 56.

greatest single spread was given by a gravis strain. greatest average spread was given by the few pical strains examined. *The average spread of gravis* ins was close to that of the atypical strains, and the est average was that of the mitis strains.

The clinical histories of 47 cases in this series could divided into two groups: (1) 11 had been artificially munised some months or years previously; and (2) 36 others had not been artificially immunised, or had en immunised too *recently to be included in the* munised. The strains causing diphtheria in the *immu-sed* were 4 gravis, 4 intermedius, 2 atypical, and 1 mitis. e average spread given by these strains was 6·1 mm., ghtly more than the greatest average for any type.

The *non-immunised* group were classified as mild, oderate, and severe cases according to the following andards:

Mild: faucial or nasal diphtheria with no toxic signs or mplications.

Moderate: diphtheria accompanied by slight paralysis, cetonuria or albuminuria, or slight cardiac paresis, with o other signs of toxæmia.

Severe: toxic, hypertoxic, and fatal cases: including ases with bull neck, paralysis, and other complications, uch as heart-failure and hæmorrhages

Of the 36 cases in this group 17 were classed as mild, caused by 7 gravis, 3 intermedius, 5 mitis, and 2 atypical strains, the average spread given *by the organisms in* this group being 5·8 mm.; 5 cases, caused by 2 gravis, 1 intermedius, and 2 atypical strains, were classed as moderate, the average spread being 4·2 mm.; and 14 cases, caused by 10 gravis, 3 intermedius, and 1 mitis strains, were classed as severe, the average spread being 5·1 mm.

In this series, therefore, a clear relationship does not appear to exist between production of substance B and severity of diphtheria. On the other hand, the discrepancy occurs mainly in the group of cases classed as mild. The mildness of a case may depend just as much on the natural immunity of the patient as on the virulence of the causal organism. That the resistance of the patients in this group was high is suggested by the high proportion of gravis strains. The average spread caused by these gravis strains was 6·6 mm., which contributed substantially to the high average recorded for all strains in the group.

Series II.—In this series the organisms were of the types shown below. The atypical strains were similar to those of the first series. The production of substance B was given by the spread in mm. read 30 min. after injection.

Type	*No. of strains*	*Amount of spread* *Maximum*	*Minimum*	*Average*
Gravis	15	11 mm.	4 mm.	7·86 mm.
Intermedius	8	8 mm.	6 mm.	6·87 mm.
Mitis	8	9 mm.	3 mm.	6·25 mm.
Atypical	19	10 mm.	4 mm.	6·84 mm.
Total	50			

As in series I, the *greatest individual spread* was given by gravis strains, 3 of which gave a reading of 11 mm. The greatest average spread was also given by the gravis strains. The lowest average spread was given, as in series I, by mitis strains. Intermedius and atypical strains, which were more numerous in this series, ranked close together between the extremes of gravis and mitis.

The clinical histories of 44 of the cases were dealt with in the same manner as in series I. Of the 44 cases, 17 were in persons artificially *immunised.* The strains responsible were 9 gravis, 2 intermedius, 2 mitis, and 4 atypical. The average spread given by these strains was 7·1 mm., a figure which is second only to the average for the gravis strains.

Of the 27 cases in the *non-immunised,* 11, caused by 2 intermedius, 3 mitis, and 6 atypical strains, were classed as mild, the average spread given by the organisms being 5·9 mm.; 10 cases, caused by 3 gravis, 1 intermedius, 1 mitis, and 5 atypical strains, were classed as moderate, the average spread being 6·9 mm.; and 6 cases, caused by 1 *gravis,* 1 intermedius, 1 mitis, and 3 atypical strains, were classed as severe, the average spread being 8·1 mm.

In this series of cases a relationship is therefore suggested between severity of case and production of substance B by the causal organisms. The average spread given by the organisms causing the severe cases was above the average for any single type. The average spread given by the organisms causing the mild cases was below the average for any single type. It is noteworthy that among the organisms causing mild diphtheria there were no gravis strains, and in this respect the mild cases in series II differed from those in series I.

DISCUSSION

From the foregoing experiments it is apparent that substance B is produced by virtually all diphtheria bacilli which cause clinical infection. Accurate assess*ment of the amounts of substance B* produced by strains is rendered difficult by the fact that the property of forming this important constituent of diphtheria toxin declines rapidly on subculture in the laboratory after isolation. In spite of the inaccuracies which are an inevitable consequence of such decline, it has been shown, by the study of the organisms isolated from 100 cases, that, on the average, gravis strains form most substance B, and mitis strains least. Intermedius and atypical strains lie between. The greatest individual formation of substance B is by gravis strains.

There is a strong suggestion, in the results of both series of cases studied, that diphtheria in the immunised is caused by organisms which are active producers of substance B.

In 50 cases in series I no relationship was apparent between production of substance B and severity of toxæmia. It may, however, be reasonably suggested that the absence of relationship was due in part to a high resistance to the toxæmia of diphtheria on the part of the patients in the mild group of cases, because the proportion of gravis strains causing diphtheria in the group was unduly high. In the 50 cases in series II a relationship between production of substance B by the causal organisms and the severity or mildness of the cases is suggested. *It was found that the severe cases* were caused by organisms which produced, on the average, more substance B, and the mild cases were caused by organisms which produced, on the average, less substance B. Cases of moderate severity were caused by organisms intermediate in their capacity to produce substance B.

SUMMARY

The Dublin work on the composition of diphtheria toxin and antitoxin and on the nature of hypertoxic diphtheria is briefly summarised to date.

The production of substance B by 100 strains of *C. diphtheriæ* is studied in relation to type of strain, severity of case, and the development of diphtheria in the artificially immunised.

We are indebted to the Medical Research Council of Ireland for a grant for expenses, and to numerous clinicians who kindly supplied details of their cases. One of us (H. H. B.) *was in receipt of a grant* from the Sarah Purser Medical Research Fund.

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PRODUCTION OF SUBSTANCE B BY CORYNEBACTERIUM DIPHTHERIÆ

IN RELATION TO TYPE OF STRAIN AND SEVERITY OF TOXÆMIA

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It has been shown by one of us (O'Meara 1940) that diphtheria toxin formed by the diphtheria bacillus has two components, provisionally called substance A and substance B, which act together in the production of the clinical picture of diphtheria.

Substance A is the guineapig lethal factor and is formed in relatively minute amounts by the bacillus in all cases of clinical diphtheria, though it is formed in superabundance by the Park Williams no. 8 strain used in the preparation of laboratory toxin.

Substance B acts in conjunction with substance A. Though not appreciably toxic itself, by spreading substance A through and into the tissues it causes, when present in sufficient quantities together with minute amounts of substance A, a type of hypertoxic diphtheria in human subjects and in experimental animals, such as the guineapig. The special characteristics of this form of diphtheria are local œdema and necrosis, cardiac failure, wasting and paralysis, and sometimes hæmorrhage into the skin and mucosæ. Clinical hypertoxic diphtheria, moreover, does not respond to treatment with modern commercial antitoxin, even when administered early in very large doses; the toxæmia persists, and the membrane does not coagulate and separate in the normal fashion after treatment with antitoxin.

In the work done in 1939, showing the existence of substance B in diphtheria toxin and its importance, it was demonstrated that the avidity of diphtheria antitoxin depended on its power of neutralising substance B. It was also predicted that, for the successful treatment of hypertoxic diphtheria, none but the most avid antitoxins would be of use. Some avid antitoxin was prepared under an agreement which gave to a firm engaged in the manufacture of antitoxin the advantage of a year's knowledge of the work before its publication, in return for antitoxin to be tested clinically in Dublin (O'Meara 1943, 1946). The results of the clinical trials (McSweeney 1941) fully justified the prediction that avid antitoxin would provide the answer to hypertoxic diphtheria.

It was later shown that avid antitoxins could be prepared by immunising animals with antigens rich in substance B, and that a relation existed between the production of substance B by strains of the diphtheria bacillus and the clinical severity of diphtheria caused by them. O'Meara et al. (1946) discussed the methods of producing avid antitoxin of high dilution ratio and demonstrated its production in the serum of animals inoculated with antigens rich in substance B. The antigens used corresponded in general character to those used by the pioneers of antitoxin production who obtained therapeutic sera effective in small doses against the toxæmia of diphtheria (O'Meara 1939, 1941).

Schmidt (1946) has confirmed the production of substance B by freshly isolated diphtheria bacilli and noted the rapid disappearance of the power of producing it when the organisms are subcultured on laboratory media, an observation with which we have been familiar for some years. We find, however, that the decline in activity of the strains, though very rapid at first, is not absolute. Substance B continues to be produced in smaller quantities for a very long time, and it is doubtful if the property is ever completely lost. Neve it is essential, when studying the production of stance B by the diphtheria bacillus, to use strains have been subcultured as little as possible after isol

In the experiments described below, two series 50 strains of *C. diphtheriæ* were studied. One of (R. S. W. B.) was particularly associated with the of the first series of strains, and another (H. H. B.) with second series. In both series, to estimate substance we have used its property of spreading. When first series was being studied, the importance of fresh of strains was not fully appreciated. Further, some guineapigs with dark skins, making readings diffic had to be used for the estimations, as other anim were not available. In consequence the values for spre in the first series are lower, on the average, for all typ of the organism than in the second series. If circumstances permitted very rapid work, values even high than those of the second series would probably be obtained.

PROCEDURE

The strains studied were isolated from swabs sent to the laboratory for routine diagnosis by hospitals and private practitioners. There was no special selection of strains, and no inquiry was made about the type of case from which they were taken, until all the examinations in each series had been completed. After isolation the organisms were typed, the criteria used being colony form on chocolate-tellurite-agar similar to, but not identical with, that of Anderson *et al.* (1931), and starch fermentation. When typing had been completed, the organisms, taken from 24-hour slope cultures on Löffler's medium, were emulsified in sterile heated rabbit serum. The emulsions were dried *in vacuo* in sterile glass tubes which were subsequently sealed and stored until required.

To measure the production of substance B the strains were inoculated into broth from the desiccated growth and incubated for five days at 37° C. The cultures were then well centrifuged to remove all organisms, and 0·2 c.cm. of the supernatant fluid was injected intradermally into guineapigs. Eight strains were tested at a time on each guineapig. The animals weighed about 350 g. and were, so far as possible, white-skinned. Many strains were also tested by emulsifying the growth from Löffler slopes in saline in the manner originally described (O'Meara 1940). For the purposes of the present work, broth cultures were found more convenient.

In reading the results of the inoculations, diameters of the weals were measured with fine-pointed callipers 30 min. after the injection. It was found in numerous tests that 0·2 c.cm. of uninoculated broth injected intradermally gave a weal 14 mm. in diameter. Th weal did not tend to spread but, after persisting some hours, was absorbed. In recording results of spread a deduction of 14 mm. has therefore been made from all readings to obtain the true figure for spread due to the presence of substance B in the supernatant fluid.

When the types of all organisms in each series and their production of substance B had been investigated, inquiry was made concerning the cases from which they had come; and the findings in the laboratory were correlated with the clinical findings.

RESULTS

Series I.—In this series the organisms were of the types shown below. The atypical strains corresponded to type 4 of Wright and Christison (1935), giving daisy-head colonies but not fermenting starch. The production of substance B is given by the spread in mm. read 30 min. after injection.

Type	*No. of strains*	*Amount of spread* *Maximum*	*Minimum*	*Average*
Gravis ..	.. 23	.. 13 mm.	.. 3 mm.	.. 5·7 mm.
Intermedius	.. 13	.. 9 mm.	.. 1 mm.	.. 5·1 mm.
Mitis ..	.. 8	.. 6 mm.	.. 4 mm.	.. 4·6 mm.
Atypical	.. 6	.. 9 mm.	.. 2 mm.	.. 6·0 mm.
Total	50			

suitable. What constitutes dangerous angulation the eyes of one operator may not be considered so by other; therefore any dogmatic pronouncement on the int is out of place here. Experience alone will decide. A likely site for implantation of the opposite ureter ould also be gauged, particularly when exposure may ave to be delayed till a second operation. The point f entry of the second ureter need not necessarily be t the same level. Implantation close to the mesenteric order should be avoided, because of the profuse bleeding kely to arise in this situation.

When the site of implantation has been decided on, n incision 1 in. long is made in the colon to a depth hat exposes the mucosa. At this point, after the mucosa as been nicked open at the distal end of the incision, he ureter is straightway inserted and anchored within the bowel. The edges of the gutter in which it lies are united to form a roof over it. A safer alternative, while sacrificing very little time, is first to secure the ureter to the proximal end of its gutter with an anchoring stitch (fig. 1). The mucosa is now opened and the free end of the ureter inserted within the bowel. The anchoring suture ensures that there is at least an inch of ureter on which the backward pull of its whole length is no longer exerted. The security thus afforded allows the ureter to be inserted unhurriedly into the bowel without backward tension. There is also time and freedom to correct, or modify, an unsatisfactory insertion, with no risk of the ureter retracting during the process.

The second suture, which carries the distal end of the ureter to its anchorage within the bowel, should transfix the ureteral coat at no greater distance than 1 mm. from its extremity (fig. 2). A longer projection of lax ureter beyond its point of fixture within the bowel incurs the risk of kinking (fig. 3). A lax unsupported extremity more than 1 mm. long cannot maintain alignment and will either angulate passively or be pressed on by mucous folds. This suture will endure until at least five days later, constituting a fulcrum or hinge beyond which any appreciable length of unsupported ureter tends to undergo acute flexion.

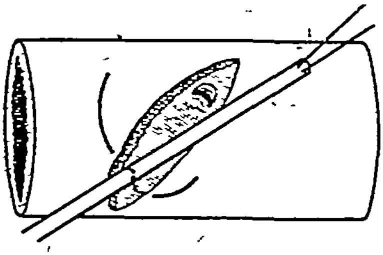

Fig. 1—Stitch anchoring ureter to proximal end of gutter in bowel.

If, therefore, during the five days following operation urinary suppression should arise from this purely mechanical cause, the futility of giving intravenous sulphate to induce uresis is at once apparent. The cause being mechanical, chemical fluids provide no remedy. Appreciation of how such a mechanical accident arises should lead to its avoidance. This by no means discountenances the use of intravenous fluids when rationally evoked.

After implantation the exposed ureters should be peritonised in the manner fully described in textbooks on the subject. A few c.cm. of 'Soluseptasine' is sprayed on the area of implantation. If the ureters have been inserted deftly and cleanly, the abdomen is closed without drainage.

POSTOPERATIVE CARE

These patients should be nursed in modern surgical beds.

Colonic gaseous distension is usually a troublesome sequel which, if not promptly relieved, may lead to urinary suppression. When suppression arises in this manner, its mechanical nature should be appreciated and treated, before blindly resorting to intravenous sodium sulphate in an endeavour to promote uresis. Severe distension raises the intramural pressure of the colon sufficiently to compress the ureters in the course of their mucomuscular tunnels. The timely insertion of a rectal tube, or even digital dilatation of the sphincter ani, will often suffice to expel the accumulated gas and relax the colon. Intramuscular 'Pituitrin' considerably aids expulsion. With the riddance of gas, urine, for the first time usually intermixed with blood, is often seen trickling through and around the tube.

The colon, then, must be prevented from becoming a taut gaseous cylinder, hindering the function of kidneys and ureters. After forty-eight hours a rectal saline washout is given by an experienced nurse. In its hasty or clumsy administration lies a real danger, from too sudden distension of the colon imposing excessive strain at the points of inosculation of the ureters.

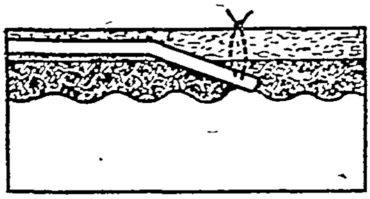

Fig. 2—Stitch anchoring ureter to distal end of gutter in bowel, only 1 mm. of ureter being allowed to project into lumen.

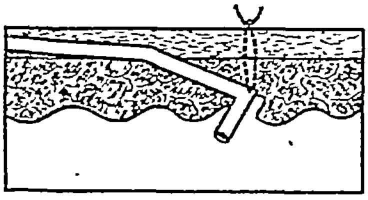

Fig. 3—Kinking of ureter due to too long a length being allowed to project into lumen of bowel.

The general discomfort of patients awakening from operation is in great measure due to immobility. The thoughtful shifting of their dead weight does much to restore restfulness. Passive movements of trunk and limbs also decrease the risk of postoperative thrombosis and pulmonary embolism. As a further precaution against this complication, patients are instructed to take deep respirations whenever they wake.

As excessive fluids encourage gaseous distension, small dry meals are allowed after forty-eight hours.

Manifest distress should unhesitatingly be relieved with morphine.

URETEROCOLOSTOMY IN MALES

Ureterocolostomy in males (apart from boys with ectopia vesicæ) is undertaken because of advanced urinary schistosomiasis, which often leads to multiple perineal fistulæ and "watering-can scrotum." A fibrotic bladder and disorganised urethra, complicated by long-standing gonorrhœal stricture, seriously interferes with normal sphincter control. Cystoscopy, when possible in these cases, reveals that the ureteral orifices too are often stenosed beyond the stage when sodium antimony tartrate is effectual.

ILLUSTRATIVE CASES

CASE 1.—A young man, aged 24, had been treated with neoarsphenamine in the outpatient department for a syphilitic penile ulcer. Kahn reaction +. As there was no satisfactory response he was admitted to hospital. Schistosome ova were found in the urine, and a course of 'Anthiomaline' was given. Later the neoplastic character of the ulcer was noted, and a section of its tissue was reported on as a squamous carcinoma of low-grade malignancy with little probability of metastases.

Laparotomy was nevertheless undertaken to investigate the bladder, which was found characteristically fibrosed and contracted, with its peritoneum studded with confluent bilharzial nodules. The appendix, which also was involved in this heavy hæmatobium infestation, was removed, and bilateral ureterocolostomy was done. After closure of the abdomen the penis was amputated.

Convalescence was smooth, the patient being up fourteen days after operation. There was little postoperative disturbance of pulse and temperature.

BILATERAL URETEROCOLOSTOMY

A REVIEW OF 17 CASES

A. C. Lovett-Campbell
L.R.C.P. & S.

UNTREATED vesicovaginal fistula causes protracted suffering among West African women. Too often the afflicted become uncared-for social outcasts. Years may pass before treatment is sought, apathy and fear contributing to delay.

Late cure by local repair is rendered difficult by the large size and indurated edges of the fistulæ, and may have to be abandoned for the more formidable procedure of ureter implantation. The work of Hayes,[1] in India, who cured 76 out of 85 cases by local repair, demonstrates the excellent results achieved by an experienced operator.

In certain localities of West Africa, the difficulties of local repair are increased by chronic vesical bilharziasis. In areas where bilharzia is hyperendemic, bladders are seen so densely infiltrated and fibrosed from long-standing bilharziasis that they no longer contract. In such cases, even if the fistula is satisfactorily repaired, the thickened fibrosed bladder remains a passive receptacle incapable of emptying, the urine stagnates and decomposes, and the repaired fistula breaks down again. Further, the bladder muscles are so disorganised that they cannot recover their normal structure. Therefore cure by local repair has to be abandoned, and implantation of both ureters within the large bowel offers the only hope of permanent relief. Misgivings that patients having to undergo this admittedly drastic procedure may emerge resentful victims of a physiological impertinence are dispelled when later one contrasts their well-being after operation with their previous miserable existence.

Success in operating on neglected cases depends on a simple yet reliable technique. Newcomers to the tropics, working in isolated localities, may hesitate to attempt an operation to which textbooks devote so much insistence on instrumentation with catheters and other mechanical aids to uresis during and after operation. Every young surgeon working in the tropics should familiarise himself with the admirable technique followed by Grey Turner,[2] who emphasises that a gentle dexterity ensures a quietude of convalescence unattainable by more elaborate time-consuming methods.

Using a similar technique I have performed, since 1936, 17 bilateral ureterocolostomies in 13 females and 4 males, aged between 22 and 58. There were 2 deaths, both in young women. Of the women who recovered, 2 subsequently bore children without mishap and were seen in good health three and five years later. A close follow-up of most of the patients was impossible after three years, but all were seen up to eighteen months after operation.

The first death after operation was due to general peritonitis following accidental spill from a colon distended with an enema, inadvertently given in the ward immediately before operation.

The second death was due to diffuse cirrhosis of the liver, discovered post mortem. It is important in the tropics to be mindful, before operation on these cases, of possible hepatic insufficiency, no less than of renal impairment. These debilitated subjects have for years suffered from the effects of protein deprivation. Hepatic cirrhosis, frequent among young people in the tropics, is mainly confined to the large pauper class into which these fistulous cases submerge. Their fall in the social scale adversely affects their diet which becomes inadequate in factors protective to the liver. A patient with a liver unable to detoxicate is scarcely a good risk. Yet the threat of postoperative "liver d though not unfamiliar, may be overlooked as a co indication to surgery in these cases, in face of immediate considerations in a preoperative asses of the patient. Further, the rapid decline and d after operation of a patient in this manner, follo bilateral implantation of ureters, may, if not clini recognised as such, be mistakenly attributed to re failure.

PREOPERATIVE MANAGEMENT

An erythrocyte-count less than 3,000,000 and lower than 55% are unfavourable indications requir correction. Eradication of heavy helminthic infestati will substantially contribute to improvement. localities of Northern Nigeria, schistosomiasis ankylostomiasis are hyperendemic. Prompt and thoro treatment to get rid of the parasites, followed by iro and liver therapy and a generous diet, raises the blood-count satisfactorily. The blood-pressure of these asthen cases is similarly improved by such measures.

A preoperative course of sulphonamides is given as routine. Attention to excoriated skin surfaces improve morale. Patients are encouraged to walk about and maintain muscular tone. Cheerful nurses and companions, and visits by ex-patients successfully operated on, help to restore broken spirits. On an average twelve days' preoperative stay in hospital is about the desir able limit, as many patients become fretful at longer delay. Few have any idea of the nature of their coming operation.

ANÆSTHESIA

Sedation with morphine gr. $^1/_6$ or gr. $^1/_4$ on the morning of operation ensures the necessary mental tranquillity. 'Nupercaine' 10 c.cm. given intrathecally provides durable muscular relaxation throughout the operation. In nervous cases spinal anæsthesia is supplemented with 2 or 3 c.cm. of intravenous 'Cyclonal sodium.' The ensuing sleep usually continues for three hours after the patient's return to the ward. Inhalations of CO_2 at intervals maintain respiratory vigour and help to counter the inevitable fall of blood-pressure.

OPERATION

I do not intend to give a detailed account of the operation but wish to accentuate certain procedures on which its successful outcome greatly depends.

A right subumbilical paramedian incision is favoured. As a rule it is convenient to expose the right ureter first through a $1^1/_2$-in. incision in the covering peritoneum. Careful hæmostasis in freeing the ureter from its bed, and the removal of clot within this bed before closure, are important. The freed ureter should be abundantly cuffed with areolar tissue. A "cleaned" bared ureter should be viewed with misgiving.

After the ureter has been divided as near the bladder as possible, the proximal portion is folded back and protected with gauze. Its extremity may be secured with a small mosquito forceps. There is no necessity, after dividing the ureter, to ligate its distal cut end, as a fistulous bladder has ceased to be a reservoir.

The size and mobility of the pelvic colon, and its position relative to the course of both ureters, should be observed before selecting the site of implantation. With the free ureter tentatively approximated to a likely site, the colon, grasped in the left hand, is swung from side to side through the arc of a circle, while the ureter—its extremity secured with forceps held in the right hand—is made to follow each excursion. Next, the colon is moved upwards and downwards on its axis, to test its range of mobility in each of these directions. If, throughout all manipulations, the ureter maintains satisfactory approximation without pronounced angulation or undue tension, the site chosen can be regarded

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[1] Hayes, S. N. *Surg. Gynec. Obstet.* 1945, 81, 346.
[2] Turner, G. G. *Brit. med. J.* 1943, ii, 535.

100 c.cm. The initial leucocyte-count was 11,800 per mm., and this figure was maintained throughout the illness. Treatment, after 40 c.cm. of antileptospiral serum had been ven intramuscularly on the day of admission, was entirely mptomatic.

The patient was discharged on the fifty-second day, and by at time there was no evidence of impairment of renal nction. He was sent for a long convalescence. The diagnosis as established by agglutination.

Persistent Tremor.—This was found in two cases (one roved and one probable). Both cases ran the usual ourse except for pronounced drowsiness, profuse constant sweating, and a fine tremor of the outstretched hands and protruded tongue. One of these cases (the proved one) presented as acute appendicitis, but the associated features and the leucocyte-count of 5900 per c.mm. ruled out this diagnosis. These cases made an uneventful recovery on routine treatment, and, apart from a serum reaction in the proved case, there were no skin manifestations. Their drowsiness and sweating cleared up within 5 days, but the tremor persisted into the second week of the illness. Their average stay in hospital was 17 days.

Tonsillitis and Pulmonary Complications.—One patient was admitted with the usual severe symptoms but complaining in addition of a sore throat.

The tonsils were hypertrophied, inflamed, and covered by a fine mucous exudate which gave them a cherry pink colour. The tonsillar lymph-nodes were enlarged and tender. A throat swab (repeated once) revealed no evidence of leptospiræ and there was no leucocytosis at this time. In this case the fever persisted, and the patient, who was very ill, developed bilateral basal consolidation and a fibrinous pericarditis. Antileptospiral serum was administered from the onset in 20 c.cm. doses intramuscularly to a total of 160 c.cm. without any obvious effect. Penicillin (15,000 units intramuscularly 3-hourly to a total of 1,000,000 units) was administered from the onset of the pneumonic processes and produced no detectable alteration in the course of the disease, and no improvement followed an adequate course of sulphathiazole. Sputum culture showed a predominant growth of pneumococci, and leptospiræ were not recovered despite repeated examinations. Empyema subsequently developed on the left side, but after rib-resection and drainage the patient made an uninterrupted recovery. Culture of the pus from the pleural cavity confirmed that the infecting organism was a pneumococcus.

From the point of view of jaundice, oliguria, and albuminuria, this case behaved as those already described, and the diagnosis was verified by positive agglutination reactions.

CONCLUSIONS

The course of the illness was mild in the majority of cases.

Fever was a well-marked feature only in the case complicated by pneumonia; in all the other cases it was transitory.

Jaundice was never very deep; it appeared early and never persisted for long.

Renal damage was more evident than hepatic damage, and all the cases which recovered showed no lasting impairment of renal function.

Leucocytosis was not invariable.

I am indebted to Lieut.-Colonel L. F. K. Way, R.A.M.C., late o/c Military Hospital, Isle of Wight, for permission to publish these cases.

"Only 25% of the 2,000,000,000 people of the earth are properly nourished. Only 500,000,000 ever get enough of the proper food. This is not because of natural limitations. We have the scientific knowledge to provide an adequate diet for everyone if the information were properly applied. The false barriers erected by man himself are responsible. The antiquated social systems, ignorance, stupidity, and fear prevent a large percentage of the peoples of the world from enjoying even the most fundamental of the benefits of science."—C. F. KETTERING, retiring president, addressing the American Association for the Advancement of Science, on Dec. 27. (*Science*, 1946, 104, 609.)

Preliminary Communication

METABOLIC STUDY OF BURN CASES

THIS investigation, of which full details will be published elsewhere, had as its principal aim a complete study of the nitrogen balance of burned patients, including the loss of protein in the exudate from the burned area.

Nitrogen Balance.—16 nitrogen balances have been carried out on 7 patients with burns of 6–50% of the body surface. The well-marked tendency for burned patients to go into negative nitrogen balance, as shown by the work of Co Tui and others [1] and Taylor and others,[2] is confirmed, but it was not as difficult to attain positive nitrogen balance as might have been anticipated. Negative nitrogen balances in our cases seemed to be due to reduction in food intake rather than to an increased loss of nitrogen.

Urine nitrogen was measured in 20 cases, our findings being in agreement with the statement of Cope and co-workers [3] that extensive deep burns are not necessarily accompanied by a large loss of nitrogen in the urine.

Exudate nitrogen, measured in 10 cases, made up 2–25% of the total nitrogen output (excluding fæces).

Plasma proteins were usually low. Where serial observations were made, a pronounced fall was seen soon after burning.

Creatinuria.—Creatine was present in the urine of 3 men with burns of 7, 15, and 20% of the body area, but was absent or present only in small amounts in that of 4 others with burns of not more than 2·5% of the body area. However, one young man with 60% burns excreted very little creatine: this was associated with a low excretion of nitrogen, probably due to renal damage.

Proteinuria.—This was generally related to the severity of the burn, being greatest in patients with extensive burns

Urine and Plasma Chloride.—As a rule the urinary output of chloride was greatly reduced after moderate and severe burning, and this reduction was associated with a fall in the plasma-chloride concentration— finding which is in agreement with Davidson's [4] suggestio that the fall in urinary chloride output in burns is due no primarily to kidney change but rather to a lowering o the plasma chloride to below the renal threshold level In one or two of the cases investigated, however, rena damage probably played a part (cf. McIver [5]).

Reconstituting the dried plasma with saline instea of with distilled water tended to prevent the fall i plasma-chloride concentration.

Blood-sugar.—Blood-sugar levels after burns of variou degrees of severity were measured in 11 cases. In 2 case there was undoubted hyperglycæmia, and values in som others were perhaps slightly high though not abnormal

Collection of Specimens.—Many early results had t be disregarded because examination of the ward record showed that no reliance could be placed on the urin specimens having been accurate 24-hour collection This trouble was largely due to shortage of trained sta before special nurses were put in charge of this wor The collection of urine, &c., should be supervised by reliable and responsible person if the laboratory work i metabolic investigations of this sort is not to be vitiate

It is a pleasure to acknowledge the help received fro Dr. Leonard Colebrook, F.R.S., director of the unit, and fro Mr. Garfield Thomas, biochemist to the Queen Elizabet Hospital, Birmingham. Thanks are also due to Sister R. Selley and Miss L. Thrussell, the "metabolic nurses." Full acknowledgments will be made later.

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CASE 2.—An ex-soldier, aged 58, had a sloughing scrotum, distortion of the penis, and complete urethral blockage. Multiple perineal fistulæ had formed, through which urine constantly leaked. His general condition was poor.

Preliminary suprapubic cystotomy was carried out, with subsequent bilateral ureterocolostomy in two stages at twelve days' interval. Recovery was uneventful, except for some difficulty, at first, in rectal control, which later improved.

SUMMARY

A series of 17 bilateral ureterocolostomies is reviewed. There were 2 deaths.

Preoperative management is discussed; points regarded as most important in operative procedure are emphasised, and a method is described of inserting the ureters with the least possible danger of subsequent blockage.

Postoperative care is discussed.

Indications for ureterocolostomy in males are illustrated by citation of 2 of the 4 male cases operated on.

AN OUTBREAK OF WEIL'S DISEASE

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BETWEEN November, 1944, and June, 1945, thirteen cases of Weil's disease were admitted to a military hospital on the Isle of Wight. In nine of the cases the diagnosis was definitely established, and four were diagnosed presumptively. All but one of the patients were Free French Naval personnel stationed at the F.F.N. Chasseur Base, Cowes, I.o.W. These ratings lived on their chasseurs under unhygienic conditions and in contact with rats. The one exception was a British gunner (a proved case) who formed part of a detachment at Newport, I.o.W. The first case occurred in November, 1944, and this was followed by three cases in December, 1944, three in April, and six in June, 1945. The clinical picture in this outbreak differed materially from the textbook descriptions.

CLINICAL PICTURE

Onset.—In every case the illness began suddenly with severe pains in the abdomen, back, and thighs. The abdominal pain was mainly felt in the right hypochondrium and epigastric region in all except one case in which it was maximal in the right iliac fossa. The pain was accompanied by nausea, violent vomiting, and retching. On admission the patients appeared anxiously ill and toxic, and all showed well-marked suffusion of the conjunctiva and a dry coated tongue with much sordes in the mouth and around the teeth. During the acute phase of the illness there was tenderness to a greater or lesser degree over the hepatic region, in the renal angles, and not uncommonly in the thighs.

Uncomplicated Cases.—There were eight uncomplicated cases, five of which were proved and three probable. Of these, five (three proved and two probable) were gravely ill and were admitted to hospital within 12 hours of the onset. The rest (two proved and one probable) were not so severe, and as a result did not reach hospital until the second day of the illness. In all cases icterus was present on admission and was apparently maximal at that time, for it began to fade almost immediately, disappearing within 6 days on an average. The fever (in the region of 101·4° F on admission) fell by lysis slowly over a period of 6 days, and rarely amounted to anything more than peaking to 99° F after the third day in hospital. The acute symptoms lasted only 24–48 hours, after which the patients felt relatively well. Labial herpes was encountered in one case, and another had a subconjunctival hæmorrhage.

Albuminuria and oliguria were well-marked features. The oliguria persisted for only 3–5 days, and there was no associated hypertension. The albuminuria cleared up slowly over a fortnight, and, apart from traces of and granular casts on admission and for a day or two thereafter, there were no other significant urinary changes.

The leucocyte-count varied considerably. In three of the proved cases the counts were 5800, 5800, and 7 per c.mm. (average figures of repeated counts), while in the remainder they were 11,000–12,000 per c.mm. The highest icteric index observed was 50, with a serum-bilirubin level of 9·0 mg. per 100 c.cm. The diagnosis was established by the agglutination reaction.

Five of the patients were given 20–40 c.cm. of anti-leptospiral serum, the dose depending on the severity of the initial symptoms; the remainder received no specific treatment. In spite of this the course of the illness was more or less the same in all cases. The average time in hospital was 20·5 days. At the end of this period the most severe cases were sent on 2 weeks' convalescence, the rest returning to duty. Renal-efficiency tests were carried out in all cases before discharge, and none of the patients showed impairment of renal function.

COMPLICATIONS

In five cases the following complications were encountered.

Renal Failure.—Two cases showed evidence of this complication. Both followed the initial course as already outlined, but the oliguria persisted.

The first patient had to be catheterised throughout his illness, and during the first 10 days only small quantities of urine (2–4 oz. daily) were being excreted. Over this period the urine was heavily albuminous and contained granular casts, red-blood cells, and bile. Icterus was present, though not pronounced, for 12 days, and œdema was not obvious until the ninth day of the disease. The leucocyte count was 15,000 per c.mm. at the onset, rising gradually to 20,000 per c.mm., and a progressive hypochromic anæmia resulted from frequent profuse nose-bleedings from the seventh day onwards. The patient was intermittently drowsy and maniacal, making nursing and intravenous therapy extremely difficult, and latent tetany was manifest about the fifth day. Vomiting persisted until the thirteenth day, and although there was an increase in the volume of urine excreted at this point there was no improvement in the patient's general condition. About this time petechial hæmorrhages and extensive purpuric patches began to appear, the patient became more drowsy and eventually comatose, and he died on the fifteenth day.

Apart from symptomatic treatment, this patient received penicillin 20,000 units 3-hourly intramuscularly from the time of admission and antileptospiral serum 40 c.cm. daily intravenously at the onset, reduced to 20 c.cm. intramuscularly later on. This therapy was continued until death.

The diagnosis was confirmed by positive agglutination reactions, and the findings at necropsy were in keeping with this diagnosis.

The second case showed the same persistent oliguria, only passing 5–8 oz. daily for 8 days. Despite this the patient felt fairly well after the second day, although blood-pressure readings and blood-urea estimations were climbing steadily. On admission the patient had a small patch of herpes on his lower lip and was icteric. The jaundice was present for 7 days. After the first day of illness the temperature was never over 99° F. On the eighth day the patient had a series of eight fits, epileptiform in type but with definite carpopedal spasm, and about this time slight œdema of the eyelids was manifest. There were no fundal changes The blood-pressure was 200/120 mm. Hg. The blood-urea was 384 mg. and serum calcium 5·0 mg. per 100 c.cm. The cerebrospinal fluid contained 40 mg. of protein per 100 c.cm., showed no other abnormality, and was not icteric. On the ninth day the fluid intake and urinary output were balanced, and there were no further fits until the tenth day when the patient had a further thirteen fits exactly similar to those already described. By the twelfth day œdema was obvious and generalised despite the polyuria now established; the blood-pressure had fallen to 155/110 mm. Hg and the albuminuria had decreased slightly, but the blood-urea was 480 mg. per 100 c.cm. Thereafter the patient's condition improved steadily, with rapid fall in blood-pressure and a much slower return of blood-urea which on the twenty-third day of the illness was still 120 mg.

CHRONIC LEG ULCER OF 18 YEARS

Healed after treatment beneath Elastoplast

CASE-HISTORY

On August 5th, 1936, a married woman was admitted to hospital with an extensive deep ulcer. She had a history of an ulcerated leg for 18 years. The condition seen upon admission had prevailed for 5 years. The Wassermann was negative. Treatment in hospital consisted of applications of Red Lotion, Silver Nitrate and emulsion dressings beneath tightly applied Elastoplast bandages.

October 20th, 1936. She was discharged to continue treatment as an out-patient, and commenced doing full house-work.

January, 1937. Improvement maintained. Treatment continued with ultra-violet ray, strips of Ichthopaste and tightly applied Elastoplast bandages.

1938–39–40. Treatment as out-patient continued throughout this period and applications of Cod Liver Oil and Ichthopaste beneath Elastoplast bandages. Area of ulcer constantly diminished.

January, 1941. Hard scar was removed from base of ulcer, which was lightly packed with Jelonet, covered with Ichthopaste and bandaged tightly with Elastocrepe.

April 18th, 1941. Ulcer healed completely and patient in good health.

The details and illustrations are of an actual case. T. J. Smith & Nephew Ltd., Hull, manufacturers of Elastoplast and Ichthopaste, publish this instance—typical of many in which their products have been used with success.

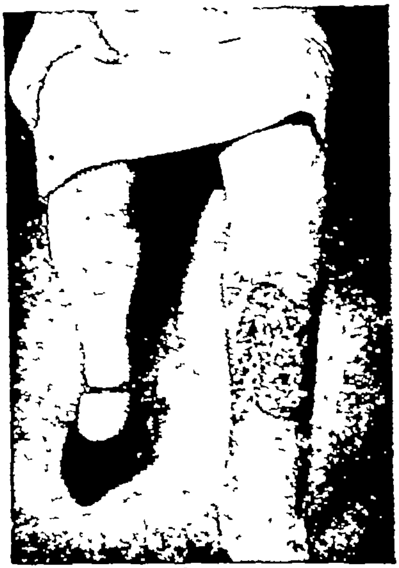


Fig. 1

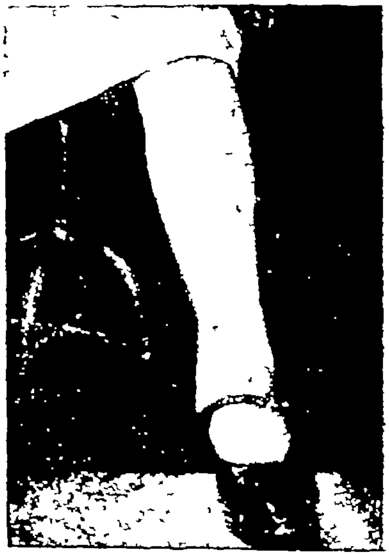
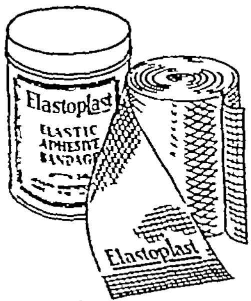


Fig. 2



In the Elastoplast elastic adhesive plasters a combination of the particular adhesive spread, with the remarkable STRETCH and REGAIN properties, together provide the correct degree of compression and grip. They mould readily to any part of the body without slipping, rucking or constriction.

In the treatment of sprains and strains, Elastoplast should be firmly bandaged over the joint and for some distance above and below. It should be applied as soon after the injury as possible, thus immediately providing firm support and controlling the formation of effusion and hæmatoma.

Elastoplast plasters available are 1" wide × 1 yd. (1¾ yds. when stretched), and 1" wide × 3 yds. (5·6 yds. when stretched). Elastoplast, Elastocrepe, Jelonet and Gypsona are products of T. J. SMITH & NEPHEW LTD., HULL.

Reviews of Books

The Causation of Appendicitis

A. Rendle Short, M.D., B.SC., F.R.C.S., professor of surgery, University of Bristol; surgeon, Bristol Royal Infirmary. Bristol: John Wright. Pp. 79. 10*s.*

In this little book Professor Rendle Short reviews rather briefly the main and more general aspects of this important and complicated subject. A short chapter on the history of appendicitis is interesting but inconclusive owing to inadequate data in medical records before the nineteenth century, and the changing meaning of medical terms. In more recent years, evidence of a striking rise in the number of cases of appendicitis in Great Britain, chiefly between 1895 and 1905, seems to be reliable, and he seeks some possible causative factor before and about this time. He finds a significant change in the national diet—mainly a decrease in the amount of cellulose eaten. This hypothesis is of course not new: he advanced it in 1920. The evidence is not entirely satisfactory, because of the lack of reliable statistics from the less civilised countries; but as far as they go, the facts of national distribution of appendicitis tend to support the hypothesis. The disorder appears to be very rare among those peoples who eat much cellulose (Chinese, Indians, and Africans), though the incidence is high among those same people when they live in the manner of Western civilisation. The Eskimos might be expected to provide a touchstone because they eat so little food with a residue; but unfortunately the small number of Eskimos and their very scattered and inaccessible communities make reliable figures unobtainable. As far as they go they rebut the hypothesis; but apes in captivity and civilised vegetarians are on the author's side.

Though it does not break new ground, this is a useful and interesting contribution to the problem; yet it leaves a feeling that the author has used statistics rather loosely and has not related the general aspects of his subject (particularly diet) sufficiently closely to the detailed facts of pathology.

The Surgery of Repair

Injuries and Burns. (2nd ed.) D. N. Matthews, M.D., M.CHIR. Camb., F.R.C.S., squadron-leader R.A.F.V.R., surgical officer in charge R.A.F. plastic unit. Oxford: Blackwell Scientific Publications. Pp. 371. 45*s.*

Current interest in the repair of burns and injuries has led to the publication of a new edition of this book within three years of the first. A section on the type of injury common in the war but likely to occur occasionally in peace is followed by a good account of facial fractures, which many textbooks ignore. The greater part, however, deals with repair, and in this the average surgeon will learn much of the principles and details. Possibly the difficulties are not sufficiently stressed: the tiro must be warned that it is not all as simple as it sounds. Nevertheless it is very important that all emergency surgeons should understand the principles, and the book goes far to fill an important gap.

The Household Doctor

London: English Universities Press Ltd. Pp. 224. 3*s.* 6*d.*

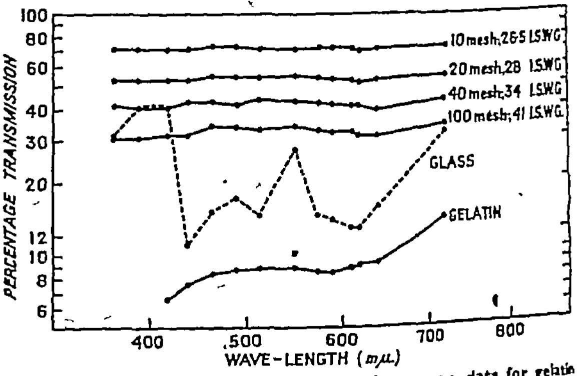
This little book is wrongly named: it could more accurately be called "Understand your Doctor." While offering no encouragement to the lay reader to diagnose and treat his own diseases, it does explain to him in straightforward language what symptoms may be expected in various disorders, what we know of the causes of those disorders, what treatment the doctor is likely to order, and why. About half the book deals not with sickness but with health, beginning with a very short and simple account of anatomy and physiology, followed by chapters on general hygiene and exercise, diet, the care of the expectant mother and of the child at his various stages of development, and health in the middle years and in old age, and ending with chapters on first-aid and the household medicine cupboard. Home nursing is well and shortly described, and there is a useful chapter of advice for those in the tropics—an unusual but welcome addition to this kind of book. There are some weaknesses; the nervous system cannot be adequately, or even cursorily, described in 13 lines, and the diagram of the central nervous system must be a puzzle to anyone who does not know what it is meant to represent; but the book as a whole is a sensible account of *the body in health and illness*, which could be recommended confidently to any non-medical person who wished to know more of such things. The author remains anonymous, but according to the book jacket is "a famous family doctor." Famous or not, he has done this job neatly.

New Inventions

PERMANENT NEUTRAL STANDARDS IN PHOTO-ELECTRIC COLORIMETRY

In clinical colorimetry it is not always feasible to compare directly the unknown with the standard. This difficulty arises if the standard is unstable or cannot readily be obtained pure, or if an attempt is made to compare the transmission of light by the unknown with that by a blank, in which case the readings of the unknown are usually crowded into the lower (insensitive) range of the scale.

To overcome these difficulties a neutral filter is sometimes used instead of the standard or the blank. The neutral filter is first calibrated against the standard and substituted for it as a secondary standard, as has been recommended for the estimation of hæmoglobin.[1] By using a neutral filter together with a blank, crowding of readings into the lower end of the scale may be avoided. For example, a solution may show a transmission of 10 %, the blank giving a reading of 100 %.[2] A transmission as low as 10 %, however, cannot be read with a high degree of accuracy on most instruments. If a neutral *filter is at hand whose transmission is*, say, 52 %, it may be inserted together with the blank. By increasing the intensity of light the colorimeter can again be brought to read 100 % on the galvanometer scale, with blank and neutral filter in position. If the unknown is now substituted for the blank and the neutral filter the reading will be roughly twice as high, falling within the sensitive range. Instead of 10 % we obtain 19·2 % (for 10 : 19·2 = 52 : 100). These new readings have to be multiplied by 0·52 to obtain the correct value.



Transmission of light by different neutral screens; data for gelatin filter obtained from makers; instrumental error of photometer ±1%.

Unfortunately these grey filters are not always stable and do not show the same transmission over the whole range of the spectrum (see figure). These disadvantages can be overcome by using inexpensive permanent neutral screens made from woven wire nettings. For greater convenience during handling, and to protect them against dust and dirt, these are inserted into test-tubes, which are stoppered and sealed with wax or picein.

We are indebted to Messrs. Thomas Locker and Co. Ltd, of Warrington, for samples of woven wire nettings.

Walter Koch, M.D., PH.D. Vienna
Deborah Kaplan, PH.D., M.SC. Jerusalem.

Department of Hygiene, Hebrew University, Jerusalem.

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1. King, E. J. Micro-Analysis in Medical Biochemistry, London, 1946, p. 30.
2. Gibb, T. R. P. Optical Methods of Chemical Analysis, New York and London, 1942, p. 151.

THE LANCET

LONDON: SATURDAY, FEB. 8, 1947

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Nor are the approved schools and borstal institutions anything like satisfactory at present, as the latest report[2] of the Prison Commissioners and the Directors of Convict Prisons reveals. Admittedly they were working under great difficulties raised by the war: staff shortage, "war restrictions, blackout, and an increasing restlessness of youth." This last element—which in one light seems healthy evidence of independence and spirit—was responsible, the commissioners say, for an increase in absconding; but surely it means, too, that the schools and borstals were not offering these growing minds enough to hold them. Naturally the task is extremely difficult; the aim, the report says, is "to hold the balance between too tight a rein, which would inhibit personal development and frustrate the intention of the [Prevention of Crime] Act, and too loose a rein, which would equally be bad training and may make the Institution unwelcome to its neighbours" They add that in the years under review the hold on this purpose has been subject to considerable strain. Lack of staff and accommodation made it necessary to reduce the average period of training, and the amount of aftercare given had to be reduced. Despite these difficulties, over 4000 of the 6084 youths discharged between April, 1942, and March, 1945, entered the Services, and most of them did well, several becoming officers and many N.C.O.s. The training must therefore have been fitted to the needs of a large proportion of boys committed to approved schools and borstals; and with better staffing and quarters could no doubt give even better results. The care of girls has been disappointing: "It cannot be denied that the percentage of girls who have done well is low." Of 638 discharged between 1938 and 1942, 31·5% have already been convicted again on two or more occasions, and only half have avoided a reconviction. The girls under care may be a more hardened lot than the boys, but evidently there is room for advance in the management of institutions training them.

During the years under review the feeding of prisoners was investigated by Mr. MAGNUS PYKE, D.SC. He found various deficiencies, chiefly in vitamins, which were afterwards largely corrected. He also found that the food supplied to borstal boys was inadequate in quantity, and this was overcome by a substantial increase in the bread-supply. In all prisons and borstals there was a shortage of fat in the diet, and dried eggs were excluded except for hospital use, which indicates that the commissioners estimate nutritional needs at a lower level than that set by ordinary rationing. While recording many small attempts to improve the lot of prisoners and give them an opportunity to develop into normal citizens, the report as a whole makes all too clear how much is still wrong with our attempts at criminal justice. Lord TEMPLEWOOD's Criminal Justice Bill of 1938, by raising the minimum age for imprisonment to 16, would have ensured that no young offender could be sent to prison by a court of summary jurisdiction; and none between 17 and 21 unless he could not safely be detained in a remand home. Inside the prisons, as he pointed out in his lecture, work should not be lifeless, but useful, interesting, and reformative, though hard. He would like to see it modernised on the lines set out by the Salmon Committee, who considered that the system of earnings, which stimulates interest and self-respect, should be more widely developed. He shares our belief that mental abnormality should be taken into account in assessing criminal responsibility: the courts, he believes, should be able to order the mental examination of offenders put on probation, and those who need it should be treated at the public expense. Young offenders, if they are to be kept out of prison, might go to attendance centres once a week, and perhaps live in special hostels for a while, from which they could go out to work.

Yet he does not believe that even these much-needed reforms can cure our troubles; for our sickness is moral, and "however we may explain it, many moral restraints have lost much of their power in the confused and restless world of today." Civilised behaviour springs from mutual trust and personal integrity; we have to re-create a world in which these things are valued.

Sedimentation-rate

THE use of erythrocyte-sedimentation as a diagnostic aid originated some four hundred years B.C. with the observation of HIPPOCRATES that sickness was accompanied by an increase in the phlegma or mucus, the uppermost of the blood's four humors. So constant was this change that the Greeks concluded that the phlegma was the most important cause of illness. GALEN, in the 2nd century A.D., persuaded Roman physicians to adopt this theory, which was accepted without serious question for the next 17

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[1] See *Times*, Feb. 1, pp. 2 and 5.

[2] Report for the years 1942–44. H.M. Stationery Office. Pp. 154. 2*s*. 6*d*.

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AMONG criminals, the young are the most easily reclaimed, and the most easily confirmed in crime. Lord TEMPLEWOOD, lecturing on Jan. 31 in the new department of criminal science in the law school at Cambridge,[1] affirmed that the fundamental problem of crime is juvenile delinquency; and he went on to discuss our disquieting failure to solve this problem. It is generally recognised that the numbers of young offenders increased during the late war—between 1938 and 1945 the offences committed by children and young people under twenty-one rose by more than half the rate of previous years—but it is less widely known that between 1907 and the beginning of the 1939 war the numbers of young offenders found guilty had already increased by 125%. We have now reached a point when 1 child in 90 between the ages of eleven and sixteen is found guilty of an indictable offence; and this figure takes no account of the many children not brought into court for their offences, or of the many offences not brought to the notice of the police. Our chosen reformative methods—probation, and training in approved schools—can give good results when properly applied; but in many places, Lord TEMPLEWOOD finds, probation is equated with dismissal or acquittal, cases are not properly followed up, and aftercare is scarcely attempted when the probationary period is over.

Nor are the approved schools and borstal institutions anything like satisfactory at present, as the latest report[2] of the Prison Commissioners and the Directors of Convict Prisons reveals. Admittedly they were working under great difficulties raised by the war: staff shortage, "war restrictions, blackout, and an increasing restlessness of youth." This last element—which in one light seems healthy evidence of independence and spirit—was responsible, the commissioners say, for an increase in absconding; but surely it means, too, that the schools and borstals were not offering these growing minds enough to hold them. Naturally the task is extremely difficult; the aim, the report says, is "to hold the balance between too tight a rein, which would inhibit personal development and frustrate the intention of the [Prevention of Crime] Act, and too loose a rein, which would equally be bad training and may make the Institution unwelcome to its neighbours." They add that in the years under review the hold on this purpose has been subject to considerable strain. Lack of staff and accommodation made it necessary to reduce the average period of training, and the amount of aftercare given had to be reduced. Despite these difficulties, over 4000 of the 6084 youths discharged between April, 1942, and March, 1945, entered the Services, and most of them did well, several becoming officers and many N.C.O.s. The training must therefore have been fitted to the needs of a large proportion of boys committed to approved schools and borstals; and with better staffing and quarters could no doubt give even better results. The care of girls has been disappointing: "It cannot be denied that the percentage of girls who have done well is low." Of 638 discharged between 1938 and 1942, 31·5% have already been convicted again on two or more occasions, and only half have avoided a reconviction. The girls under care may be a more hardened lot than the boys, but evidently there is room for advance in the management of institutions training them.

During the years under review the feeding of prisoners was investigated by Mr. MAGNUS PYKE, D.SC. He found various deficiencies, chiefly in vitamins, which were afterwards largely corrected. He also found that the food supplied to borstal boys was inadequate in quantity, and this was overcome by a substantial increase in the bread-supply. In all prisons and borstals there was a shortage of fat in the diet, and dried eggs were excluded except for hospital use, which indicates that the commissioners estimate nutritional needs at a lower level than that set by ordinary rationing. While recording many small attempts to improve the lot of prisoners and give them an opportunity to develop into normal citizens, the report as a whole makes all too clear how much is still wrong with our attempts at criminal justice. Lord TEMPLEWOOD's Criminal Justice Bill of 1938, by raising the minimum age for imprisonment to 16, would have ensured that no young offender could be sent to prison by a court of summary jurisdiction; and none between 17 and 21 unless he could not safely be detained in a remand home. Inside the prisons, as he pointed out in his lecture, work should not be lifeless, but useful, interesting, and reformative, though hard. He would like to see it modernised on the lines set out by the Salmon Committee, who considered that the system of earnings, which stimulates interest and self-respect, should be more widely developed. He shares our belief that mental abnormality should be taken into account in assessing criminal responsibility: the courts, he believes, should be able to order the mental examination of offenders put on probation, and those who need it should be treated at the public expense. Young offenders, if they are to be kept out of prison, might go to attendance centres once a week, and perhaps live in special hostels for a while, from which they could go out to work.

Yet he does not believe that even these much-needed reforms can cure our troubles; for our sickness is moral, and "however we may explain it, many moral restraints have lost much of their power in the confused and restless world of today." Civilised behaviour springs from mutual trust and personal integrity; we have to re-create a world in which these things are valued.

Sedimentation-rate

THE use of erythrocyte-sedimentation as a diagnostic aid originated some four hundred years B.C. with the observation of HIPPOCRATES that sickness was accompanied by an increase in the phlegma or mucus, the uppermost of the blood's four humors. So constant was this change that the Greeks concluded that the phlegma was the most important cause of illness. GALEN, in the 2nd century A.D., persuaded Roman physicians to adopt this theory, which was accepted without serious question for the next 17 centuries. From this faith sprang the ritual of blood-letting as a remedy and a guide to diagnosis and prognosis. Physicians of the 18th and early 19th centuries, when phlebotomy reached its peak of popularity, used to watch the sedimentation of blood standing in large brass bowls and vary the amount of blood removed accordingly. In the 1850's the humoral theory was overridden by VIRCHOW with his cellular pathology, and, while venesection fell from favour, research-workers found a field for exploration more fascinating than the naked-eye appearances of blood. In 1893 BIERNACKI returned to the study of blood-sedimentation, urging its importance in diagnosis, but his words fell on deaf ears. A further twenty years passed before FAHRAEUS,[1] in 1918, popularised the test. Since then it has been the subject of more papers, and of more controversy, than any other laboratory procedure. Physicians, surgeons, pathologists, and general practitioners all adhere to their favourite methods of estimating the sedimentation-rate; the multiplicity would matter little if results were comparable, but this, despite nomographs, they are not. If blood-sugar values were reported in as many ways as the sedimentation-rate, the confusion would endanger lives.

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[1] See *Times*, Feb. 1, pp. 2 and 5.

[2] Report for the years 1942–44. H.M. Stationery Office. Pp. 154. 2s. 6d

Among clinicians the Westergren technique holds first place; 1·6 c.cm. of venous blood is drawn into a syringe containing 0·4 c.cm. of a 3·8% solution of sodium citrate, and the mixture is set up in a 200 mm. graduated tube. The result is expressed as the fall of the erythrocyte column in one hour. It is an advantage of this method that dilution diminishes the sensitivity of the test by retarding the initial fall, so that the normal range after an hour's fall does not exceed 5 mm. for a man and 7 mm. for a woman or child; at the same time the fall is exaggerated in pathological bloods. A disadvantage is that the same blood sample cannot afterwards be used with reliability for other purposes. If, however, blood from a previously dry syringe is added to a narrow-bore tube containing the diluent, the tube having been previously marked at the 2 c.cm. level, the rest of the blood may be used for other tests and the patient will be spared a second puncture. This device is often frowned on, but it achieves equally great accuracy in dilution. Of late years, techniques employing undiluted blood have been favoured as more reliable than the Westergren method, though such criticism has often been based more on errors in performance than on any faults inherent in the test; the common mistakes are inaccurate dilution, inconstant temperature (high temperature increases the rate), initial delay in setting up the test, and failure to keep the tubes strictly vertical. With the Westergren technique the reading is not easily corrected for anæmia. In anæmic blood sedimentation is hastened, so the observed rate will be too high. This will not matter much when, for example, the progress of a case of tuberculosis is being watched, for improvement in the anæmia will usually go hand in hand with improvement in general condition. But in diagnosis, particularly that of rheumatic disease, the presence of anæmia may be seriously misleading, unless the reading is corrected against an estimation of hæmoglobin or packed-cell volume, or a red-cell count. With the Westergren technique one of these estimations must be done separately before a correction can be made. One of the reasons why pathologists on the whole favour the Wintrobe method is that being done in a hæmatocrit mere centrifugalisation will give the packed-cell volume, from which the sedimentation reading can easily be corrected from the published charts. Moreover, with the Wintrobe method, other procedures can be carried out on the same blood-sample, for the blood is not diluted, being kept fluid by the addition of heparin or HELLER and PAUL'S[2] mixture of ammonium and potassium oxalate, designed to prevent shrinkage of the erythrocytes. The Wintrobe test is set up in a 100 mm. graduated hæmatocrit tube held vertically and read at the end of an hour. There being no dilution to retard sedimentation, the range of normality is greater—up to 9 mm. for a man and 20 mm. for a woman or child—while owing to the shorter tube the scale of abnormality is reduced. In the wide-bore or "spa" method,[3] a highly sensitive modification of the Wintrobe technique, 5 c.cm. of oxalated blood is allowed to settle in a wide graduated centrifuge tube and the result is expressed as a percentage, sometimes of the plasma layer to the total volume and sometimes in terms of the cell-bulk. The wide tube makes a strictly vertical posture less essential, and it is easier to fill and to clean; the packed-cell volume can also be easily obtained by running the tube in the centrifuge. Many other techniques are in common use. One of the most popular is the micro-method, practised in many ways, which is designed to obviate venepuncture and is reliable provided the tube is wide enough to exclude the effect of surface tension.

To sum up. When the sedimentation-rate is used as a periodic test of progress, the method is immaterial, provided the same technique is always used, and the choice is based on convenience. Thus the Westergren is favoured for watching the course of pulmonary tuberculosis, while the wide-bore method is convenient for controlling treatment in rheumatoid arthritis, and a micro-technique for the review of rheumatic children. In these diseases the test is more than a check on clinical acumen, for an increased rate often presages relapse. For diagnosis the choice of method is more difficult. Westergren's is possibly best unless a more sensitive technique is required, as in a suspected case of rheumatoid arthritis, and where correction for anæmia is desirable when the Wintrobe or the wide-bore techniques are preferable. The correction against packed-cell volume often gives valuable help, for the hæmatocrit is an independent yardstick of progress in rheumatoid arthritis.[4] When all is said and done the sedimentation-rate remains simply an empirical test of clinical convenience. Factors influencing the rate are being slowly elucidated with improving analysis of plasma-proteins. Thus GORDON and WARDLEY[5] have separated these into 9 fractions, which they combine in 39 pairs; they find that fibrinogen and euglobulin are "fast" and are inhibited by the "slow" nucleoprotein and globoglycoid. They conclude that the rate of sedimentation is controlled not by the absolute concentration of the otal plasma-proteins or of the protein fractions but y the inhibition of one protein by another. A high ibrinogen content, for instance, may be found with low sedimentation-rate, owing to an increase of seudoglobulin at the expense of euglobulin, the total globulin remaining stationary. An increased sedimentation-rate, they say, normally denotes an alteration not in the chemical structure of the proteins (with the possible exception of Bence-Jones protein) but only in their relative proportions. It seems likely, therefore, that the test will ultimately disappear when electrophoretic analysis of proteins is generally adopted. Until then attempts to over-elaborate what is an essentially simple clinical test are to be discouraged.

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[1] Fahraeus, R. *Biochem. Z.* 1918, 89, 356.

[2] Heller, V. G., Paul, H. *J. Lab. clin. Med.* 1931, 19, 777.

[3] Collins, D. H., Gibson, H. J., Race, J., Salt, H. B. *Ann. rheum. Dis.* 1939, 1, 333.

[4] Gibson, H. J., Pit, R. M. *Ibid*, 1946, 5, 83.

[5] Gordon, C. M., Wardley, J. R. *Biochem. J.* 1943, 37, 393.

The Serum of Bogomoletz

For the past fourteen years Russian pathologists, headed by the late Academician Alexander Bogomoletz, a pupil of Metchnikov's, have been studying the therapeutic properties of antireticular cytotoxic serum—A.C.S. for short. Knowledge of this work outside Russia has largely been founded on scientific gossip and a few odd snippets in the daily press, though Bogomoletz published short summaries[1] here and in America in 1943. His review stimulated American research-workers into action, and the first results of their inquiries are now coming through.

The Russians, according to Straus,[2] claim that A.C.S. in carefully graded doses is beneficial in fractures, murine typhus, schizophrenia, rheumatism, scarlet fever, hypertension in its early stages, tuberculosis, inoperable carcinoma, and frostbite. To these we may add reports in the popular press that it is good for the degenerative changes of old age. But A.C.S. is no old-fashioned panacea, for it was found to be without effect in erysipelas. Straus's review enables one to piece together the theoretical background of these extraordinary claims. In the first place, by "reticular" tissue Bogomoletz meant not merely the reticulo-endothelium but the whole of what many histologists call the "mesenchymal" tissue—the hæmopoietic tissues and their derivatives, vascular and lymphatic endothelium, and all the cells belonging to the superfamily of fibroblasts. If human spleen or bone-marrow extracts (both wholly mesenchymal) are injected into horses, rabbits, or goats, tissue-specific antibodies are formed which in high concentration are toxic to cells of the type that called them forth. But in low concentration, as determined by a standard complement-fixation test, the action of the antibodies is stimulatory—an idea first suggested by Metchnikov himself. It is to the generalised stimulating effect of A.C.S. in low dosage that its beneficent properties are ascribed.

There is nothing particularly novel or surprising in the idea that tissue-specific antibodies may be elicited by injecting cells into an animal of another species.[3] Indeed, Cruickshank's[4] work on antilymphocytic sera suggests that antibodies may be aimed more exactly than against the mesenchymal tissues as a whole. For many years, moreover, workers on tissue culture have claimed that such tissue-specific antisera have a toxic action in vitro. Pomerat and Anigstein[5] have investigated the properties of A.C.S. itself by tissue-culture methods; and in confirming its cytotoxic action they find that a high degree of species-specificity is superimposed on its specificity towards mesenchymal tissues, in the sense that anti-rat-spleen antibodies will inhibit the growth of a rat sarcoma in culture, where an anti-chicken-spleen serum will not. So far so good; but the novelty and the whole theoretical substance of Bogomoletz's claims turn on whether such antisera are stimulating in low dosages. It is technically very difficult to demonstrate feeble stimulatory actions by tissue-culture methods, but in preliminary work Pomerat[6] does indeed find that the outwandering of cells from chick-heart fragments is stimulated by homologous (i.e., anti-chick) A.C.S. in low dosages.

No clinician, of course, will be satisfied with anything less than a clean-cut demonstration of the effectiveness of A.C.S. in vivo, and here (after satisfying themselves with the validity of their technique of assay and other technical details) Straus and his colleagues[7] have made a beginning. They chose in particular to study the most overtly reasonable claim—that A.C.S. in the appropriate low dosages expedites the healing of fractured bones. The A.C.S. was prepared by injecting rabbit spleen and bone-marrow extracts into goats, and its titre adjusted by complement-fixation to 1 : 130. Rabbits were now subjected to a standard complete fracture of the radius and ulna in a modified Grattan osteoclast and divided for injections into four groups. Each rabbit in the first group received a "stimulating" dose of 0·00125 ml. and each in the second group the inhibitory dose of 0·10 ml. Members of the third and fourth groups received 0·00125 ml. and 0·10 ml. of normal goat serum. After two weeks the efficiency of healing was determined by radiography, histological examination, and measurement of the breaking strength of the union. All three methods combined to affirm that the 0·1 ml. dose of A.C.S. has a depressive action on healing. The mechanical method alone gave evidence that the fractures healed better in the rabbits that received the stimulating dose of A.C.S. than in the controls; whereas the breaking strengths of the bones in the stimulated groups were clustered more or less symmetrically round a mean value of 6·83 kg., the results from about a third of the controls were clustered around zero, though the other readings had about the same range of scatter as the experimental set. In short, a shot has been fired for the defence; and editorial and private comment on A.C.S., which has hitherto been cool, may be warmer after this discovery. Since A.C.S. keeps well and is not difficult to prepare (though the source of antigen may give trouble), it is to be hoped that equally critical trials will be made of the other benefactions alleged to be within its gift. So far, supplies have permitted only one small trial in England—that of Bach[8] for the Empire Rheumatism Council—and its results were unfavourable.

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1. Bogomoletz, A. A. *Brit. med. J.* 1943, ii, 203; *Amer. Rev. Soviet Med.* 1943, 1, 101.
2. Straus, R. *J. Immunol.* 1946, 54, 151.
3. Cf. Landsteiner, K. Specificity of Serological Reactions, New York, 1945.
4. Cruickshank, A. H. *Brit. J. exp. Path.* 1941, 22, 126.
5. Pomerat, C. M., Anigstein, L. *Tex. rep. Biol. Med.* 1945, 3, 1; *Fed. Proc.* 1945, 4, 1; *Cancer Res.* 1945, 5, 724.
6. Pomerat, C. M. *Tex. rep. Biol. Med.* 1945, 3, 404.
7. Straus, R., Runjavac, M., Zaitlin, R., Duboff, G., Swerdlow, H. *J. Immunol.* 1946, 54, 155. Straus, R., Horwitz, M., Levinthal, D. H., Cohen, A. L., Runjavac, M. *Ibid*, p. 163.
8. Bach, F. *Ann. rheumat. Dis.* 1945, 4, 62.

Annotations

NEGOTIATION

LAST week the Royal College of Physicians of London expressed its wish that the Negotiating Committee, on which it has three representatives, should "enter into discussions and negotiations with the Minister on the regulations authorised by the National Health Service Act." Neither this resolution nor the similar ones passed by the councils of the two other English Royal Colleges lays down conditions on which negotiations will be resumed: unlike the resolution passed on Jan. 28 by the representative body of the British Medical Association they do not refer to the possibility of amending legislation. On the other hand they by no means commit the colleges to approval of any part of the Government's scheme which after negotiation appears unacceptable to the profession. Opinions have differed and still differ on several sections of the Act, and the representatives of different bodies will no doubt look at it from different angles; but their general unity will be preserved so long as they are all trying to produce, by agreement, a workable service. This is also the desire of the Ministry, and we believe that joint effort will in the end prove capable of removing both mountains and molehills.

SURGERY IN VESICOVAGINAL FISTULA

THE surgeon planning his line of treatment for a case of carcinoma of the urinary bladder—one of the most distressing of human ailments—is not likely to be swayed by the mortality and end-results of ureterocolostomy. Excision of the malignant bladder after diversion of the urine into the colon or on to the skin offers the only chance of cure, even if the operative mortality is about 50% and few patients survive for longer than five years. The fate of untreated cases is so hopeless and their end so terrible that the surgeon may with justice ignore, while striving to diminish, the enormous operative mortality. But the problem is very different in the patient with a non-malignant vesicovaginal fistula. In this condition the operation of ureterocolostomy ignores the primary pathology, which is neither progressive nor lethal, and deals with the symptom—the urinary leak. The operation neither saves nor prolongs life; in all probability life will be shortened. Local plastic repair of the fistula is to be preferred whenever possible, since thereby a return to normal micturition is obtained. Some surgeons, notably Mahfouz Pasha in Egypt, Hayes in India, and Chassar Moir in England, have had great experience of this difficult operation and have reported a high proportion of successes. But unless we know the severity of the original lesions, figures representing percentage successes can be very misleading. There are cases in which plastic repair has been so often unsuccessful even in expert hands that they must be considered irreparable. These are particularly common among primitive peoples where modern midwifery is unobtainable. The well-intentioned habit of some native tribes of packing the postpartum vagina with rock salt to promote fibrosis and shrinkage leads to a particularly intractable type of fistula after the next obstructed labour. In the West African series described by Lovett-Campbell on another page fibrosis and thickening of the bladder from chronic bilharziasis was a feature of the intractable cases.

In cases like these the relative merits of ureterocolostomy and conservative measures, such as the use of receptacles, inefficient as they are, must be considered. The patient is entitled to know the hazards and end-results of the operation in order to weigh them against the discomfort and misery of her condition. In the final analysis the patient, guided by an honest presentation of the facts by the surgeon, must herself make the decision. In average hands the operative mortality is in the region of 15%. Especially skilled operators have from time to time presented lower figures, but it is the average which must be sought while the best is aimed at. What of the end-results? Control of rectal micturition is the rule, though occasionally there is incontinence at night. As far as expectation of life is concerned, there is no doubt that a long and reasonably healthy life is possible after ureterocolostomy. Grey Turner[1] has recorded the histories of 9 patients, survivors of an original series of 17, who were alive sixteen to thirty years after operation. Wade[2] has published records of 16 patients, from an original group of 21 suffering from benign conditions, who were alive up to fourteen years after operation. Lower[3] reported on 6 patients who were living twenty years after operation. Of the late complications, there is evidence that about half the cases develop some form of renal disease. Thus 4 of Grey Turner's 9 patients had renal complications. Hydronephrosis, chronic infection, and nephrolithiasis are all known to occur. It is a tribute to nature's adaptability that these complications do not develop in all the patients. Conception and childbearing are not contra-indicated after the operation. One of Grey Turner's patients bore several children, and Lovett-Campbell mentions that 2 of his patients subsequently went through pregnancy and labour without mishap.

The facts, in summary, are these. The operative risk is high but not excessive, the expectation of life is fairly good, some renal impairment develops in half the cases, continence is almost certain, and pregnancy and labour are not impossible. In the face of this evidence who can doubt what is the right advice to give to the unfortunate woman who is inflicted with an intractable vesicovaginal fistula or what choice they themselves would make if they had the necessary training to grasp the facts?

INTELLIGENCE AND FERTILITY

WE hear a good deal these days of the potential menace to the nation of the present trends in reproduction-rates among the more intelligent section of the population.[1] In a discussion at the Eugenics Society on Jan. 21, Lord Horder, who was in the chair, said that intelligence, in so far as it can be measured by formal tests, is clearly a heritable function of the mind. A negative association has been observed between the intelligence-test scores and the size of the family to which the tested child belongs, which means that the more intelligent parents of the more gifted children in all social classes are tending to have small families. A continuation of present trends would reduce the proportion of children with high mental endowment and increase the frequency of feeblemindedness. Whether these trends will continue is an open question which Sir Alexander Carr-Saunders discussed in his opening remarks. He did not think that the trends could be safely ignored. He had no doubt that there are these differences in intelligence and fertility between different social groups, and innate intellectual efficiency is often associated with qualities of particular value to the community. How this national intellectual endowment can be conserved is a problem requiring unbiased unemotional scientific appraisal by sociologists, psychologists, and statisticians. This sentiment was echoed by Sir Cyril Burt, who pointed out that although there is general agreement about the methods and interpretation of the results so far achieved, there is no good direct evidence of a decline in the average intelligence quotient from one generation to the next. Such studies as have been done have been obscured by sociological difficulties such as migration, and fresh efforts are needed.

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[1] Turner, G. G. *Brit. med. J.* 1943, ii, 535.
[2] Wade, H. *Edinb. med. J.* 1939, 40, 61.
[3] Lower, W. E. *J. Urol.* 1943, 50, 58.

[1] [illegible] 1946, ii, 52, 204; Jan. 4, p. 36.

Prof. L. S. Penrose raised the possibility of restitution ctors which must have been at work to counterbalance e influence of differential fertility-rates over the past undred years. Recessive genes may be important in e genetic background of geniuses, whose deviation om the norm may also be evident in a diminished rtility. There is, too, an analogy between intelligence nd stature, in that a negative correlation between height nd size of family has been shown to exist in Toronto hildren of twenty years ago; yet a height survey ecently undertaken has shown a rise, not a fall, in the verage height of the Toronto children of today. The indings in intelligence-test results may be partly explained by a negative association between test score and order of birth, since the achievement scores in a family tend to decrease from oldest to youngest. Later speakers stressed the importance of nutritional factors in the explanation of the Toronto results. Prof. Godfrey Thomson agreed that much could be done by cultural and educational improvements. On the other hand, the matter could be put to the test by direct comparisons between generations. Some studies, he said, are already under way, and preliminary results are not reassuring. The full analysis of the results of the large-scale studies will be awaited with much interest and perhaps a little trepidation.

MEDICAL SUPPLIES

EVEN nowadays, when much of the cost falls on the individual pocket, the national bill for drugs and other medical supplies is large. From April, 1948, when everyone will pay an all-in weekly contribution, it is likely to be at least as heavy. Indeed, experience in other countries where national medical services are already in action suggests that one of the problems we shall have to face, if possible before the appointed day, will be a heavy increase in the demand for medical supplies. On the second reading of the National Health Service Bill Mr. R. Sargood suggested that the annual cost of hospital supplies alone would be about £20–£25 million, and he was anxious that there should be bulk purchasing. For each region to have its own organisation would, he held, lead to overlapping and variation in the standard of equipment.

On Dec. 2 Mr. A. M. Skeffington tried to induce Parliament to discuss the subject in more detail, but was baulked for want of a quorum. Speaking from his wartime experience as assistant director of medical supplies at the Ministry of Supply, he affirmed that if the needs of the new National Health Service were to be satisfied promptly there must be a superdirectorate with authority to coördinate the efforts of the "small, highly competitive and even antagonistic firms" of which the industry is largely composed.

Weight is added to Mr. Skeffington's argument by the situation mentioned in the House of Commons by Mr. de la Bere, member for Evesham, in whose constituency there lies a dump of ex-American medical equipment. This, *he said*, is worth about £1 million; and there is every reason to suppose that its value is really much more. Hospitals have known of it and been trying to get at it for some time now, and both the Ministry of Health and the Ministry of Supply (who are the temporary owners) are anxious that they should make use of it. They are held up, however, by the fact that the Ministry of Health, never having had to deal with stores on such a scale, has in fact no adequate machinery for doing so. The equipment is stored in 100 large hangars, jammed to the roof with crates full of equipment and drugs; and these crates are in no order, with few labels and no inventory —just as they were left by the departing Americans, whose natural instinct was to get rid of the stuff quickly and get home. To the civilian mind the problem is somewhat daunting; but, after all, during the war far bigger ones were dealt with by the R.A.O.C. almost as a matter of routine. Since it seems that the Ministry will eventually have to handle stores on a very large scale, this might be a good moment to establish an organisation. It would first have to take over and cope with the stores in Worcestershire and elsewhere, and would then carry on in more normal manner with the medical supplies which will be needed by the National Health Service. At the moment there must be a large number of ex-officers who are experienced in attending to vast quantities of stores, and it should be comparatively easy to find the right people for doing the work.

Mr. Skeffington also wanted to see the standardisation of equipment, which had proved so successful in war, developed to meet the needs of peace. This proposal is being tackled by the British Standards Institution, who at the suggestion of the British Hospitals Association have set up a committee to go into the problem (*Lancet*, Jan. 25, p. 164). A start has already been made with the institution's published specifications for gas-cylinders and anæsthetic apparatus, hypodermic syringes, stretchers, and stretcher-carriers, and at the suggestion of Sir Alfred Webb-Johnson, P.R.C.S., a standard for apparatus for fluids for intravenous administration is now being prepared. In other countries the national standards organisations are undertaking similar work. At a conference held by the institute on Jan. 14 the chairman, Sir Clifford Parsons, F.R.S., said that most of the difficulties of bulk buying, which had not always proved as advantageous as was expected, could be overcome by the use of British Standards.

> "It is not necessary," he explained, "that standards should require a precise representation of articles but the essentials with which the articles have to conform may be made standard. Standardisation does not necessarily lead to regimentation, nor to exact similarity if it is carried out intelligently and confines itself to such requirements as are essential. It is probable that there are quite a number of items of equipment in hospitals which do not lend themselves to standardisation, or for which standardisation is undesirable. On the other hand, there does appear to be a very large field from which advantages should be obtained."

The new committee has an urgent and important task in hand, and its recommendations will be awaited with interest both by the executants and the administrators of the National Health Service.

TOXICITY OF THIAMINE

SOME unpleasant reactions and two deaths have now been reported after the administration of thiamine hydrochloride intravenously and by mouth. The various manifestations have been classified as toxic and anaphylactic.[1] Nausea, sneezing, dyspnœa, urticaria, and asthmatic attacks have been seen, and Mills,[2] Leitner,[3] and others have noted a thyrotoxic syndrome with nervousness, tremor, tachycardia, and sweating. Steinberg [4] reports three cases of herpes zoster following thiamine administration; one of these patients was receiving the vitamin by mouth, and another developed the condition a second time after a second course of thiamine.

The thyrotoxic reaction, Leitner suggests, is due to overdosage. Mills [5] saw many examples of this reaction in Panama in patients who had previously been severely deficient in thiamine; in one woman the symptoms developed after a $2^1/_2$ weeks' course of 10 mg. daily. The normal daily requirement of thiamine varies, but it is less than 5 mg.; overdosage in therapy is so common that it must be supposed that supersaturation, with or without faulty excretion, causes the thyrotoxic symptoms and not simply an overdose. When the vitamin is withdrawn the nervousness and other symptoms disappear. The anaphylactic phenomena seen in patients receiving the vitamin by *injection* are of all grades of severity, from sneezing to anaphylactic shock and death within

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1. Reingold, I. M., Webb, F. R. *J. Amer. med. Ass* 1946, 130, 491.
2. Mills, C. A. *Ibid*, 1941, 116, 2101.
3. Leitner, Z. A. *Lancet*, 1943, ii, 474.
4. Steinberg, C. L. *Amer. J. dig. Dis.* 1938, 5, 680.
5. Mills, C. A. *J. Amer. med. Ass.* 1941, 117, 1501.

Special Articles

THE STORY OF THE KING'S FUND

1897–1947

FIFTY years ago the prognosis for many of the volun-ry hospitals was poor. Demand for their services had l to rapid expansion in the nineties. Their future was enaced by financial instability as it has never been enaced by plans for nationalisation. Appeals for help ere sporadic, uncoördinated, and aimed at meeting nmediate crises rather than at establishing a sounder ate of financial health. Wards were opened on the roceeds of a special drive for funds, and closed again lmost before they were fully in use.

For the sick who needed hospital treatment the only lternative was admission to the institutions maintained y the guardians under the poor-law and by the Metro-olitan Asylums Board in London—a prospect from hich all but the most necessitous shrank. While ousing and domestic conditions were then more favour-ble for the care of the sick in their homes, district urses and trained private nurses were few, and the need or maintaining the bed-complement of the voluntary hospitals was perhaps as urgent as it is today. If the demand was less insistent that was due to remnants of the old prejudice against hospitals—a legacy from the days of sepsis and of surgery without anæsthesia.

BEGINNINGS

Meanwhile, the preparations for the Queen's Diamond Jubilee were in hand and the Prince of Wales was considering what cause was most worthy to be adopted in commemoration of it. One suggestion came from Sir Henry Burdett. He had made the great hospitals of London his special concern, but his four-volume work on *Hospitals and Asylums of the World* shows how wide were his studies. He insisted on the need for sound administration and control of expenditure, and prepared a scheme for a central hospital fund for the metropolis. The need, the hour, the advocate, and the patron thus came together, and the body which was later to be known as King Edward's Hospital Fund for London came into existence.

The first appeal for funds, a letter from the founder dated Feb. 3, 1897, which was published in all the London newspapers, met with a good response, and at a meeting in May the Prince was able to report that over £130,000 had already been received. "Naturally, everybody will ask when we have got a sufficient sum, 'What are you going to do with it? How are you going to spend it?'" said the Prince. "That is a very grave question . . . it will never do for us to give money right and left to hospitals which are in need. It will be necessary for us to investigate the state in which these hospitals are, to find out those which are in most pressing need of assistance, and also to form some opinion as to the state of efficiency in which they at present exist and how the management is carried on. The subject is one that will require the most mature consideration."

The early meetings were held at Marlborough House, the council being limited by the number of chairs which could be set around the dining-room table. Lord Lister presided over the distribution committee which was responsible for making grants—always on a constructive basis, and not as a means of making up leakages. For instance, the London Hospital was encouraged by a promise of an annual grant of £5000 to spend £100,000 of its own invested funds in bringing its equipment up to date.

One of the failings of the time was the isolation of the hospitals. They were applying the method of trial and error to many variations of the same problems, and were failing to learn from the successes and failures of their neighbours. The King's Fund broke in on this isolation not only by building up a central reserve of capital from which regular grants could be made, but also by requiring efficiency in organisation and adequacy in accommodation and equipment of hospitals receiving its grants. Its reports, based on Sir Henry Burdett's statistics, have for fifty years given hospital administrators a means of comparing their own institution with others of a similar nature.

WAYS AND MEANS

By 1946 the generosity of donors and subscribers, together with munificent legacies, had brought the capital fund up to £5 million, while no less than £12 million had been distributed to the hospitals of London. How was this achieved?

By December, 1897, the total receipts had risen to over £227,000. This sum included nearly £35,000 raised from hospital stamps[1] issued in commemoration of the Diamond Jubilee. A Coronation gift brought in about £124,000. From donors in Canada came £400,000, and from India £15,000. A bequest for £250,000 followed. By 1905 the Fund had an assured permanent income of £50,000 a year, and the founder lived long enough to see an annual distribution of £150,000. During the next decade many large donations and legacies were made, including one of £324,000 from Sir Julius Wernher and one of £150,000 from Isabella, Dowager Countess of Wilton. The stress of the 1914–18 war bore heavily on the hospitals and increased their claims. In 1918 the joint committee of the Order of St. John of Jerusalem and the British Red Cross placed £250,000 at the disposal of the Fund, and in 1920 alone over £700,000 was distributed.

The Fund's system of annual visits to hospitals and of special visits before a grant is made towards a particular project has possibly achieved sounder and more lasting results than any attempts to impose a rigid code on the hospitals could have done. The practice of appointing one medical and one lay visitor for each visit matches the system of honorary medical staff in partnership with a lay committee which has achieved so much of value in the voluntary hospitals. The visitors are not primarily technical experts and do not act as inspectors. They are chosen as being people who are likely to bring to hospital problems a considered judgment enriched by experience in other fields of public life, though some are closely associated with the management of individual hospitals. In visiting a hospital they ask questions prompted by the conditions they meet on their visit, and on subjects chosen for special inquiry. Their impressions are reported in confidence to the Fund, and their reports, collected and summarised year by year, have offered a pointer to the directions in which help is most needed in the interest of efficiency, and have led to the publication of recommendations on such subjects as the supervision of nurses' health, hospital diet, standards of staffing, and the employment of domestic staff.

The Fund also finances special services such as the Emergency Bed Service[2]; the Nursing Recruitment Service, which has guided over 10,000 prospective student nurses into the hospital training-schools; the Radium Pool; and the new system of bursaries in hospital administration.

THE NEXT FIFTY YEARS

The fiftieth anniversary of the Fund coincides with the end of an era and with acceptance of a new conception of hospital provision. If the National Health Service can conserve the best of the voluntary and municipal systems, and can obtain the staff needed to give it life, the hospitals of this country might become, as Burdett said of the voluntary hospitals in an earlier epoch, "the wonder of foreigners and the just glory and pride of the British nation." From this point of view it is important that the Act, while providing for maintenance from public moneys, leaves the way open for supplementation from voluntary sources. The "over and above," the humanising touches which can come only from voluntary gifts, will be needed more than ever. There is always apprehension that a State service, and particularly one which is partly on an insurance basis, will by force of circumstances become a minimal service. In no other field, whether that of transport and communications, the provision of fuel, or even of education, could reduction to a minimum be more directly disastrous to the men, women, and children of this country than it would be in the field of medicine and public health.

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[1] Some of these stamps are being used to decorate the booklet *Today and Tomorrow* on the work and aims of the King's Fund, which has been issued this week.

[2] See *Lancet*, Jan. 18, p. 109.

The King's Fund will have in hand some £300,000 a year, the greater part of which has been spent in annual maintenance grants to hospitals, to supplement and humanise the national hospital service in the London regions. Its Act of Incorporation empowers it to apply its funds "in or towards the support, benefit or extension of the hospitals of London . . . (whether for the general or any special purposes of such hospitals) and to do all such things as may be incidental or conducive to the attainment of the foregoing objects."

Details of the Fund's programme for the future must, to some extent, await the pattern of things to come. But already it has shown its trend in encouraging the new methods of hospital treatment which medical science has opened up, and in providing better facilities for training all grades of staff. Nothing which would help to relieve the present pressure on hospital beds, the shortage of nursing and other staff, the plight of the chronic sick and advanced cases could be alien to it. The rehabilitation and development of convalescent homes and the provision of special equipment and amenities where they are most needed are already occupying its attention.

On its fiftieth birthday we wish the King's Fund godspeed in the belief that its influence on the quality of the hospital services in the London regions will be as important during the next half-century as it has been in the last.

SPECIAL DIETS FOR INVALIDS

THE PROCEDURE EXPLAINED

THE following correspondence has passed between Sir Edward Mellanby and Mr. Strachey.

Dear MINISTER,—I am writing to you in my capacity as chairman of the Food Rationing (Special Diets) Advisory Committee of the Medical Research Council. As you know, this committee was formed seven years ago at the request of the Minister of Health, the Secretary for Scotland, and the then Minister of Food, Mr. W. S. Morrison. Since then this same committee has functioned continuously under successive Ministers—Lord Woolton, Lord Llewellin, Sir Ben Smith, and yourself—and until the last few weeks there have been few complaints directed against this branch of your Ministry's work. I think you will agree that this is a noteworthy achievement considering the onerous, and often invidious, duties of the committee and is in marked contrast to experience in the first European war when invalid and other claims were a major difficulty in working food-rationing plans, and even at one stage threatened to wreck the scheme. When I have reviewed the hard, disinterested, and very competent service given by its members, and in an outstanding degree by its secretary, Professor Himsworth, and also by Professor Davidson in Scotland, I could not help feeling surprised at how little their work was known or understood. There can be few instances in which the work of a whole department of a ministry, apart from routine administrative duties, has been planned and carried on for so long by an honorary committee entirely outside the ministerial organisation itself.

The committee has not only advised your Ministry on thousands of individual appeals against the rationing regulations for invalids, on appeals from commercial food interests against restrictions on their supplies, given authoritative opinions on requests from industrial bodies and trade unions for special consideration, and undertaken negotiations with professional bodies on behalf of the Ministry, but it has also entirely devised the present system of invalid rationing down even to its administrative details.

I am sure you will appreciate that the members of the committee, being busy and distinguished men, are beginning to wonder how long their services will be required. They appreciate, of course, that no such medical man could undertake the functions which they now discharge as a body; and I, as their chairman, may perhaps be permitted to add that I know of no other group of men in this country who have either the status or the knowledge to take their place. Realising these points, and knowing that their duties will not continue indefinitely, the committee would no doubt be prepared to continue, but they do feel in need of reassurance on two points.

First, the committee would like to know if you still desire their services. If so, they would appreciate a public statement that the Government has confidence in them. Perhaps you might consider it appropriate to make such a statement in the House when you deal with the matter of invalid rationing. It would certainly be appropriate, although I realise it might be impracticable, if past Ministers of Food were to associate themselves with such an expression of appreciation.

Secondly, the committee would like to know whether the situation regarding food-supplies is still such that you would wish them to continue on the same strict principles which were necessary under the exigencies of war. Hitherto, such has been the food situation that the committee has had to formulate its advice in accordance with the following general principles:

(*a*) that extra rations should only be granted to invalids on the grounds of proven therapeutic necessity;

(*b*) that extra rations could not be spared for comforts;

(*c*) that, in deciding between competing claims for the limited supplies of food, preference should be given to those categories of invalids who are capable of being restored to health, or preserved, by means of diet, as active workers;

(*d*) that extra rations should not be granted on vague general grounds, such as debility or general ill health, but only when there were precise indications that certain foods were specifically necessary for the patient's treatment.

(*e*) that only in exceptional cases could the committee advise you to exercise your prerogative of granting compassionate rations.

These are hard principles; and the members of my committee, while appreciating their necessity, have disliked applying them. As physicians they know that, although the extra rations desired by the patient may be of little or no material benefit to him, the refusal of such rations may cause very real psychological distress. But because of the food-supply situation they have had no option in such cases but to advise refusal. Are they to understand that, if you still desire their services, the food situation is still such that, it is necessary for them to continue to be guided by the same strict principles?

London, S.W.1, Jan. 9, 1947. E. MELLANBY.

Dear Sir EDWARD MELLANBY,—Thank you for your letter of Jan. 9, to which I hasten to reply.

Let me say at once that I value intensely the work of yourself and your colleagues of the Food Rationing (Special Diets) Advisory Committee of the Medical Research Council. I do not see how any Minister of Food could carry on the medical side of food-rationing without the help of such a body. As you say, it is a unique but exceedingly valuable feature of the present arrangement that an independent honorary committee entirely outside the ministerial organisation itself is responsible for this side of our work.

I also agree with you that the present membership of the committee is authoritative and eminently fitted to perform its duties. I welcome the opportunity to make these views public, which will be given me by a question put down by Sir Ernest Graham-Little which I shall be swering in the House of Commons next Wednesday, n. 22.

I need hardly tell you that I do desire the continued operation and assistance of the committee. I realise arduous and self-sacrificing work which it has per-med, but I must appeal to the committee to continue perform its functions while our food difficulties ntinue.

Finally, I come to the points raised by you as to whether me relaxation of the very stringent principles under ich the committee works might not now be permitted. nfortunately, the food situation, especially in regard to e particular foodstuffs which I take it are most often commended, such as butter, eggs, and meat, has not t improved. In all the circumstances, I am inclined to ink that we cannot yet make any marked changes in e terms of reference of your committee. On the other and, I do think that when your committee sits in what I ight term its function as a Court of Appeal against its vn regulations as applied by my divisional food officers, might now begin to take a more lenient view of indi-dual applications: and I would trust that such a relaxa-on would help your committee in its arduous and often npleasant work.

It is, of course, still vitally important to prevent a eneral relaxation in the granting of extra foodstuffs to atients, such as did tend to occur this autumn in the ase of milk. It would undermine our entire rationing ystem if it became possible to obtain, say, double the ormal milk ration by means of a complaint to a general ractitioner about feeling overtired or other undefined ymptoms.

Ministry of Food, Jan. 14, 1947. JOHN STRACHEY.

In reply to a request by the British Medical Association, he Ministry of Food has described in detail the procedure or dealing with applications for extra rationed foods on nedical grounds. The following are extracts.

Routine Cases

The procedure in routine cases is for the form R.G.50 or medical certificate to be scrutinised on presentation at the food office for obvious clerical errors, illegible signatures, and anomalies such as the classification of a patient for extra milk under class 1(c) without any classification for extra eggs. Queries of this nature are, as far as possible, dealt with immediately and the wishes of the doctor ascertained. Applications on which no questions arise are granted immediately, and the necessity for speed in arranging for patients to be able to get their extra supplies has been stressed. Cases which must be referred to higher authority are forwarded immediately, and, when applicable, extra supplies are granted at once, either in accordance with the instructions that have been issued or under the food executive officer's powers of discretion.

Special Cases

Applications for extra foods, or for extra quantities of foods, that are not covered by the advisers' standing recommendations and Ministry instructions, are all treated as special cases. Food executive officers have no powers of decision and the applications must be forwarded without delay to divisional food officers. Divisional food officers are not empowered finally to reject any application that is supported by a medical certificate, but they are informed, both by their experience and by information passed to them by headquarters, of the requirements and views of the advisers and, therefore, they ensure as far as possible, by reference back to food executive officers or doctors, that applications include all the required information. This procedure does, of course, in practice dispose of a number of applications.

In general all non-routine cases are received at the headquarters of the Ministry, where the department concerned is in continuous and close touch with the Ministry's advisers through the Ministry's Scientific Adviser's Department.

Since the appointment of the Advisory Committee in January, 1940, a number of precedents have been established. Applications which are clearly covered by precedent are promptly granted or rejected, or, if necessary, further information is requested. Any case, however, in which there is the slightest doubt whether an exact precedent has been established, cases in which the applicant is dissatisfied with a previous ruling, and all cases specifically made under paragraph 19 of MED2 are referred to the Scientific Adviser's Department for special consideration by the Advisory Committee.

The Advisory Committee advises the Minister on the best disposal of the limited amount of foods available for invalids. In respect of the special applications referred to them by the Ministry they advise on the priority to be accorded to each on the basis of the statement of the particular case set out in the medical certificate and of the foods available. Applications from England, Wales, and Northern Ireland are sent in the first instance to Prof. H. P. Himsworth in London; applications from Scotland to Prof. L. S. P. Davidson in Edinburgh. If the application concerns a matter on which the committee has already given general guidance a written statement of the reasons for or against granting the particular application is prepared and, if agreed to by another member of the committee, forwarded to the Ministry of Food. If the application raises a new point it is referred to the whole committee, advice on the general principle being, if necessary, obtained from professional bodies, or, in the case of unusual illness, from other persons with expert knowledge.

General

In practice the Department always accepts the advice which is given and no officer of the Ministry is permitted to adjudicate on the medical evidence given in any case. This does not prevent them, however, putting into effect the known views of the Advisory Committee, but the principle which has been followed is that all lay officers who handle applications for extra foods on medical grounds do so essentially in the capacity of a secretariat for the Ministry's medical advisers.

Reconstruction

TRAINING SCHOOLS FOR NURSES

NEED FOR NEW METHOD OF FINANCE

FROM A CORRESPONDENT

THE inauguration of the National Health Service offers a chance of separating the finance of the nurses' training schools from the finance of the hospitals. This would go a long way to give nursing a new start and lay aside a whole group of handicaps under which it labours today. If nursing is indeed a profession, does it not stand to reason that the nurses' training school should, like the medical school, draw its money, in part at least, from educational funds rather than from moneys voted for the relief of the sick?

PRESENT STATE OF AFFAIRS

The "apprenticeship system" which is so strongly established in this country—as contrasted with American practice—has great advantages and has contributed to the high standard of actual bedside manners, particularly in the larger training schools. But it is apt to subordinate the interests of the student to the interests of the hospital as such. Moreover, it has opened the way for hospitals to become training schools on inadequate grounds: sometimes they have been too small to give comprehensive experience; sometimes the ratio of trained staff to student nurses, or of nurses to patients, has been too low; and the quality of training is apt to suffer accordingly. It is by no means uncommon to hear of cases where the training of the individual nurse has been sacrificed to the needs of the hospital. Thus a girl who is already a qualified children's nurse and is seeking to complete her training at a general hospital too often finds herself called on to help out with the children's ward—this being the one type of hospital work of which she has already had ample experience. Help in an occasional crisis is one thing, but the frequency with which such things now happen is not really defensible. It is common to find that the needs of the training school for proper accommodation and necessary facilities play second fiddle to other requirements of the hospital.

Now all this is very largely a matter of finance. So long as the finance of the training school is inextricably bound up with the general finance of the hospital, the nation." From this point of view it is important that the Act, while providing for maintenance from public moneys, leaves the way open for supplementation from voluntary sources. The "over and above," the humanising touches which can come only from voluntary gifts, will be needed more than ever. There is always apprehension that a State service, and particularly one which is partly on an insurance basis, will by force of circumstances become a minimal service. In no other field, whether that of transport and communications, the provision of fuel, or even of education, could reduction to a minimum be more directly disastrous to the men, women, and children of this country than it would be in the field of medicine and public health.

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Details of the Fund's programme for the future must, to some extent, await the pattern of things to come. But already it has shown its trend in encouraging the new methods of hospital treatment which medical science has opened up, and in providing better facilities for training all grades of staff. Nothing which would help to relieve the present pressure on hospital beds, the shortage of nursing and other staff, the plight of the chronic sick and advanced cases could be alien to it. The rehabilitation and development of convalescent homes and the provision of special equipment and amenities where they are most needed are already occupying its attention.

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HEALTH CENTRES ATTACHED TO TEACHING SCHOOLS

But the utilitarian outlook, though proper to these ard times, is not enough. Besides discovering how to upply medical care economically we have to find out how o improve its quality; and from the first there must e some centres which are in no sense makeshift but are eliberately designed as the best we can devise. These hould serve the purpose both of experiment and teaching, nd should therefore be attached to the undergraduate eaching schools.

In the neighbourhood of each teaching school there night be a district where the students could see general practice at its best and in process of development. Such a district, with a population of perhaps 100,000 and containing half a dozen health centres, could be the field of study for the professor of social medicine and his staff, who would work in conjunction with the health-centre practitioners in teaching, in research, and in improvement of the service.

It may be many years before the ordinary health centres elsewhere can do more than concentrate on the work in hand; but in the health centres of a designated teaching area the staff could be supplemented from university and trust funds, and many valuable experiments could be made without throwing an undue strain on the participating practitioners. For example, within the designated area periodic examination of all the people could be undertaken, accurate morbidity statistics could be collected, the technique and results of health education could be explored, and medical liaisons with local industry could be formed. At the same time the field of general practice could be demonstrated to the student in a way that has hitherto been impossible, and his outlook could thereby be given a new and preferable orientation.

In a word, the health centres attached to a teaching school could from the beginning be given a special opportunity to live up to their name—to promote the positive health of the people under their care. In so doing they would enable us to form opinions as to what should or should not be undertaken later elsewhere.

This would, of course, carry the corollary that, as soon as circumstances allow, centres embodying all that has been found best in these prototypes must be planned and provided as widely as possible. Otherwise we should only be preparing for the next generation of general practitioners further frustrations. If we are to show the medical student how efficient and attractive general practice can be made, we must not deny him the use of the same methods in his own practice.

PRIORITIES

Naturally, for many a long day, priorities will still have to be observed. The case for the establishment of centres is, and will continue to be, stronger in some areas than others. It would be idle to attempt now any detailed assessment of future needs; but we may hope that well-designed and well-equipped centres will prove a potent means of attracting the best of the new doctors (and perhaps some of the older ones, too) to areas where they are most required. Therefore consideration should be given to the early establishment of centres in unattractive and under-doctored areas.

Another pre-eminently suitable field for experiment will be the new satellite towns. Here there should be a good opportunity for testing new methods of approach to health problems, both preventive and curative, and for finding ways whereby the health services may best be integrated into the life of a newly developing community.

PERSONAL HEALTH AND PUBLIC HEALTH

The health-centre project again exposes the impermanence of the old boundaries between the provinces assigned to the medical officer of health and the practitioner. The M.O.H. was supposed to concern himself with preventive medicine, and the practitioner with curative medicine. But the real boundary, in so far as there must be one, lies between personal health and public health. The M.O.H. is primarily interested in the *community*, and therefore in epidemiology, in environmental standards, and in general health education. The practitioner's particular duty, on the other hand, is to do all he can for his *individual patient*, and he will fail therein unless, besides curative medicine, he practises preventive medicine and what we have termed functional medicine—the promotion of the highest level of function possible for the individual.

The health centre, as we have been describing it, is essentially a place where personal health is to be sought —through curative, preventive, and functional medicine. It is dedicated to the individual patient or person, not to the community, and only by a series of historical accidents does it come at all within the realm of the doctor who specialises in public health.

It is natural that the keen M.O.H., now accustomed to administering hospitals and remedial clinics, should tend to see it as an extension of his own department, affording him a welcome opportunity of closer study of the environmental and social aspects of public health. Indeed, by taking away from the local health authority its function of providing a hospital service, and placing on it the new task of establishing, maintaining, and largely staffing the centres, the National Health Service Act lends colour to this idea that these centres are part of the local public-health service; and the M.O.H. may be forgiven for thinking of the practitioner's quarters as a mere annexe to the local-authority clinic. Nevertheless the personal-health service is *not* a part of the public-health service, however closely the two should be connected. To regard it as such is to invite difficulties, and we feel sure that the best work for health centres will be done by the M.O.H. who, in the temple of Personal Health, is content to serve as provider and arranger, taking care to reserve his vestments of a chief priest for the temple of Public Health where his supremacy is unquestionable.

GROUP PRACTICE

Another fundamental question that arises is the relation of the patient to the doctors working in a group. The traditional foundation of the personal-health service is a contract between the patient and a single doctor. Is this basis to be changed when the service is embodied in a health centre? Will the patient cease to be the patient of a particular doctor and become the patient of the group?

We should be sorry to see so great a departure from former custom. Hitherto the patient has had the benefit of two kinds of care. From his family doctor he has had the care of an adviser who accepts responsibility as an individual, and often as a personal friend. When this adviser has felt that his help was insufficient, he has handed over the patient to a second kind of care—that of a group of people forming the staff of a hospital. Here, though admitted in charge of a particular member of the staff, the patient is really under the care of the group as a whole, many of whose members share the responsibility for him.

Those who think that a patient attending a health centre should be the patient of the whole group are bringing the hospital conception into general practice, to which it is foreign; and they may be depriving the patient of the comfort of committing himself and his fortunes to a single person whom he knows and trusts. Might it not be better if, on the contrary, we increased rather than diffused the responsibility of the individual practitioner for his patient? Ideally, should we not arrange that even when he transfers his patient to the matron and others responsible for the standard of training have their hands tied, and must continually give way to what are represented as more urgent demands.

It is significant that the one training school where this separation has been to some extent attempted is the Nightingale School at St. Thomas's, where the school has its own endowment and a separate set of accounts. "The distinctive advance made by the Nightingale School"—to quote Worcester's book on *Nurses and Training*—"was due to its independence. From the first its liberal endowment has allowed it to hold fast to its educational ideals. And there it has been proved that the best nursing service in a hospital can be given by pupil nurses of a school that has for its main purpose their education, and not the pecuniary advantage of the hospital."

A DIFFERENT METHOD

The case for drawing on educational funds for a proportion of the assessed cost—not only of the teaching staff but also of the maintenance and remuneration of the pupil nurses—is therefore strong. It would perhaps be unreasonable to urge that the entire cost should be so met, since it is appropriate that the hospital should recognise by a financial contribution the benefit it gets from the presence of the training school within its walls.

The appropriate source of the educational moneys seems to be either the University Grants Committee or the Ministry of Education—supplemented, perhaps, as such funds might well be, by grants for special purposes and by grants from the great hospital trusts—King Edward's Hospital Fund for London and the Nuffield Provincial Hospitals Trust. A stimulus would thereby be given to those responsible for organising the training schools: but more than this, they would be given, in respect of the educational responsibility, a status which they at present lack. It would not then be necessary for the training school in need of a better supply of textbooks, or whatnot, to argue the claim in competition with the urgent need for repairs to the domestics' furniture, or for the matron to be told that the reprinting of the prospectus of the training school to bring it up to date was something of a luxury and must wait.

These instances of petty but serious handicaps under which the nurses' training school labours under the present régime are not far-fetched: they are everyday occurrences in many hospitals. Nor will they disappear with the mere assumption by the Ministry of Health of financial responsibility; for the hospital management committee is to have a free hand to manage its own affairs within its budget, and there is never likely to be money enough to meet all demands. The fact is that the object of the training school and the object of the hospital are not identical, though of course they overlap. It is too much to expect the hospital, which has to find money for all sorts of worthy objects of its own, always to be fair to the training school whose aims may often seem by comparison to be of less immediate consequence. We shall not be likely to get things in their proper proportion so long as the present financial tangle is preserved.

WHAT SHOULD BE DONE

The right solution appears clear enough. The training school should make up its own accounts, and it should carry the whole cost of teaching staff and also of the maintenance and remuneration of the student nurses. In return it should secure on the one hand a grant from the Exchequer, via the Ministry of Education or the University Grants Committee, and on the other an agreed amount from the hospital in recognition of services rendered. It does not very much matter how the amounts are calculated, or in what proportion, so long as the object is kept in sight—namely, that the requirements of the training school are not subordinate to those of the hospital.

The need for some such change was recognised by th Athlone Committee in its report of 1939, though th merely suggested that payment should be from th Exchequer. It was not then foreseen that the Exchequ would become responsible for hospital finance, and if i the new circumstances a distinction is to be maintain we must go a little further than the Athlone Committe and stipulate that the payment ought to come from th Exchequer by another route than through the Ministr of Health.

The introduction of the National Health Servi should enable us to bring about easily and smoothl a change which might well do more than any oth single step to secure the student status of the nurse i training.

Health Centres of Tomorrow

VI—CONCLUDING REFLECTIONS

AN American visitor the other day thought it odd us to be giving health centres so large a place in o plans for the National Health Service. "As far a I can see," he said, "you haven't got any yet. In t States we should handle this differently: we shou want to see some centres in operation before decidin to have a whole lot more."

As things stand, however, neither he nor anyo else need fear that health-centre practice will be general adopted before there has been time to test its value. the irony of fate, the era of planning which has n dawned in this country coincides with an era of mater scarcity; and the plans for creating a really good medi service depend, like most other plans, on whether, despi wars and rumours of war, the new techniques of producti can create the world of abundance that science h promised. Till that happens it will be impossible to bui large numbers of health centres all over the count and even our experiments may often have to be ma with makeshift apparatus.

Nevertheless there is a strong case for taking th experiments very seriously, and for making them extensive and convincing as we can. On the long vie the really well-equipped health centre may prove to the ideal base for the general practitioner of the futu and we need pilot models now. On the short and ut tarian view, a less ambitious type of centre might b valuable means of economising medical resources w these remain straitened. Even a makeshift centre, hous in old buildings or military hutments, and using surp war equipment now in store, might enable practition to do more and better work in less time and with effort; and without some such saving in medical m power there will certainly not be enough doctors provide a genuinely comprehensive medical service.

Since the State is offering medical care to everybo it must spend enough to make that care efficient; an health centres fulfil their promise the money devo to them will be very well spent.

Concentration of the work of six doctors at a ce should mean overhead costs lower than those of separate practices. With nurses, secretaries, and t phonists at hand, and the social services on tap, practitioner should be relieved of much non-med labour. The burden of clerical work and record-keep can be largely shifted to clerks. Ready access to techn aids and the help of colleagues should save time trouble. Much duplication of equipment and inst ments can be avoided, while standardisation and b buying will reduce expense. As in large partnersh arrangements for free afternoons, nights off duty, sufficient holidays can obviate the chronic fatigue wh prevents so many practitioners from making the best of their skill.

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Suppose, for example, that you are faced with a child with a high temperature. To announce hesitantly that it is rather difficult to say at the moment but that pneumonia may well develop serves truth but is not helpful. The confident statement, however, that this is a severe chill is immediately acceptable, and allows for a really remarkable recovery by the next day, or alternatively a definite localisation of the trouble. Thus a chill may settle on the chest, even to the extent of the lungs becoming congested. Other possibilities include a "chill on the kidneys," or, more simply, a "chill round the water-works."

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We start with the landlady and the parents being woken in the night by a screaming baby, and we are at once warned that having a baby means work, work, work: warned too that if we don't master him, he'll master us—no mention of fun and pride, or the fascination of seeing an infant grow and become an individual, or the subtle changes of feeling which parents undergo when their children are growing up. The relationship depicted between parents and children is often disciplinarian, rarely that of mutual enjoyment. There is no understanding that with parenthood, as with all professions, unless we get satisfaction and pleasure from it we are unlikely to be successful. On the contrary this presentation is so largely in terms of blood, sweat, and tears as to be most discouraging to the beginner. Perhaps the Royal Commission on Population will ban it on these grounds.

When the film concentrates on how to keep children happily occupied it is good: when it tells us how to deal with difficulties it is frankly deplorable. When the three-year-old is found playing with the carving knife, instead of his being offered some alternative plaything and his interest diverted, the knife is wrenched from him with the expected screams. Granny, who takes his side, is held up as a monster from whose spoiling ways the child must at all costs be preserved. The child who prefers pudding to veg. is given the option of veg. or nothing. No give or take, no finding out what suits, above all no humour. When the child of five years wets herself mother is reprimanded for inadequate training. Naughty children, naughty mothers, naughty grannies!

To many whose work lies with parents and children, especially those who have got into difficulties, this film will seem a calamity. The very fact that about half of it is very good makes the resulting mixture even more unfortunate, since the bad parts will appear more plausible. No doubt its sponsors on reading these criticisms will remark that it is hopeless to attempt anything in this field because all the experts disagree. But the B.B.C. has shown us how a nationalised or governmental body can deal with controversial topics—by giving exponents of different points of view an opportunity of expressing them and by avoiding any suggestion of authoritative statement. So far from discouraging the Ministry from making films on child upbringing, therefore, I hope that others will be made, presenting so far as possible the divergent points of view now current. And I am willing to bet that the one which is psychologically most accurate, and therefore most helpful, will be the most popular.

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hospital he should continue to watch over that patient's interests, just as the captain of a ship remains on the bridge when a pilot is taking his vessel through difficult waters ?

All the same, if half a dozen practitioners are to work together in the partnership of a health centre they will fail in their duty towards one another if they do not develop a certain responsibility for each other's patients ; and in a good health centre the patient, though he gains all possible advantage from having his *own* doctor, will also enjoy the protection of the group as a whole and of any member whom he encounters.

The development of a group spirit among the doctors in a health centre is indeed a necessity ; for the biggest advantages to be expected from inviting several practitioners to work under one roof are the intangible advantages of professional and personal association. Here it may be relevant to recall Bion and Rickman's requirements for a good group spirit,[1] which included—

(*a*) a common purpose ; (*b*) common recognition of the "boundaries" of the group and their position and function in relation to that of larger units or groups ; (*c*) the capacity to absorb new members and to lose members without fear of losing group individuality ; (*d*) freedom from internal groups having rigid boundaries ; (*e*) each individual member of the group is valued for his contribution to the group and has free movement within it, limited only by the generally accepted conditions devised and imposed on the group ; (*f*) the group must have the capacity to face internal discontent and must have means to cope with it.

GENERAL PRACTICE

Those who see the patient as belonging to the group rather than to his "own" doctor usually have in mind a partnership in which the partners develop specialised functions and the patient (as in a hospital) goes to the ones most skilled in managing his ailment. In our third article we contested this view that the health centre should become a group of specialists forming a minor Mayo Clinic, and argued that each member of the staff, though he might develop special aptitudes, must continue to be a truly general practitioner.

Those who favour a high degree of specialism among practitioners often claim that this is the only way to keep them interested in what is otherwise apt to be a dull occupation. We believe that general practice need not be dull, but can and should, under proper conditions, be capable of giving a full and satisfying life. Specialisation should only be necessary to the extent that it enables the individual to enhance his contribution to the group and so more effectively allows him to fulfil criterion (*e*) above. It is possible that, in the course of cultivating such a special interest, the practitioner may find that he has an aptitude for his chosen specialty which justifies his eventual translation to the purely specialist field, but he should be encouraged to take this step rather because it offers better chances of his using his particular talents than because it promises much better financial reward. There is much to support the argument of those who say that general practice is itself a specialty, demanding a great deal of knowledge, skill, and judgment from those who take it up. The renaissance of general practice, they feel, will be achieved not by making each practitioner a graded specialist in something else but by asking a high standard in his own specialty.

Whether it is or is not desirable for him to make a hobby of some particular kind of work, the G.P. still has wide scope for the exercise of his talents. He will always have great responsibilities.

To him comes the patient with his earliest presenting symptoms. Many of these will only be manifestations of minor illness or injury. Yet the proper and skilful handling of these ailments—learnt best, and perhaps only, in general practice—may often prevent their developing into more serious troubles. Especially this true in the case of minor psychological disorders And always among these seemingly unimportant symptoms there will be the first warning signals of the commencement of more serious illness, the early detection of which must essentially remain the task of the general practitioner. He must as well continue to shoulder the responsibility for the early diagnosis and prompt handling of surgical and medical emergencies, and should be able to call on the nursing and laboratory facilities that would enable him to deal efficiently himself with the pneumonias, with cardiac failure, and with diabetic coma, without necessarily losing touch with his patients in a specialist hospital.

The general practitioner will remain the close confidant of his patient. He it will be who will decide when hospital investigation is needed or consultation should be sought. He should be given every opportunity of easy personal access to the consultant services. His position of trust, the "family-doctor relationship" he has with his patients, makes him the most suitable person to advise on matters of health as well as illness. Ideally he should be the doctor giving continuou advice through all ages on the problems on which hi patients so often need help—problems which may rang from those of diet and clothing to those of genetics an family relationships. Apart from the judicious educatio of his patient in healthy living, the practitioner has th duty to see that he has the full benefit of preventi methods such as immunisation. Much of the antenatal pædiatric, school, and industrial work now done by full time medical officers should and can be restored to th general practitioner, and obstetrics will still be practise by those interested in it.

The fact that so much more can nowadays be done fo people means that the general practitioner has a mor important rôle in seeing that it is really done. Th health centre of tomorrow must give him all he needs t realise the great potentialities of what is still to man the most fascinating and useful branch of medicin It remains for the profession to convince itself and t persuade others that the vigour of a country's medic service is measured by its strength in general practic from which all other branches spring.

The new National Health Service must not becon just a new method of paying for the general practitioner services : it must give him new advantages, enlar his capabilities, and restore some of the opportuniti which general practice has—with the advance of medici —been lately in danger of losing. To do this it will necessary to explore and utilise to the full the conceptic of group practice in health centres.

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[1] 1. Bion, W. R., Rickman, J. *Lancet*, 1943, ii, 678.

INFECTIOUS DISEASE IN ENGLAND AND WAL

WEEK ENDED JAN. 25

Notifications.—Smallpox, 0 ; scarlet fever, 128 whooping-cough, 2151 ; diphtheria, 247 ; paratypho 1 ; typhoid, 6 ; measles (excluding rubella), 11,07 pneumonia (primary or influenzal), 1270 ; cerebrospi fever, 94 ; poliomyelitis, 5 ; polioencephalitis, encephalitis lethargica, 3 ; dysentery, 97 ; puerpe pyrexia, 133 ; ophthalmia neonatorum, 87. No case cholera, plague, or typhus was notified during the we

The number of patients in the infectious diseases' hospitals of London County Council on Jan. 23 was 1153. During the provi week the following cases were admitted : scarlet fever, diphtheria, 22 ; measles, 55 ; whooping-cough, 41.

Deaths.—In 126 great towns there were no dea from scarlet fever, 1 (0) from an enteric fever, 4 (0) fr diphtheria, 7 (0) from measles, 8 (0) from whoopi cough, 83 (4) from diarrhœa and enteritis under t years, and 92 (17) from influenza. The figures in par theses are those for London itself.

The number of stillbirths notified during the week 277 (corresponding to a rate of 27 per thousand to births), including 29 in London.

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Letters to the Editor

HISTOLOGY OF THE COMMON COLD: AN APPEAL

SIR,—Apart from the work of Hilding[1] we have found no references to careful studies of the histological changes produced in man by the common-cold virus. Further information about such changes would be of great value in the studies of this disease now being conducted here.

Many people are killed in accidents or die suddenly from other causes; many people have common colds, especially at this time of year: there must therefore be many who die suddenly in the early stages of a cold. We should be very grateful to any pathologist who could let us have small pieces of nasal mucous membrane from cases of accidental or other sudden death where it was known that the subject was in the first week of a cold. Material should be placed in saturated corrosive sublimate solution containing 10% of formalin (10% formaldehyde) and sent to this address. One of us would also be glad to attend personally any autopsy on such a subject taking place in the London area.

National Institute for Medical Research, Hampstead, London, N.W.3.
C. H. ANDREWES
J. S. F. NIVEN.

TREATMENT OF TUBERCULOSIS

SIR,—One thing that appears to be quite clear from this correspondence is that the authorities entirely disagree. While Dr. Houghton and Dr. Corrigan (Dec. 14) find it necessary and advisable to use the "harmless" amphetamine for blotting out the deleterious and often disastrous apprehension of active interference, which is generally felt by patients in modern sanatoria, Dr. Simmonds (Jan. 11) finds that "the majority of patients here accept the need for active interference without emotional upset." Dr. Howard (Jan. 4) is of the opinion that amphetamine is not harmless, and that some patients have an individual idiosyncrasy to it which is far greater than with other drugs; the makers of amphetamine question this view (Jan. 18).

The surgically minded tell us of the benefits to be derived from immobilising the lung by artificial pneumothorax, inflating the peritoneal cavity, paralysing the diaphragm, and cutting out portions of the bony thorax; yet perhaps the least mobile part of the lung, the posterior aspect of the apices, is most often attacked by the disease, while during and following such procedures the *other* lung is given double the work to do. Is it that, ignoring the diseased lung, they have adopted for the lesser affected lung Mr. MacMahon's advice (Jan. 25): "Physicians and nurses who are to have charge of tuberculosis cases should, by breathing and physical exercises, fully develop their chests and lung capacity, for it seems to me that lungs which are thoroughly aerated must have a better chance of resisting the disease."

We are indebted to Dr. Temple Clive (Jan. 25) who very ably sums up the difference between treatments in the various institutions: "Let us not forget that the quiet and peaceful surroundings of the true sanatorium have as prominent a place in the treatment of the tuberculous as the noisy and restless environment of the surgical wards of the chest hospital."

Though opinions conflict on these matters it is generally agreed that resistance to the disease is lowered by poverty and overwork in cold, damp, ill-ventilated, or overcrowded dwellings; yet we still see millions expended on sanatoria and mass radiography which could more profitably be used in building up resistance by improving *the food and homes of the people.*

We also know that by far the greater majority of the people who contract tuberculosis recover from it without the disease being specifically treated or even recognised except by chance or mass radiography, and that the disease has progressively diminished with improvement in the social welfare of the people. Would it not therefore be cheaper and more reasonable to expend our efforts in this direction rather than waste them in expensive, ineffective, inefficient fractional measures?

Birmingham.
JAMES F. BRAILSFORD.

SIR,—Dr. Clive's axe, though possibly somewhat blunted, can still be wielded to good advantage; he does well to draw attention (Jan. 25) to the increasing of surgical interference in pulmonary tuberculosis, the "noisy and restless environment of the wards."

The true value of collapse therapy has yet to assessed; as far as I am aware there is still no statistical proof on an actuarial basis that cases need this therapy have end-results even as good as th not needing it. I would be the last to deny th collapse measures have often been brilliantly successf but with the present demand, both inside and outsi the profession, for more and more collapse therap there is need for a firm restatement of the fundament importance of rest and fresh air. Rest must be not o physical but mental. The quietude of mind induced b old-fashioned sanatoria was the basis of many success cures; and there was little need in those days to f back on amphetamine or other cerebral stimulants allay the feeling of "apprehension and alarm" wh has been mentioned in this correspondence.

Lip-service is always paid to the value of long-co tinued rest; but very few institutions have really carri out this treatment, although it is the bedrock of tuberculosis therapy and the only measure which h stood the test of time. Since Lillingston and Rivi raised their voices in its favour few in this country ha emphasised the value of a long period of rest; and these days of restless unceasing search for new metho of collapsing the lung, or draining cavities, or raising t diaphragm, or removing ribs, I feel that collapse measur already at hand should be appraised anew.

J. H. CRAWFORD
Douglas House, Bournemouth.
Medical superintendent.

GENTIAN VIOLET IN GASTRO-ENTERITIS

SIR,—I have had considerable success in the treatment of gastro-enteritis, where no specific organism is involved, with gentian violet in keratin-coated capsules. Th should be combined with a bland bismuth mixture as sedative for the gastric mucosa. The dose for an adult is *1 grain twice daily given as four gr.* 1/4 capsules. For a child half this dose and for an infant a quarter. Youn children with teeth are apt to bite the capsules, an unless this is prevented by administering the capsules i jam and tickling the child the treatment may fail.

The treatment is of almost immediate benefit to mo *cases and a* few hours suffices to produce well-mark improvement. It should however be continued for day or two to avoid relapse.

I have found it of great use in the present widespre gastro-enteritis at all ages, though I have not had t opportunity of trying it in a bad epidemic of neonat diarrhœa. In the few cases of the latter that I have tri it on it has been successful, and in my opinion it deserv further trial. I consider it far superior to the sulpho amides as a bacteriostatic in the gut.

Lytham.
ROBERT F. E. HARRINGTON.

DOCUMENTATION

SIR,—In the third of your series of articles on *Heal Centres of Tomorrow* (Jan. 18) you imply that R.A. records during the war were written by hand. Aft four years of Army psychiatry during which I saw ma R.A.F. cases I whole-heartedly agree that Air For medical records are good. The reason however is th they are *typewritten.* All special investigations a reports are also typed on the same record, and it is th possible to read a R.A.F. case-paper in a fraction the time which it takes to peruse other forms of recor which often consist of a multitude of odd-sized pieces paper with every variety of scribble. As to the accura of the typewritten records, which you mistrust, I fou very few errors; and the simple check of initialli after perusal should be sufficient to guard against maj mistakes.

My experience of *handwritten case-records* of chro patients in mental institutions leads me to the sa conclusions. The value of these records is severe limited by the difficulty which one experiences in readi them, written as they are by many hands.

In my opinion the typewritten flimsy is the ide solution. The importance of uniform paper size cannot over-emphasised, and all additional reports and inform n should be copied on to the same record. In addition special summary form at the front showing special atures, such as operations, X-ray of chest. or vaccina- on, is essential. It is high time that ordinary doctors well as consultants demanded the use of efficient ethods commonly required by business concerns of uch less national importance. The setting up of the ew health centres should give the patient the benefit f a modern record system without saddling the doctor ith the burden of additional clerical work.

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[1] Hilding, A. *Arch. Otolaryng., Chicago,* 1930, 12, 133.

St. Mary Cray, Kent. BRIAN H. KIRMAN.

GERMANY

SIR,—We want to plead for the better provision of good therapeutic material for the Germans of the British zone. While we cannot claim to have made a detailed study of what drugs are available, we have been in Germany for a considerable time, and our dismay at their inadequacy has grown steadily. Having but just returned from leave in England, we are frankly ashamed to think that, whereas in Britain life-saving and limb-saving drugs such as penicillin may be prescribed for simple sore throats and other trivial ailments, they are denied to all Germans save those with acute gonorrhœa. Presumably nobody denies our responsibilities towards the population of the zone, and we wonder if there can be more than a handful of your readers who would not share our sentiments in this matter had they been timidly approached by eminent German doctors with a request for some penicillin to save a life or a limb which would otherwise perish. We make the plea that British medicine should restrict or ration its use of this and comparable drugs in order to help our fellows.

We are aware that the press generally makes life in Great Britain appear intolerably hard just now, and occasionally features life in Germany as just a little more intolerable. As two medical men who know both worlds and have seen the slow hunger and helplessness that have so embittered our ex-enemy protectorate we venture to cast a little shame on us all and beg that we be allowed to relapse into Christianity, which we have fought for, and so long-denied in our dealings with these people.

N. SAUNDERS
Lübeck. L. F. LEVY.

_ In our issue of Jan. 25 (p. 158) an appeal for money to buy penicillin for Germany was made by the Ecumenical Refugee Commission, 21, Bloomsbury Street, London, W.C.1.—ED. L.

CHILBLAINS

SIR,—I have been using calciferol in the treatment of chilblains for several years, and agree with Dr. Phelan (Jan. 25) that it is a most potent curative agent; but it seems to be less valuable in prophylaxis.

I have always administered calciferol in the form of high potency 'Ostelin' tablets (50,000 I.U. per tablet): 1 tablet daily is given, irrespective of age, until cure or marked improvement is apparent—which is often in less than a week. After that 1 tablet is given three times a week for several weeks, to prevent relapse. In severe cases in adults I sometimes start by giving 1 tablet twice daily. Most cases are quickly cured by this treatment, and no ill effects have been noticed.

Troon. JAMES ROSS.

PAYING THE ANÆSTHETIST

SIR,—Anæsthetists will, I am sure, appreciate the emphasis in your leading article of Jan. 4 on their responsibilities at a surgical operation.

The wide range of the anæsthetist's duties, which is still not recognised, will not, I fear, of itself attract enough suitable recruits to the specialty. To ensure that they are forthcoming the remuneration will have to be considerably improved.

Outside the teaching centres it is exceptional for an anæsthetist, however competent, to be able to earn a living solely by the practice of his specialty, and nowhere does he enjoy a reward comparable to that of his colleagues otherwise engaged. The tradition of high surgical fees and low anæsthetic fees will not be ended until the advantages of having skilled anæsthetists are appreciated. And who will champion the anæsthetist's interests?

The addition of higher anæsthetic fees to the already high cost of surgery would, I believe, be unfair on most patients, to whom the cost of surgery must already be well-nigh insupportable. How then is the anæsthetist to receive a proper reward for his services?

An operation requires a team consisting of surgeon, anæsthetist, and assistant, upon whom responsibility devolves in that order, with, as you have emphasised, a close bracketing of the first two. It would seem reasonable to charge the average patient an inclusive fee for the team's services and to remunerate its individual members out of that sum by a division which fairly reflects the responsibility of each. Opinions will differ as to the division, but long experience and much thought lead me to suggest that a fair division would be: surgeon 60%, anæsthetist 30%, and assistant 10%.

The institution of a scheme such as this would, I believe, be gratefully welcomed by the public; while adequately remunerating the surgeon it would establish the practice of anæsthesia on a financial basis satisfactory enough to attract sufficient able recruits.

Bournemouth. S. F. DURRANS.

CHEST DISEASE IN RAND MINERS

SIR,—An error has crept into your annotation of Dec. 28 (p. 952). You say, "The miners are examined every three years after an initial examination . . ." As a matter of fact all miners were examined every six months during the period covered by the Miners' Phthisis Medical Bureau Report—the three years ended July, 1944. Since then the Act of 1946 has modified this proviso, and miners with less than six years' continuous or cumulative service need only be examined once every twelve months. However, miners with continuous or cumulative service of more than six years must still be examined every six months, as has been the law for many years past.

This matter is of great interest to those concerned with the control of silicosis. In the opinion of all of us who have had lengthy experience with this disease, the initial examination, by eliminating persons who are likely to be more than ordinarily susceptible to dust inhalation, plays a not inconsiderable rôle in reducing the incidence of silicosis; and the periodical examination, by influencing the retirement from the industry of a certain number of early cases of silicosis, is often an important factor in preventing the progress of the disease or at least greatly slowing it down.

A. J. ORENSTEIN
Rand Mines Ltd., Johannesburg. Chief medical officer.

SIR,—It might be instructive to compare the conclusions drawn in your annotation of Dec. 28 with those we carried away from visits to various hospitals and mines in Johannesburg and district in October, 1944.

In the first place, the statement "no form of mass radiography has yet been introduced" seems peculiar, as we saw the miniature radiography equipment installed at the Witwatersrand Native Labour Association Ltd. Hospital. With this equipment the officer in charge of the X-ray department, K. G. F. Collander, told us that he could examine the chests of about 500 natives in a forenoon. We were also led to believe that native workers were examined by X rays at intervals of approximately 6 months, especially those in whom some abnormality had been found. Here we were shown some miniatures of a very high standard, as well as the large plates from the same case.

With regard to the factors concerned in the spread of chest disease, we were told, in the mine we visited, that the air was dried, in an endeavour to prevent the incidence of silicosis and tuberculosis; yet, in almost his next breath, our guide drew our attention to the large water tanks throughout the mine, all open to the air. On the actual drilling face we found a thick moist warm fog through which it was impossible to see for more than a yard or two; to us this appeared to be the perfect place for the production of silicosis, yet there was no evidence of any prophylactic face-masks being worn.

We note with interest your statement that any miner found to have phthisis is forced to stop underground work. We were informed (though our information may have been false) that native workers suffering from phthisis were given a choice similar to that allowed to cases of silicosis. As the pension awarded was stated to be equivalent to a year's pay, the natives almost invariably chose to continue work in the mines, a choice tantamount to signing their own death warrant, since tuberculosis is known to have a high mortality among natives.

In conclusion, a word about the treatment of native workers suffering from chest diseases. During a brief visit to the W.N.L.A. Hospital, no case of chest disease was seen, but at the Infectious Diseases Hospital at Rietfontein we found that the admission of more than minimal numbers was impossible owing to shortage of staff. In a further hospital near the centre of the city this shortage of staff was responsible for several new wards for the treatment of tuberculous cases remaining unopened.

London, S.W.10.

J. F. D. FRAZER
J. I. WALKER.

MEDICAL ASPECTS OF MARRIAGE GUIDANCE

SIR,—Dr. Griffith's comprehensive survey last week raises a question which is discussed in the medical press less often than I would wish.

There is general agreement that ignorance of erotic technique among married people is a bad and deplorable thing. The intelligent and sane study of erotics as an art and a source of pleasure and satisfaction seems to me to be the mark of a civilised community, just as is skill in the preparation of food. Yet anyone who attempts to publish an explicit account of the variations and methods of this study is likely to find himself the butt of a silly and humiliating prosecution, in which, as in a recent case where a medical man was prosecuted and resoundingly acquitted, he is liable to find himself in company with the writers of erethistic books on torture and of other paper-backed works which are simply printed symptoms of abnormal behaviour-patterns. Even a work directed wholly to medical readers may not escape criticism.

The real offence lies in directing instruction to the general public at a reasonable price. The idea of illustrating such a work to make it intelligible would raise any publisher's hair. Our own society takes a view which is probably unique.

This is one of the forms of stupidity for which we, or rather our patients, pay in loss of normal enjoyment, and in the guilt and malaise which accompany sexual distortion. The range of normal variation in sexual practice is wide enough to satisfy all but the grossly deranged; but unless they can read French or Latin they have no means of informing themselves.

I wonder how our health would fare if the entity which is optimistically described as "public morality" took the same view of cookery as it does of sexual technique. The anomaly is one which medical opinion cannot itself remove; but medical protest might in time persuade the public at large to remove it.

PHYSIOLOGIST.

THE NURSING CRISIS

SIR,—Your leading article last week cannot claim to be comprehensive in its dealing with this problem of nursing shortage.

You lay emphasis on the disadvantages of the standard Rushcliffe range of salary, pointing out that the policy of uniformity has made it impossible for some hospitals to offer any compensatory advantage. This is not true. The Rushcliffe scale has only established a national *minimum* range of salary. There is nothing to prevent a hospital paying more, except that this extra would not qualify for the 50% grant which the Ministry of Health is prepared to give to cover the increased costs to them by adopting the scale. Less attractive hospitals can, therefore, increase this minimum in order to secure nurses.

Cardiff.

DAVID G. MORGAN.

*** We are obliged to Dr. Morgan for drawing attention to a gap in our article: we should have explained how the minimum scale has come to be regarded as a maximum. He is no doubt technically correct, but the Rushcliffe policy of uniformity is none the less a reality. Though the committee was appointed to draw up "agreed" scales of remuneration, it has used its influence to ensure that its "recommended salaries and emoluments" shall be generally adopted without additions by individual hospitals or authorities. Its attitude was made clear in its first report (1943), which spoke of "undesirable competition for staff between different hospital authorities" and said that "the national *adoption of the scales we have drawn up* will bring such competition to an end."—ED. L.

LEPTOSPIROSIS CANICOLA

SIR,—Dr. Klein (Jan. 4), commenting on the paper by Dr. Baber and myself,[1] states that Professor Lukes was the first to identify *Leptospira canicola*. I should like to point out that I have acknowledged Lukes's pioneer work on Stuttgart disease in a recent paper,[2] but I cannot admit his identification of this organism. The spirochæte found by Lukes and Debrek[3] in th kidneys of affected dogs was called by them *Spirochæt melanogenes canis* and was said to be highly virulen for guineapigs. Later, in 1926, Lukes admitted certai technical errors in his earlier work and implied that th virulence had not been established. I quote from Wirth[4] "Lukes später (1926) selbst wörtlich: 'Wir müssen abe zugeben dass uns die Arbeiten von . . . auf Irrweg geführt haben . . . *so dass wir die Mehrzahl* unsere Versuche weglassen müssen und nur seltene als positi bezeichnen.'"

Although its feeble virulence for the guineapig is on of the major features distinguishing *L. canicola* from *L. icterohæmorrhagiæ*, this somewhat equivocal information does not prove that Lukes was working solely wit the first organism. Again the transmission of Stuttgar disease to animals does not identify the organism in th inoculated material as *L. canicola*. Wirth[5] showe experimentally that rat leptospiræ (which are neve *canicola* strains) could occasionally produce typica Stuttgart symptoms in dogs, and suggested[6] that th symptomatology depended as much on the age an resistance of the infected animal as on the infectin strain. It is of course now well established that Stuttgar symptoms in dogs are usually caused by *L. canicol* but the fact that they can on occasion be produced b *L. icterohæmorrhagiæ* invalidates any claim to identi fication on this ground. Accordingly, I consider tha Klarenbeek and Schüffner[7] who first isolated and sero logically differentiated *L. canicola* must be accorded th credit for its first identification.

The earlier work of Lukes and his colleagues is o sufficient intrinsic merit to obviate any necessity fo a claim which cannot be substantiated; I freel acknowledge that some of the spirochætes seen by Luk as early as 1910[8] *may* have been *L. canicola*.

Central Public Health Laboratory,
Glasgow.

R. D. STUART.

FATAL USE OF A DANGEROUS UNIVERSAL DONOR

SIR,—It is to be hoped that all clinicians who ord or give a blood-transfusion will appreciate the importan of Dr. Tovey's letter (Feb. 1), in which he abho the use of the term "universal donor." It is certainl one which should have been discarded by now, thoug it is still employed quite generally by doctors; an because of unfortunate propaganda it is now well established in the lay mind. Many blood-donors who find th they are not of the "universal group" feel that th are not required, which is particularly unfortunate i the case of group-A donors. As group-A and group people are, roughly speaking, numerically equal, patients were grouped before transfusion the deman for A and O blood could be made nearly equal; peop of groups B and AB can of course be used to provi plasma. *With donor panels decreasing* in most region the urgent need for group-to-group transfusion cann be too strongly emphasised.

It is perhaps unfortunate that the human organis can survive *considerable insults in respect* of incompatible transfusion; I know of a group-O patient wh was recently given in error 2 pints of group-A blood, an who was none the worse for it. The fact that a clinicia

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1. Baber, M. D., Stuart, R. D. *Lancet*, 1946, ii, 594.
2. Stuart, R. D. *Vet. Rec.* 1946, 58, 131.
3. Lukes, J., Debrek, M. (1923) cited by Lukes, J. *Ann. Inst. Pa* 1924, 38, 523.
4. Wirth, D. *Wien. tierärztl. Mschr.* 1935, **22**, 129.
5. Wirth, D. *Tierärztl. Rdsch.* 1935, **41**, 1.
6. Wirth, D. *Wien. tierärztl. Mschr.* 1939, **26**, 353.
7. Klarenbeek, A., Schüffner, W. *Ned. Tijdschr. Geneesk.* 193 77, 4271.
8. Lukes, J. *Rec. Méd. vét.* 1910, 87, 376.

y “ get away ” with transfusion of blood of the wrong oup has in some instances established a somewhat sual attitude to transfusion, with the omission of direct mpatibility tests—an attitude engendered in the first stance by the erroneous conception of the universality “ universal ” blood. I think it is a pity to suggest at direct compatibility tests can be omitted even here urgency is too extreme to permit of such a test.” ely the patient can and should be saved temporarily the use of plasma until correctly matched blood is ailable. As an aid to routine compatibility tests in ose patients who may require blood urgently (I refer severe postpartum hæmorrhage), it should be an tomatic procedure that when a woman goes into bour, particularly at home, a specimen of her venous ood is withdrawn into a sterile tube. Her serum is hen available for the direct compatibility test should he require blood.

DOUGLAS MCRAE
Director.

Blood Transfusion Service, Edinburgh
and South-east Scotland Region.

Parliament

THE SCOTTISH BILL IN COMMITTEE

ON Jan. 28 a standing committee of the House of Commons began the consideration of the National Health Service (Scotland) Bill under the chairmanship of Mr. G. MATHERS. The people of Scotland, Lieut.-Colonel WALTER ELLIOT declared, had themselves done a great deal to provide effective health services, and he feared that the Bill's policy of centralisation might slow up this process. Therefore, in their criticisms and amendments of the measure, the Opposition would seek rather to lay emphasis on that danger.

THE HEALTH SERVICES COUNCIL

Mr. J. S. C. REID moved an amendment to clause 2 designed to make the ambit of the Health Services Council as wide as possible so that it could advise upon services not yet in operation as well as existing ones. Mr. J. WESTWOOD accepted the amendment in the spirit in which it was moved, as helpful in providing a more comprehensive service. The amendment was agreed to. He also accepted an amendment, which was agreed to, providing that the council should be allowed to appoint its own members on the standing advisory committees instead of their appointment being made by the Secretary of State after consultation with the council.

Colonel ELLIOT moved an amendment to omit the proviso enabling the Secretary of State to refrain from laying before Parliament the report of the council if he was satisfied that it would be “contrary to the public interest.” The danger of unauthorised disclosure, he held, was completely covered by the Official Secrets Act. But, Mr. WESTWOOD insisted on retaining this safeguard, and the amendment was negatived.

On the question that clause 2 stand as amended part of the Bill, Mr. Westwood, without pledging himself to accept any particular suggestions, promised to consider any proposals to secure as comprehensive and as good a health service as could be provided for Scotland. In setting up the advisory committees he had in mind the appointment of medical, nursing, hospitals, mental health, dental, and pharmaceutical committees; and it might be that the idea of other committees would crop up. Because of the special health problems in those areas a Highlands and Islands committee would also be set up. Each standing advisory committee under clause 2 would be empowered on their own initiative to advise on any matters connected with their special services. Both the Secretary of State and the main council might refer to a standing advisory committee.

TEACHING AND RESEARCH

Mr. REID, in moving the omission of subsection (2) of clause 3 which throws upon the Secretary of State responsibility, in providing hospital and specialist services, to make available facilities for clinical teaching and research, affirmed that if there was to be a flourisl school of medicine there must be close and frie relations between the university and the hospita which the clinical teaching took place. The Secretar State and his permanent officials were not the r people to deal with the four universities in Scotl and dictate to them what clinical teaching they ough have. The Scottish universities would be put int position of inferiority and have to take what was g to them. If the Bill passed in its present form Mr. viewed with apprehension the future of Scotland resort for foreign students of medicine. Sir JOHN GRA KERR, F.R.S., pointed out that a university or med school was not independent of the teaching hospi they were inextricably entangled one with the other constituted a unity which was important to the wel of the whole health service.

Dr. STEPHEN TAYLOR felt that the English Bill a considerable advantage over the Scottish Bill the way it treated its teaching hospitals. There w great deal to be said for a teaching hospital ha a considerable degree of autonomy. The commi should take special thought for the protection of re because it was desirable to give the rebel in medi the maximum opportunity for developing himself from excessive supervision. But Dr. Taylor did not t that the proposal to omit this subsection achieved object. The Secretary of State clearly must have duty of considering the size of the medical labour f which he would require in the future. Therefore, he m make some kind of decision as to how many pe were needed in the medical school, and how m clinical teaching was required. Dr. Taylor had he *it said that owing to the popularity of the Edinbu* school the ratio of students to clinical teaching in Royal Infirmary had become increasingly unsatisfact He thought that the regional board might also not a desirable body to nominate the teaching hospit The Secretary of State could take a nation-wide in deciding how big a medical force would be nee But once the teaching hospitals had been chosen Taylor thought it would be an improvement to them the kind of autonomy they had under the Eng Bill.

Mr. G. BUCHANAN, Joint Under-Secretary of S for Scotland, said that the Bill did not affect teac at all; teaching remained the duty of the univers The Secretary of State provided the facilities for teach but in no sense did he interfere with what had alw been the historic privilege of the universities. Scottish set-up, he thought, was superior to the Eng one. On this issue the local authorities, the Bri Medical Association, and the universities were in princ agreed. The only body against the scheme was British Hospitals Association. In Scotland the teach hospitals played a much larger part in the provisio bed accommodation than in England. If the teach hospitals were set apart from the ordinary regio work a serious disservice would be caused. It proposed to set up for the teaching hospitals a sepa board of management which would not be responsibl the regional board. He hoped to see teaching hospi expanded rather than contracted. It was proposed give the universities representation on every board management, and the only condition imposed was t if there was a substantial amount of teaching the uni sity should have a larger representation. The Gove ment went further still and said that the staff should represented on the board. These were more import and far-reaching proposals than the English ones. amendment was negatived by 34 votes to 18.

QUESTION TIME

Special Diet for Invalids

Colonel M. STODDART-SCOTT asked the Minister of F how many times the Food Rationing (Special Diets) Advis Committee had met during the last six months of 19 and how many medical men were present on each occasio Mr. JOHN STRACHEY replied: Applications for special rat for individual patients are not taken to the committee a whole, but are sent by the secretary to at least two mem of the committee, the two members most qualified to d

camp he came to this country in 1939. Eventually he became assistant medical officer of health to the West Hartlepool corporation, an appointment which he held until his death.

Apart from medicine, Lissauer's interests were centred in his home and in the faith of his forefathers. His mind possessed a sparkling quality which, together with his urbane manner and sensibility, always suggested a Gallic origin, perhaps the result of a French bias in his early education. His death was keenly felt by his colleagues, who salute a life of brave endeavour. He is survived by his wife, Dr. Charlotte Lissauer, of the Middlesbrough school health service, and by one young daughter.

J. C.

Diary of the Week

FEB. 9 TO 15

Monday, 10th

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
3.45 P.M. Prof. F. Wood Jones, F.R.S.: Structure of the Perineum.
5 P.M. Dr. David Slome: Physiology of the Kidney.
MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1
8.30 P.M. Dr. Geoffrey Marshall, Mr. C. Price Thomas: Surgical Treatment of Pulmonary Tuberculosis.

Tuesday, 11th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Dr. Alan Kekwick: Nutrition and the Surgeon.
5 P.M. Prof. J. D. Boyd: Distribution of Vascular Pressor-receptors and Chemo-receptors in the Body.
ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5 P.M. *Experimental Medicine and Therapeutics.* Dr. E. E. Pochin, Dr. R. G. Macfarlane: Radioactive Tracers.
5.30 P.M. *Psychiatry.* Dr. Maxwell Jones: Emotional Catharsis and Re-education with the Help of Group Methods. Dr. Charles Anderson: Aspects of Pathological Grief and Mourning.
CHELSEA CLINICAL SOCIETY
7 P.M. (South Kensington Hotel, 41, Queen's Gate Terrace, S.W.7.) Mr. Kenneth Walker, Mr. N. J. Scorgie, Mr. G. N. Gould: Artificial Insemination.
LONDON SCHOOL OF DERMATOLOGY, 5, Lisle Street, W.C.2
5 P.M. Dr. A. C. Roxburgh: Cutaneous Syphilis.
EDINBURGH POSTGRADUATE BOARD FOR MEDICINE
5 P.M. (Royal Infirmary.) Prof. A. G. Ogilvie, B.SC.: Human Habitat and Social Geography.

Wednesday, 12th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Dr. Kekwick: Nutrition and the Surgeon.
5 P.M. Professor Boyd: Arteriovenous Anastomoses.
ROYAL SOCIETY OF MEDICINE
5 P.M. *Joint meeting with the Scientific Film Association.* Dr. Peter Hansell, Mr. J. P. Stephenson, B.SC., Dr. Brian Stanford: Filmstrip in Medical Teaching.

Thursday, 13th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Dr. E. L. Patterson: Relations and Connexions of the Thalamus.
5 P.M. Prof. W. R. Spurrell: Physiology of the Alimentary Tract.
ROYAL SOCIETY OF MEDICINE
5 P.M. *Ophthalmology.* Mr. R. Affleck Greeves, Prof. B. W. Windeyer, Dr. M. Lederman: Radiotherapy in the Treatment of Non-malignant Superficial Eye Lesions.
LONDON SCHOOL OF DERMATOLOGY
5 P.M. Dr. G. Duckworth: Chronic Pyodermias.
EDINBURGH POSTGRADUATE LECTURE
4.30 P.M. (Royal Infirmary.) Mr. A. Logan: Prognosis in Empyema Thoracis. (Honyman Gillespie lecture.)

Friday, 14th

ROYAL COLLEGE OF SURGEONS
5 P.M. Sir James Walton: Hunterian Ideals Today. (Hunterian oration.)
ROYAL SOCIETY OF MEDICINE
3.30 P.M. *Joint meeting with the Tuberculosis Association.* (26, Portland Place, W.1.) Mr. A. L. d'Abreu, Dr. I. W. Magill, Dr. Joan Millar: Anæsthesia for Major Thoracic Surgery in the Tuberculous.
ROYAL MEDICAL SOCIETY, 17, Melbourne Place, Edinburgh
8 P.M. Dr. R. W. Durand: The Doctor, the Patient, and the Law.

On Active Service

AWARDS

M.B.E.

Major **TURNER MCLARDY**, M.B. Glasg., R.A.M.C.
Major **N. C. WELPLY**, M.R.C.S., R.A.M.C.
Captain **SARDAR AHMED**, I.A.M.C.

MENTIONED IN DESPATCHES

Notes and News

WAR OFFICE DEMAND FOR JUNIOR OPHTHALMOLOGISTS

THE Central Medical War Committee is informed that, because of the shortage of ophthalmologists available for military service, the War Office is prepared to employ, as trainee ophthalmologists with a view to early grading as graded specialists, a number of men who, although not at present of graded specialist status, have held resident appointments for not less than six months in ophthalmic hospitals or ophthalmic departments of general hospitals in the United Kingdom, and are recommended by the ophthalmologists under whom they have worked as being competent to deal with errors of refraction, to perform minor operations of the eye, and to treat the common diseases of the eye.

A large part of the ophthalmic work in the Army falls under these headings, and if men with the limited experience referred to were available to deal with such work, the cases requiring the attention of a fully trained ophthalmic specialist could be concentrated at special centres in the home and overseas commands, and greater economy in the use of the specialist officers would thus be effected.

The Central Medical War Committee is now considering the recruitment of young practitioners whose experience of ophthalmology is such as to satisfy the Army's requirements as stated above. It invites applications from practitioners who will shortly complete junior resident appointments in eye hospitals or eye departments and who would like to undertake their military service at this stage as trainee ophthalmologists. Communications should be addressed to the secretary of the committee at B.M.A. House, Tavistock Square, London, W.C.1.

SCOTTISH NURSING

IN Scotland, as elsewhere, nursing recruitment reflects general labour conditions, being good in times of industrial depression and poor in times of prosperity.

The Scottish Advisory Committee of the Nuffield Provincial Hospitals Trust have lately published a report[1] by their medical committee on hospital staffing which reads like the refrain of an old song. All the usual troubles are there: the proportions of trained staff to total staff, and of nurses to patients, are not high enough; there are too few nurses to relieve during off-duty times and in case of sickness among the staff; the 96-hour fortnight is rarely possible; students suffer strain from combining nursing duties with study, and they do too much domestic work; trained staff who choose to live out do not get adequate allowances; there are few ways of bridging the gap between school-leaving age and admission to training; and the impression that nursing is an overworked and understaffed profession is justifiably widespread.

Cheerfully and calmly the committee set out the known remedies. The 96-hour fortnight should be enforced. The ratio of staffing in the wards of a general hospital or a sanatorium should be 1 nurse to 1·5 patients; in a fever hospital the ratio should be 1 to 2; in a maternity unit or a children's hospital 1 to 1. Much more, and much better, domestic help is needed. They remind hospitals politely of the part parsimonious administration has played in creating the present adverse impression among potential recruits. They suggest that experiments in the three-shift system should be tried. Nurses' homes should be managed with a more liberal outlook, and without irksome regulations. A simple matrix test, employed at Crichton Royal Hospital, has made it possible to recognise early those applicants who will have little difficulty in passing examinations, and it might, they think, be more widely applied. They recommend the block system of training, and advise the employment of orderlies to relieve nurses of unsuitable duties. More use could, they believe, be made of male orderlies, but they do not foresee much scope for the employment of male nurses in acute general hospitals.

It is noteworthy that there is a disinclination among entrants to the profession to become assistant nurses. "Girls who are attracted to nursing as a career want to become State-registered nurses in the full sense of the term, not to become an admittedly inferior type of nurse, expected to spend a considerable part of her time doing domestic work."

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[1] Nursing Staffing in Hospitals, 1946. Copies may be had from the Secretary to the Scottish Advisory Committee, 10, Duke Street.

The last part of the sentence indicates the light in which the nursing profession at present regards the assistant nurse. The committee suggest that the whole question of the "assistant nurse" should be reviewed—an opinion with which we cordially agree.

A WELL-ESTABLISHED CEREBRAL PALSY UNIT

AT Queen Mary's (London County Council) Hospital for Children, at Carshalton, a cerebral palsy unit, the first to be set up in Great Britain, has been active since 1943.[1] An average of 14 children at a time receive treatment along the lines laid down by Prof. W. M. Phelps, of Baltimore; and many of them improve enough to attend a school for physically defective children, while a few become fit for a normal school life. Most of them are helpless and bedridden on admission, but as they are usually normally intelligent they can learn to manage their disability, in time being able to feed, wash, and dress themselves, and to take part in the communal life of the unit. The unit provides for observation, diagnosis, and intensive treatment in surroundings which maintain the atmosphere of a residential nursery rather than a hospital ward. The numbers under treatment are soon to be increased to 20; and later it is hoped to take 40, and finally 60, when it is estimated that between 120 and 150 could be treated yearly. The head therapist of the unit has had training and experience in the Phelps method of treatment. The education committee of the council have been asked to help in finding suitable schools for children on discharge; and close links are being made with St. Margaret's, the new voluntary school for children with cerebral palsy recently founded at Croydon.[2] Proposals for increasing the staff of the unit are being put before the council.

TEACHING BY FILM

A YEAR ago the Royal Society of Medicine and the Scientific Film Association met to discuss the application of the cinema in medical teaching. A report of the discussion has now been published in a booklet[1] which covers the principles and practice of teaching by film and reveals a strong demand for short silent illustration films in preference to long film lessons. The booklet also includes a list of subjects on which films would be welcomed by teachers of medicine; this will be a useful guide to intending film makers. On Feb. 12 another joint meeting is to be held at the Royal Society of Medicine (5 P.M.), the subject for discussion being the use of filmstrip in medical teaching.

A PATIENT'S VIEW

Mr. Wilson Midgley, editor of *John o'London's Weekly*, has described his experiences in a general hospital ward.[1] With an artist's eye, and a journalist's appreciation of their true interest, he has seen all those daily episodes of the ward that we so easily take for granted, and perhaps even find humdrum. He has translated them into a series of essays, clearly and charmingly written, and though he writes primarily for a public unversed in the ways of hospitals, and perhaps often unduly apprehensive of them, almost every essay contains something, either of praise or well-weighed criticism, which we should heed. Whether he is discussing pain, or the qualities that go to make a good sister, or tepid cabbage, or the folly of nursing old men and boys in the same ward, or whether he is just painting pictures of what he sees about him, he writes with insight.

This is a book from which we may learn what we must alter in the future and what we must resolutely retain. Because of its appreciation of the humanity and humour of the life of a hospital ward it also contains much of interest to the potential patient or the would-be nurse.

Royal College of Surgeons of England

During the next months the dinners held in the college for fellows and members and members of the associations linked to the college will take place on the following Wednesdays at 7 P.M.: Feb. 12, March 12, April 9, May 7, June 11, and July 9.

University of Oxford

On Jan. 23 the following degrees were conferred:

B.M.—Granville Freeman, J. B. Walker, E. J. Madden, John Gask, R. A. L. Leatherdale.

Royal College of Physicians of London

At a meeting of the college held on Jan. 30, with Lord Moran, the president, in the chair, the following were elected representatives of the college: Dr. A. S. Barnes on the court of governors of the University of Birmingham; Sir Reginald Bond on the council of the Professional Classes Aid Council; Dr. W. G. Wyllie on the National Association for Mental Health; and Dr. Janet Vaughan on the advisory board of nursing education of the Royal College of Nursing. Sir Allen Daley was nominated to represent the college at the conference of the Royal Sanitary Institute in June.

The following having satisfied the censors' board were elected to the membership:

D. G. Abrahams, M.B. Camb., W. B. Alexander, M.B. Camb., J. V. Almeyda, L.R.C.P., C. L. Balf, B.M. Oxfd, A. H. Baynes, M.B. Camb., Patricia L. Bidstrup, M.B. Adelaide, J. H. Burkinshaw, M.B. Camb., C. R. Burton, M.D. Toronto, James Carson, M.D. Belf., A. G. C. Cox, M.B. Lond., H. D. Crosswell, M.B. Lond., P. H. Davison, M.B. Birm., John Dean, M.B. Camb., R. B. Franks, M.B. Camb., B. F. Gans, M.D. Lond., R. T. Gaunt, M.B. Sheff., K. B. Gibson, M.B. Lpool, William Goldberg, M.B. Witw'srand, K. J. Grice, M.D. Melb., G. R. Handy, M.B. Lond., Margaret M. Henderson, M.D. Melb., R. A. Henson, M.D. Lond., R. D. Hotston, M.B. Lpool, John Lowe, M.D. Birm., Anne E. McCandless, M.B. Lpool, J. A. Malloch, M.B. Edin., E. P. G. Michell, M.B. Camb., E. P. Morley, M.B. Camb., E. J. Moynahan, L.R.C.P., A. P. Norman, M.B. Camb., Gordon Osborne, M.B. Camb., J. H. S. Pettit, M.B. Lond., W. J. E. Phillips, M.B. Camb., J. R. K. Preedy, M.B. Camb., Frederick Prescott, L.R.C.P., W. A. Pritchard, M.B. Lond., E. G. G. Roberts, M.B. Wales, J. B. Robinson, M.D. Lond., N. A. Rossiter, M.B. Witw'srand, Gregory Shneerson, M.B. Lond., John Simpson, M.D. Durh., Eric Smith, D.M. Oxfd, J. B. Stanton, M.B. Camb., T. H. Steel, M.D. Melb., G. H. Valentine, M.B. Brist., captain R.A.M.C., Albert Venner, M.B. Lond., A. P. B. Waind, D.S.C., M.D. Leeds, C. W. M. Whitty, B.M. Oxfd, M. H. C. Williams, B.M. Oxfd, H. H. O. Wolff, M.B. Camb., Max Zoob, M.B. Lond.

Licences to practise were conferred upon the following 96 candidates (70 men and 26 women) who have passed the final examination of the Conjoint Board and have complied with the by-laws of the college:

D. A. B. Ashcroft, J. H. Atteridge, A. R. Baines, D. C. Barker, Mary E. Benians, N. O. Bennett, P. R. Boyd, G. A. Bracewell, D. C. Bradford, Alison M. Brydone, Joyce M. Buck, Irene M. S. Cade, G. H. Carriett, Kenneth Carter, D. J. E. Cheshire, Jeanne M. Clements, Mary M. H. Cogman, C. I. Cohen, J. J. Content, Edward Coupland, K. S. Daber, Sylvia Danks, Barbara M. Davey, Joan M. Denman, Robert Dryden, K. H. Foord, D. S. Foster, Joan Frankton, Angela D. Fuller, P. R. G. Graham, Gordon Hadfield, M. J. Hargrave, B. M. C. Harris, J. A. B. Harrison, A. J. Harrold, Mary W. Hart, F. C. B. Harvey, Hugh Herbert, G. M. Hopwood, Barbara M. F. Jacobs, K. E. Jolles, R. T. Jones, Basil Karat, R. A. Kershaw, C. S. Kirkham, S. A. Lateef, D. D. La Touche, Norman Lees, Ursula E. K. Leitner, Lillian J. Letty, A. H. Levy, F. M. MacDonagh, Anne J. W. Manley, E. D. Marsh, Stefan Mejzner, Christine L. Miller, L. G. Nicol, Jakob Niwes, C. F. Noon, A. G. Norman, Vivienne Norman, F. G. Orton, Mathoor Panikkar, Enid H. Pettigrew, G. S. Plant, I. R. D. Proctor, D. R. V. Prys-Jones, Harry Rawlings, Michael Redfern, E. N. Rees, D. E. R. Richardson, Kathleen J. Rigg, Diana M. Robinson, Sonia Rollin, G. W. J. Rothwell, C. D. Rushworth, R. A. Ryan, A. I. Sahyoun, Joan Seaman, Henry Shapiro, F. J. Sharrod, J. G. H. Shaw, S. G. A. Shute, N. T. Smith, Joan E. T. Spong, Cynthia F. Stephenson, H. S. Trafford, Maxwell Vites, David Walker, N. H. Warburton, J. C. Ward, P. A. M. Weston, H. D. White, R. M. C. Williams, Elizabeth Williamson, G. M. Woodwark.

Diplomas were conferred jointly with the Royal College of Surgeons on those named in THE LANCET of Dec. 21 (p. 930) and of Jan. 18 (p. 123), and on the following:

D.P.H.—J. B. Bramwell, Alan Butterworth, W. A. Cannell, W. J. Christie, C. W. Coffey, J. S. Coleman, Eveline M. Cumming, O. L. Day, H. McD. Forde, A. H. T. F. Fullerton, Margaret R. Gilmour, D. W. T. Harris, R. A. Hoey, E. I. Holloway, G. J. Laws, C. D. L. Lycett, H. G. Magill, J. E. Masterson, B. U. Meyer, Robert Murray, J. J. O'Dwyer, M. J. Pleydell, Isadore Reubin, Arna E. Rides, R. D. Rutherford, Christina M. Small, T. D. Spencer, M. E. M. Thomas, P. de B. Turtle, G. P. Wallace, W. M. Walsh, E. R. Winton.

D.L.O.—W. F. Dickie Clark.

Pharmaceutical Society of Great Britain

On Thursday, Feb. 13, at 7 P.M., at 17, Bloomsbury Square, London, W.C.1, Mr. H. Davis, PH.D., will speak on Chemical and Pharmaceutical Aspects of Anæsthesia.

Lectures on Child Psychiatry

Dr. Michael Fordham and Dr. R. D. Newton will give a course of lectures on child psychiatry at the West End Hospital for Nervous Diseases, 40, Marylebone Lane, W.1, on Monday and Tuesday afternoons from Feb. 10 to March 4. The course is open only to members of the Fellowship of Postgraduate Medicine, 1, Wimpole Street, London, W.1, where further particulars may be obtained.

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[1] Report of the hospitals and medical services committee to the London County Council, Jan. 21.

[2] See *Lancet*, 1946, ii, 354; Jan. 18, p. 108.

[1] The Place of the Film in Medical Education. Scientific Film Association, 34, Soho Square, London, W.1. Pp. 30. 1s.

[1] From My Corner Bed. By Wilson Midgley. London: Chaterson. Pp. 159. 7s. 6d.

Scottish Triple Qualification

The following, having passed the requisite examinations, have been admitted to the licentiateship of the Royal Colleges of Physicians and Surgeons of Edinburgh and of the Royal Faculty of Physicians and Surgeons of Glasgow:

J. D. Bowie, Audry G. Burdett, J. G. W. Cunningham, Matthew Devlin, Pearl I. Evans, William Frame, J. M. Gillies, S. J. Glueck, A. J. Graham, F. H. Hamill, Winifred M. Hiscock, R. J. Kleinglass, George Metz, W. C. Palmer, E. L. Peel, N. W. Preston, I. M. Ratner, J. M. Raynor, Eva Revesz, Stanley Rose, Georgina M. H. Smeaton, Bernard Taylor, W. B. Willder, Richard Wolfson.

Department of Health for Scotland

The Secretary of State for Scotland has appointed Mr. G. H. Kimpton to be an under-secretary in the department in charge of the divisions which deal with health services.

London Hospital Medical College

The Liddle triennial prize for 1946 of £120 has been awarded to Dr. F. O. MacCallum for his essay on epidemic jaundice. Dr. Sheila Sherlock (proxime accessit) has been awarded £50.

Nuffield Fellows from Australia

Winners of 2 of the 12 Nuffield fellowships awarded to ex-Service doctors in Australia last year have left Australia to take up their appointments. Dr. W. J. Simmonds, of Brisbane, holder of a three-year fellowship in physiology, is going to Oxford to work under Dr. F. C. Courtice. Dr. F. L. Ritchie, who holds a one-year fellowship, will take a four-month course at the Brompton Chest Hospital and at Queen Square Hospital for Nervous Diseases in London. He also intends to spend eight months at Sheffield with Prof. C. H. Stuart-Harris.

International Cancer Research Congress

The fourth International Cancer Research Congress will be held in St. Louis, Missouri, from Sept. 2 to 7, under the joint auspices of the Union Internationale contre le Cancer and the American Association for Cancer Research. Dr. E. V. Cowdry, professor of anatomy at the Washington University school of medicine and director of research of the Barnard Free Skin and Cancer Hospital, will preside. Further information may be had from Dr. M. G. Seelig, Barnard Free Skin and Cancer Hospital, St. Louis, 3, Mo., U.S.A.

Blood Shortage in Glasgow

Glasgow is seriously short of blood-donors. War-time reserves of plasma are now exhausted, and not enough donors are coming forward to meet the increasing demand for both whole blood and plasma. Figures given by the Glasgow and West of Scotland Blood Transfusion Service for the week ending Sunday, Jan. 19, show that while the output of blood and plasma, expressed as donors, was 336, the number of donors bled was only 226—a shortage of 110.

Chemists' Federation

At the federation's annual luncheon in London on Jan. 30, Sir Arthur Rucker, deputy secretary, Ministry of Health, expressed his belief that a fine service could be evolved from the National Health Service Act. The patient should, of course, choose his own doctor, "provided that the latest biennial plebiscite of the profession has shown that he is willing to give his advice." Dr. Charles Hill, secretary of the British Medical Association, said that the profession was fighting to prevent its being made into a technical branch of central or local government.

Summer School on Social Biology

The British Social Hygiene Council hopes to hold in Switzerland, during the last fortnight of August, a summer school on Social Biology—its International Aspects. The school *is intended for teachers, social workers, and others* interested in social biology, and it is hoped that there will also be students from other countries. Lectures will be in English. The estimated cost, including travel, board, and tuition, is between £25 and £30.

Early application should be made to the secretary, B.S.H.C., Tavistock House North, Tavistock Square, London, W.C.1.

PENICILLIN FOR INSURED PERSONS.—Penicillin is now sold in two forms—the ordinary yellow form, and "white" penicillin which may be crystalline or amorphous. The Ministry of Health have instructed pharmacists to use yellow penicillin or solution-tablets when dispensing N.H.I. prescriptions for local applications and to reserve white penicillin for eye-drops and preparations intended for injection.

Appointments

EVANS, T. P., M.R.C.S.: M.O.H., Amersham, Chesham, and Beaconsfield.
HAMBRIDGE, RHODES, M.R.C.S.: asst. chest physician, Surrey county council.
LAWRIE, J. H. D., M.D. Edin., D.P.H.: M.O.H., Shoreditch.
MURRAY, CHARLES, F.R.C.S.E.: asst. orthopædic surgeon, Royal Portsmouth Hospital.
STARKIE, COLIN, M.D., B.SC. Manc., D.P.H.: M.O.H., Kidderminster, and asst. M.O., Worcester health department.

Middlesex County Council:

BURNETT, C. W. F., M.D. Lond., M.R.C.O.G.: senior obstetrician, West Middlesex County Hospital.
CALLUM, E. N., F.R.C.S.E., D.T.M.: surgeon, Ashford County Hospital.
CHESTER, A. W., M.D. Durh.: chief asst., obstetric department, Hillingdon County Hospital.
COGHILL, N. F., M.B. Camb., M.R.C.P.: physician, West Middlesex County Hospital.
DAVIES, D. A., M.B. Lond., M.R.C.O.G.: senior obstetrician, West Middlesex County Hospital.
DEANE, M. M., M.B. Melb., A.R.C.P., D.P.M., D.A.: physician, West Middlesex County Hospital.
PEMBERTON, T. M., M.B. N.Z., F.R.C.S.: surgeon, Chase Farm Hospital.
SCHOLEFIELD, JOHN, M.B. Leeds, F.R.C.S.: surgeon, West Middlesex County Hospital.
STEPHENS, T. W., F.R.C.S.E., D.T.M. & H.: chief asst. to thoracic surgeon, Clare Hall Hospital.

Births, Marriages, and Deaths

BIRTHS

BARCLAY.—On Jan. 27, the wife of Dr. G. A. Barclay—a daughter.
GRAHAM.—On Jan. 28, in London, the wife of Dr. Ian Graham—a son.
HARVEY.—On Jan. 27, at York, the wife of Lieut.-Colonel W. G. Harvey, R.A.M.C.—a son.
HILEY.—On Jan. 25, in London, the wife of Surgeon Lieut.-Commander Charles Hiley, R.N.—a daughter.
KENNY.—On Jan. 27, in London, the wife of Mr. W. T. Kenny, F.R.C.S.I.—a son.
KIRSHNER.—On Jan. 29, at Chichester, the wife of Dr. A. Kirshner—a son.
PARTRIDGE.—On Jan. 28, at Worthing, the wife of Dr. A. J. Partridge—a daughter.
PEASE.—On Jan. 29, at Oxford, the wife of Dr. J. C. Pease—a son.
REINOLD.—On Jan. 27, the wife of Dr. D. G. Reinold—a son.
RICHARDSON.—On Jan. 28, at Perth, the wife of Colonel Frank Richardson, D.S.O., O.B.E., R.A.M.C.—a son.
RIGBY.—On Jan. 9, at Lewisham, the wife of Dr. J. P. V. Rigby—a daughter.
WRIGHT.—On Jan. 24, in London, the wife of Captain John T. Wright, R.A.V.C.—a son.

MARRIAGES

HARWOOD—HUGHES-JONES.—On [illegible] London, Robert Paul Harwood, M.R.C.S., R.A.M.[illegible] er,
KEYMER—GRAY.—On Jan. 23, at [illegible] O.B.E., to Mary Rae Gray, M.B.
PALMER—SMYTH-RICHARDS.—On Jan. 21, at West Buckland, Devon, G. R. C. Palmer, M.R.C.S., lieut.-colonel I.M.S., to Mary Smyth-Richards.

DEATHS

AYLWARD.—On Jan. 29, at Tunbridge Wells, Walter Charles Aylward, M.R.C.S., aged 89.
FIDO.—On Jan. 25, in London, Herbert Adamson Fido, M.R.C.S., aged 81.
LAMBERT.—On Jan. 26, at Bucklebury, Berks, Gordon Ormsby Lambert, M.D. Camb., F.R.C.P.
LANKESTER.—On Jan. 30, at Eastbourne, Herbert Henry Lankester, M.D. Lond., aged 84.
MACLEOD.—On Jan. 24, at Bradford, Norman Alexander Macleod, M.D. Glasg.
MOORE.—On Jan. 26, Reginald Mark Moore, M.B. Camb.
SMITH.—On Jan. 30, at Long Eaton, Notts, Reginald Farmery Smith, M.R.C.S.
WHITFIELD.—On Jan. 31, at Eastbourne, Arthur Whitfield, M.D. Lond., F.R.C.P., aged 78.
WRIGHT.—On Jan. 25, at Romford, Essex, Samuel Reginald Wright, M.R.C.S., aged 78.

The first issue of the *Nutrition Bulletin* contains articles on the consumption of milk, the meat ration, school meals, and food education. The bulletin, which is intended for those interested in the application of nutritional knowledge to social welfare and public health, will be issued every two months by the Central Council for Health Education, Tavistock House, Tavistock Square, London, W.C.1. The annual subscription is 3s.

The Ministry of Food bulletin, *Food and Nutrition,* now appears in a new and improved form. This little journal, hitherto hampered by paper restrictions, has proved so popular that it is now to be printed by H.M. Stationery Office, and will be accessible to a wider circle of readers. It appears monthly at a subscription rate of 4s. yearly, and records advances in our knowledge of foods, encourages the study of food values, and answers questions.

He found that 79% of the instances of agranulocytosis occurred between the fourth and eighth weeks after starting treatment. After the second month of treatment, therefore, the period of greatest danger, both from agranulocytosis and from the less alarming complications, can be regarded as past.

As regards the complications after thyroidectomy, most of the cases of tetany were mild and cleared quickly; some of them might easily have been missed if the condition had not been specifically looked for. Similarly, the vocal cords were examined before and after operation as a routine, and it was noted that in some cases a unilateral cord palsy produced only the slightest alteration in function. Postoperative auricular fibrillation usually ceased spontaneously in forty-eight hours and did not lead to cardiac failure.

The incidence of myxœdema is roughly the same in the two series. This suggests that the "antithyroid potency" of the two agents—thyroidectomy and thiouracil—is of roughly the same order. From the practical point of view, however, there is a difference, for the symptoms and signs of thiouracil-induced myxœdema disappear rapidly when the dose is reduced, *whereas surgically induced myxœdema is for the most part permanent*, though easily controlled by thyroid extract.

IMMEDIATE RESULTS

The effects of thyroidectomy and of thiouracil on the minimal waking pulse-rate and on the basal metabolic rate (B.M.R.) in the initial period were as follows:

	THYROIDECTOMY SERIES *Mean*	THYROIDECTOMY SERIES *S.D.*	THIOURACIL SERIES *Mean*	THIOURACIL SERIES *S.D.*
Minimum waking pulse-rate per min.:				
Initial ..	96·3	12·1	99·4	20·0
Final ..	76·3	6·24	84·0	11·2
B.M.R.:				
Initial ..	+19·6%	20·2	+42·6%	14·2
Final ..	−0·7%	15·7	+10·0%	12·0

The figures given above refer to the period in hospital, generally comprising about four weeks in either case; the period from the time of operation to the time of discharge was only about two weeks, and therefore shorter than the period from the start of thiouracil treatment to the time of discharge from hospital.

Sleeping pulse-rates were not as a rule recorded postoperatively; therefore only waking pulse-rates are compared. These show a greater fall in the surgical series. A similar effect is shown with the B.M.R. figures; *but these should be interpreted with caution*, since postoperative estimations were done on only 17 cases.

The surgical patients were not weighed as a routine before leaving hospital, so we cannot compare the changes in weight in the two series. From what figures we have it seems that there is no gain in weight in the first two weeks after operation (the non-specific tendency of any operation to cause a negative nitrogen balance may have been a factor); whereas the thiouracil series gained on an average 6 lb. while in hospital.

Though 9 cases with auricular fibrillation were treated with thiouracil, it was used only as a preoperative measure in 3 of them. Of the remaining 6, 2 patients developed drug-reactions, and thiouracil was discontinued after two and six weeks; fibrillation was still present at that time. Of the remaining 4 patients, 2 had gross arteriosclerotic heart disease; one of these subsequently died of coronary thrombosis, and the other became regular on thiouracil but developed fibrillation again twelve months later. There remain therefore only 2 cases in which the action of thiouracil on fibrillation could be studied. In one of these the heart became regular three weeks after the start of thiouracil therapy; in the other the heart *did not revert to normal rhythm* until quinidine was given in addition. Normal rhythm has continued in both. It will be seen that for a variety of reasons there are not sufficient uncomplicated cases for a fair comparison of the effects of thyroidectomy and thiouracil in thyrotoxicosis with auricular fibrillation.

We conclude that with both types of treatment there was evidence of a considerable amelioration by the time the patient left hospital, *and that possibly this was* greater in the surgical series.

LATER RESULTS

When the patient has left hospital the comparison of results becomes more difficult. For the purposes of general comparison we feel that the best index is the proportion of cases which are both subjectively and objectively free of symptoms of thyrotoxicosis. For this reason we have classified as "apparently cured" those patients who are leading a normal life, free of symptoms (excluding those who admit on questioning to "slight palpitations"), and whose resting (outpatient) pulse-rates are 80 or less per min. Patients who fulfil these requirements *can fairly be considered free* of their thyrotoxicosis. The use of a strict criterion such as this does injustice to any form of treatment, for in both of the present series the proportion of patients who are satisfied with the result is certainly higher than the proportion of those "apparently cured." The latter is therefore to be taken as an index of the effectiveness of a treatment and not as an estimate of the number of cases that can be expected to benefit by it. The results at intervals of three or six months are shown in table II.

TABLE II—GENERAL COMPARISON OF THE EFFECTS OF THYROIDECTOMY AND THIOURACIL

Months after start of treatment	*Thyroidectomy series*		*Thiouracil series*	
	No. of cases	Percentage "apparently cured"	No. of cases	Percentage "apparently cured"
3	87	*20*	69	*32*
6	82	*36*	57	*35*
12	82	*29*	48	*37*
18	85	*32*	31	*45*
24	56	*30*	20	*40*
30	68	*38*	12	*42*

We cannot present any numerical data concerning the time after start of treatment at which patients returned to work. Most of our patients were engaged in housework after leaving hospital, and they progressively increased the amount of work done during the day, so it is impossible to state a definite time at which their work-capacity became normal. So far as we have been able to judge, nearly all cases, of either sex, resumed their usual occupations within a month after leaving hospital.

The figure shows the rate of gain of weight in the two series, the patient's initial weight being taken as the starting-point. Since this figure was obtained in hospital, without outdoor clothes, the gain of weight shown for the first period is over-estimated in both series.

In our observations on eye signs we have distinguished between retraction of the upper eyelids (*lid-retraction*) and true proptosis (exophthalmos). Proptosis does not appear to be directly related to the degree of thyrotoxicosis and was not materially affected by treatment in either series. Lid-retraction, which seems to have a more direct relation to thyrotoxicosis, tended to decline after both thyroidectomy and thiouracil. The time taken for lid-retraction to disappear in 55 cases treated by thyroidectomy and 49 cases treated with thiouracil was as follows:

Months after start of treatment	*Percentage of cases with lid-retraction* *Thyroidectomy*	*Thiouracil*
0	100	100
3	66	89
6	63	69
12	47	65
18	38	35

During the first twelve months the rate of decline was greater in the thyroidectomy series, but at eighteen months lid-retraction had disappeared in about the same proportion in both series.

Apart from lid-retraction, it seems that symptoms disappear at about the same rate whether patients are treated with thiouracil or by thyroidectomy. The methods of measurement used do not permit of fine distinctions, and we do not consider that the data presented here indicate more than that thyroidectomy and thiouracil are of the same order of effectiveness.

Most of the patients treated with thiouracil still have a goitre. Whether such a persistent goitre is preferable to a thyroidectomy scar or not remains a matter for debate; a great deal depends on the quality of the scar, which in some cases may be almost invisible but in others may be extremely ugly. In 8 of our thiouracil cases an initially large goitre has become impalpable, or palpable only with difficulty. On the other hand, the 5 cases which have shown signs of myxœdema have simultaneously developed an enlargement of their goitres; when the dose of thiouracil was reduced the signs of myxœdema disappeared and the goitres reverted to their original sizes.

REMISSIONS AFTER THIOURACIL

In 25 cases which had shown a good response to thiouracil treatment was suspended, and the patients were kept under observation. In 3 cases thiouracil had been administered for six months or less, in 9 cases for twelve months, in 7 cases for eighteen months, and in 6 cases for twenty-four to thirty months.

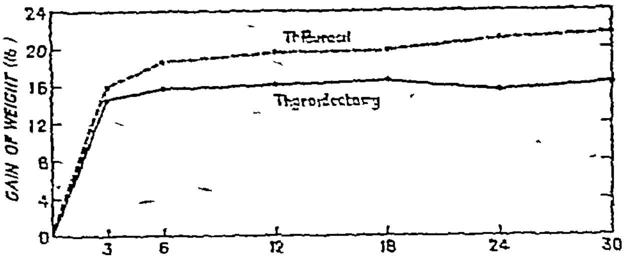
In 7 of the 25 cases symptoms and signs of thyrotoxicosis have recurred and thiouracil has had to be started again. Of these relapses, 1 occurred six months after the treatment was stopped; 2 occurred twelve months, and 4 between eighteen and thirty months after stopping treatment. There is thus a variable latent interval before the symptoms recur, and the true relapse-rate cannot be determined until the cases have been followed for a longer period. Only 6 cases have so far been observed for eighteen months or more after treatment was stopped, and 4 of these have relapsed. It cannot yet be said with confidence that thiouracil can induce permanent remissions of thyrotoxicosis.

The duration of thiouracil therapy may have some bearing on the subsequent relapse-rate, after treatment is stopped. Thus all 7 of our relapses occurred in the 12 patients who had been treated for twelve months or less, whereas none have so far occurred in the 13 patients whose course of thiouracil was longer than twelve months. The small number of cases and the variable periods of observation do not permit of a firm conclusion on this point; but we are sufficiently impressed by our findings to suggest that, when long-term treatment with thiouracil is used, it should be continued for at least twelve months, however good the response has been.

DISCUSSION

From the data presented here the following comparisons may be drawn between long-term thiouracil therapy and thyroidectomy: (1) thiouracil therapy is applicable to roughly the same proportion of cases of toxic goitre as would be operated on by the average surgeon; (2) the death-rate with thiouracil is probably less than that of thyroidectomy in the hands of the average surgeon, and the incidence of other complications is not notably greater than after thyroidectomy; (3) the immediate effect of thiouracil on thyrotoxic symptoms is well marked though probably not so rapid as that of thyroidectomy; and (4) the long-term effects of the two types of treatment are not significantly different.

We consider that these findings justify the provisional use of thiouracil as a long-term treatment of toxic goitre.



Average gains of weight after thyroidectomy (93 cases), and after thiouracil (65 cases).

All patients with toxic goitre can be treated in this way except those with signs of tracheal compression, those with severe drug-reactions, and those who cannot be seen at regular intervals. The initial dosage used in the present series (600 mg. daily of methyl-thiouracil for three weeks) may be unnecessarily high, for in the average case of toxic goitre the speed with which the symptoms are brought under control is not of great importance. We are considering a trial of smaller doses but as yet have no experience to offer.

In the present series white-cell counts were performed weekly while the patient was in hospital and at every subsequent attendance (at intervals of two to four weeks). We do not recommend this practice for general adoption, for two reasons: first, because the only major catastrophe to be feared—agranulocytosis—develops with such suddenness that these relatively infrequent blood-counts are little safeguard; secondly, because reliance on routine blood-counts tends to produce a sense of false security and diverts attention from the only real protection. This is, that every patient should be told that if he develops a sore throat or fever he must immediately discontinue the thiouracil and report to the doctor. It is the doctor's duty, on seeing such a case, to arrange for an immediate blood-count; if this shows a severe leucopenia, treatment with penicillin and other agents is urgently required.

SUMMARY

A total of 65 cases of toxic goitre have been treated throughout with the thiouracil series of drugs. The cases have been followed for periods of up to thirty months and compared with a similar series of 93 cases treated by subtotal thyroidectomy.

The reduction in pulse-rate and B.M.R. during the first three weeks of treatment with thiouracil was similar to, but probably of lesser degree than, that produced by thyroidectomy in the same period.

From three to thirty months after the start of treatment there was no appreciable difference in the condition of the patients treated with thiouracil and those treated by subtotal thyroidectomy.

Since the mortality from thiouracil is less than the overall mortality from subtotal thyroidectomy, the continued use of this series of drugs appears to be a good alternative treatment of toxic goitre.

Thyroidectomy is, however, advisable when tracheal obstruction is present, when a drug-reaction occurs, and when the patient is unable or unwilling to attend regularly for review for an indefinite period.

In 25 cases the administration of thiouracil was stopped after from three to thirty months' treatment, and 7 cases relapsed, but no relapse has so far occurred in the 13 patients who had been under treatment for a year or longer. But in the group as a whole the longer patients were followed after the cessation of treatment the more frequently did relapse occur, and it is impossible as yet to say whether such remissions can be permanent.

We wish to thank the physicians and surgeons of University College Hospital for their generous coöperation.

BLOOD-VOLUME CHANGES IN PROTEIN DEFICIENCY

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IN a previous report the clinical condition of Indian prisoners-of-war evacuated from Japanese prison camps was described (Walters et al. 1947). From a selected group of these patients further information has been obtained about the plasma and total circulating volume. It has generally been assumed that in malnutrition the blood and plasma volumes are decreased, but the exact extent of the fall, so far as is known, has never before been measured, nor has the rate or pattern of recovery been observed.

METHODS

Hæmoglobin (Hb) was estimated by the acid-hæmatin method with an Adams diluting-type hæmoglobinometer with a Sahli-Adams square-sectioned diluting tube. The instrument, including the one pipette used throughout, was calibrated by the alkaline-hæmatin method of Clegg and King (1942) from two separate specimens of hæmin, one from Prof. E. J. King, of the British Postgraduate Medical School, and one from Major M. Hynes, R.A.M.C., of the G.H.Q. (India) Anæmia Research Team. The two specimens gave identical results.

Red blood cells were enumerated in a Spencer "bright-line" counting chamber with an "improved Neubauer" ruling. The dilution was made in each of two calibrated pipettes, and two counts were done on each dilution. The recorded result was the average of the four counts done on every specimen of blood.

The *hæmatocrit* was done in a Wintrobe tube, the Wintrobe oxalate mixture being used as an anticoagulant. The tubes were spun at 2500 r.p.m. for 1 hour.

The *serum-protein* level was measured by the copper-sulphate specific-gravity method of Phillips et al. (1945). There is now ample evidence (see, for example, Hoch and Marrack 1945) to show that this method is reliable, and repeated checks with the micro-Kjeldahl and biuret methods have confirmed this. When unusually low figures were obtained, the results were checked chemically. All determinations were made on serum, and the relation

$$Pr = 343\ (G_p - 1{\cdot}0070)$$

was used throughout, where Pr = serum-protein concentration in g./100 ml., and G_p = serum specific gravity. This relation was found to be correct for the low serum-protein figures found in patients with malnutrition, but gave results up to 5% too low in normal and recovered patients. For convenience, however, all results have been expressed in terms of this relation.

The *albumin/globulin ratio* was measured by the biuret method, half-saturated ammonium sulphate being used as a precipitating reagent, and checked by the micro-Kjeldahl method using 22% sodium sulphate.

Surface area was calculated from body-weight and height by the Du Bois formula.

Plasma volume was measured by the Evans blue technique. The colour matching was done on diluted plasma without any previous removal of proteins with an improved form of the pocket photometer described by King and Delory (1944). This instrument, using an Ilford spectrum-orange light-filter, is well suited to plasma-volume determinations, and it is felt that such errors as arose were physiological rather than technical. Samples were withdrawn 10, 20, and 50 min. after injection of the dye, and the plasma volume at zero time was determined graphically.

Blood-volume was determined from the plasma volume and the hæmatocrit. It is assumed that the peripheral hæmatocrit gives a true estimate of the red-cell plasma ratio for the whole circulation—i.e., (1) that there are no large stores of non-circulating red cells, and (2) that there is no great quantity of plasma in cell-free films in the small vessels of the peripheral circulation. Errors caused by the invalidity of these two assumptions are in the opposite sense and tend to cancel each other. With regard to assumption (1), Ebert and Stead (1941) could find no evidence of red-cell stores in man. If assumption (2) is incorrect, the blood-volume measured would be too high, because the estimate of the red-cell volume from the plasma volume and hæmatocrit would be too high.

Preliminary measurements with the differential agglutination method (McMichael et al. 1943) and with the carbon-monoxide method (Hopper et al. 1944) indicate that there is little difference between the dye method and the more direct methods of determining red-cell volume. On the other hand, the radioactive iron method of Hahn et al. (1942) and the radioactive phosphorus method of Hevesy et al. (1944) indicate that blood-volumes measured by the dye method are some 10% too high. If this were so, the data given for the total circulating Hb and total circulating red cells would be too high, but the relative values would be of the same order and the general conclusions still valid.

Total circulating plasma protein was calculated by multiplying the plasma volume by the serum-protein concentration. This is really a measure of the total circulating serum protein —i.e., total circulating plasma protein less fibrinogen.

EXPERIMENTAL

Blood-volume measurements were made on the patients soon after they were admitted to hospital and thereafter at intervals of 3 or 4 weeks. The data obtained on admission and shortly before discharge are summarised in tables I–VI. Full details for each case have been given in an unpublished report (Walters et al. 1946), a copy of which has been deposited with the Medical Research Council. Tables I–VI also contain the results from a control series of apparently healthy Indians and those from a small series of patients studied shortly after their admission to hospital but not followed up. All the figures, for purposes of comparison, have been referred to unit body-weight, unit surface area, and unit body-height.

Tables I–VI show that, after a period of treatment in hospital, the patients approached normal in every respect; but, because the intermediate values are not given, they do not show the rate at which recovery took place, nor the relative rate of recovery of each of the different blood constituents. For instance, the plasma volume returned to normal very quickly (0–4 weeks); this was followed by the blood-volume and total circulating plasma protein (2–12 weeks), and it was not until much later (8–16 weeks) that such factors as the body-weight, the total circulating hæmoglobin, the concentration of Hb and plasma protein in the peripheral blood, and the albumin/globulin ratio returned to normal. Various details of this recovery process will be mentioned in the text and illustrated by individual cases. Since the phases of recovery differ considerably from patient to patient

TABLE I—HÆMATOLOGICAL FINDINGS

Group	No. of cases	Mean Hb concentration (g./100 ml.) (±S.D.)	Mean red-cell concentration (10^6 cells/c.mm.) (±S.D.)	Mean hæmatocrit (%) (±S.D.)	Mean M.C.V. (c.μ) (±S.D.)	Mean M.C.H. (γγ) (±S.D.)	Mean M.C.H.C. (%) (±S.D.)
Control series	9	15·2 ± 1·9	5·28 ± 0·48	45·5 ± 4·0	80·5 ± 8·0	29·1 ± 4·3	33·5 ± 2·4
Cases on admission	12	9·8 ± 2·0	2·52 ± 0·39	30·4 ± 4·8	121·1 ± 16·2	39·2 ± 8·0	32·0 ± 2·7
Same cases on discharge	12	13·6 ± 0·7	4·41 ± 0·57	41·6 ± 3·0	95·4 ± 8·7	31·3 ± 3·5	32·8 ± 1·9
Cases on admission not followed up	5	7·3 ± 3·1	1·93 ± 0·82	23·5 ± 10·3	121·4 ± 12·8	38·2 ± 4·5	31·5 ± 1·8

in their time relations, the use of average figures would tend to flatten and conceal the points it is desired to emphasise.

Hæmatological Findings.—The hæmatological findings in this series (table I) differed in no essential respects from those of the larger series previously reported (Walters et al. 1947). There was a normochromic macrocytic anæmia which responded well to treatment. The mean corpuscular volume (M.C.V.) and the mean corpuscular Hb (M.C.H.) fell rapidly, and the mean corpuscular Hb concentration (M.C.H.C.) remained within normal limits throughout. It was noticed, however, that the Hb concentration, the hæmatocrit, and, more rarely, the red-cell concentration usually continued to fall for a period of up to 4 weeks and then rose steadily to normal values. Two typical cases are illustrated in fig. 1.

Serum Proteins.—The serum-protein findings (table II) were also similar to those of the larger series previously reported (Walters et al. 1947). The serum-total-protein concentration was low, the reduction being confined to the albumin fraction. During treatment the serum-albumin concentration progressively rose parallel to the total-protein concentration, and the albumin/globulin ratio consequently increased. But, before increasing, the serum-total-protein concentration, like the Hb concentration, often decreased for a short time. It then returned to normal, rapidly at first, but later more slowly. It was during this period of reduced plasma-protein concentration that the delayed œdema, seen in patients recovering from protein deprivation (Stapleton 1946, Walters et al. 1947), manifested itself.

TABLE II—PLASMA PROTEIN AND PHYSICAL MEASUREMENT FINDINGS

Group	No. of cases	Mean serum protein (g./100 ml.) (±S.D.)	Mean serum albumin (g./100 ml.) (±S.D.)	Mean serum globulin (g./100 ml.) (±S.D.)	Mean ratio A./G. (x : 1) (±S.D.)	Mean body-weight (kg.) (±S.D.)	Mean height (cm.) (±S.D.)	Mean surface area (sq. m.) (±S.D.)
Control series	9	6·89 ± 0·35	4·59 ± 0·49	2·30 ± 0·30	2·0 ± 0·5	54·8 ± 5·2	165 ± 6	1·59 ± 0·10
Cases on admission	12	5·24 ± 0·74	2·63 ± 0·77	2·61 ± 0·72	1·1 ± 0·5	45·8 ± 4·1	169 ± 7	1·50 ± 0·10
Same cases on discharge	12	6·69 ± 0·42	4·25 ± 0·49	2·44 ± 0·42	1·8 ± 0·4	61·7 ± 5·7	169 ± 7	1·71 ± 0·12
Cases on admission not followed up	5	4·82 ± 0·65	3·01 ± 0·45	1·81 ± 0·35	1·7 ± 0·3	44·2 ± 5·8	166 ± 3	1·45 ± 0·08

Body-weight.—It was obvious that the body-weight of the patients studied was much below normal. The average weight on admission was 45·8 kg. (table II). This had risen, after a stay in hospital of about three months, to 61·7 kg., an increase of almost 16 kg. (over 2½ stone). The average weight on discharge (61·7 kg.) is greater than the average weight (54·8 kg.) of the control group, even when allowance is made for the difference in average height. The average reduction in weight was to 75% of the original weight. This figure, however, is misleading. Many of the patients were grossly œdematous on admission, and during the first four weeks in hospital, as the œdema disappeared, the body-weight fell; hence the reduction in body tissue other than water was much more than 25%. When the body-weight eventually began to rise, the increase was exceedingly rapid, often being some 7 lb. a week.

Body-height.—The average body-height of the patients was 169 cm. (table II). This is higher than that of the control group (165 cm.). The patients studied had obviously been, therefore, men of fine physique before they were imprisoned.

TABLE III—PLASMA VOLUME AND BLOOD-VOLUME FINDINGS

Group	No. of cases	Mean plasma volume (ml.) (±S.D.)	Mean plasma volume per kg. (ml./kg.) (±S.D.)	Mean plasma volume per sq. m. (ml./sq. m.) (±S.D.)	Mean plasma volume per cm. (ml./cm.) (±S.D.)	Mean blood-volume (ml.) (±S.D.)	Mean blood-volume per kg. (ml./kg.) (±S.D.)	Mean blood-volume per sq. m. (ml./sq. m.) (±S.D.)	Mean blood-volume per cm. (ml./cm.) (±S.D.)
Control series	9	2600 ± 229	47·5 ± 2·9	1634 ± 95	15·7 ± 1·2	4779 ± 370	86·5 ± 4·8	3004 ± 131	29·0 ± 1·7
Cases on admission	12	2446 ± 328	53·6 ± 6·2	1625 ± 182	14·4 ± 1·7	3514 ± 413	76·9 ± 7·4	2334 ± 212	20·7 ± 2·0
Same cases on discharge	12	2977 ± 458	48·1 ± 5·0	1737 ± 94	17·6 ± 2·3	5090 ± 669	82·5 ± 7·0	2973 ± 288	30·0 ± 3·4
Cases on admission not followed up	5	2430 ± 453	56·1 ± 8·1	1670 ± 244	14·6 ± 2·5	3158 ± 232	73·9 ± 10·9	2186 ± 168	19·0 ± 1·0

Surface Area.—This was calculated from the body-weight and height by the Du Bois formula. The area, so calculated, was low on admission and, during treatment, it at first fell slightly and then returned slowly to normal (table II).

Plasma Volume (table III).—The mean plasma volume of the patients on admission to hospital was 2446 ml., which is slightly lower than that of the control group (2600 ml.); but the difference is of doubtful significance. The mean figure is also less than that reported by Mollison (1946) for patients in Belsen Camp, but the scatter, 1880 ml.–2940 ml., covers much the same range. If the plasma volume were originally low, it increased to normal quickly (0–4 weeks), and then rose to well above the normal figure (2–12 weeks); and it was only later (8–16 weeks) that it fell again to normal levels. In all the cases studied the plasma volume was the first figure to return to normal.

The plasma volume referred to the body-weight in kilogrammes (PV/kg.) was above normal when the patients were admitted to hospital. This means that the relative decrease in plasma volume was not as great as that of the body-weight. During recovery PV/kg. invariably rose to figures far in excess of normal and then gradually fell again to normal values. This is because, during the early weeks of recovery, the plasma volume increased much more rapidly than the body-weight; the plasma volume reached normal values after 0–4 weeks, but the body-weight not until 8–16 weeks.

TABLE IV—TOTAL CIRCULATING HÆMOGLOBIN FINDINGS

Group	No of cases	Mean Hb concentration (g./100 ml.) (±S.D.)	Mean total circulating Hb (g.) (±S.D.)	Mean total circulating Hb per kg. (g./kg.) (±S.D.)	Mean total circulating Hb per sq. m. (g./sq. m.) (±S.D.)	Mean total circulating Hb per cm. (g./cm.) (±S.D.)
Control series	9	15·2 ± 1·9	730 ± 117	13·4 ± 2·5	460 ± 71	4·4 ± 0·7
Cases on admission	12	9·8 ± 2·0	345 ± 79	7·5 ± 1·7	229 ± 50	2·0 ± 0·4
Same cases on discharge	12	13·6 ± 0·7	692 ± 55	11·2 ± 1·1	405 ± 39	4·1 ± 0·4
Cases on admission not followed up	5	7·3 ± 3·1	225 ± 87	5·5 ± 2·6	159 ± 67	1·3 ± 0·5

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Cases on admission not followed up	5	7·3 ± 3·1	1·93 ± 0·82	23·5 ± 10·3	121·4 ± 12·8	38·2 ± 4·5	31·5 ± 1·8

portional to the surface area. With treatment in hospital the total circulating Hb per sq.m. steadily returned to normal.

When referred to unit body-height, the total circulating Hb was greatly reduced. On admission to hospital the repatriated prisoners had only 2·0 g. of Hb per cm. of body-height, whereas the figure for the control group was 4·4 g. Presumably the latter figure is a fair estimate of the total circulating Hb per centimetre body-height of the patients before they were imprisoned. The actual loss of Hb to the body was therefore much greater than that indicated by the fall in the Hb concentration. With treatment in hospital the total circulating Hb per centimetre body-height gradually increased.

Total Circulating Red Cells (table v).—It has previously been seen that the red-cell concentration rarely fell during the early stages of recovery as did the Hb concentration. This is reflected in the progressive fall in the M.C.H. and the disappearance of the macrocytosis. Multiplying the red-cell concentration by the blood-volume gives the total number of red cells in the circulation. The average for the repatriated prisoners on admission to hospital was $8\cdot8 \times 10^{12}$ cells, whereas the figure for the control series was $25\cdot3 \times 10^{12}$, and that for the patients on discharge was $22\cdot2 \times 10^{12}$. The total number of circulating red cells thus approached normal during the period of treatment in hospital.

The total number of circulating red cells referred both to unit body-weight and unit surface area was also greatly reduced, as also was the total number of circulating red cells referred to unit body-height. The figure of $5\cdot2 \times 10^{10}$ cells/cm. on admission can be compared with $15\cdot3 \times 10^{10}$ cells/cm. for the control series. All these figures approached normal after the treatment in hospital.

Total Circulating Plasma Protein (table vi).—After a period during which there was little improvement, the serum-protein concentration rose, at first rapidly and then more slowly, until normal values were reached. This rise was almost entirely in the albumin fraction; hence there was a progressive increase in the albumin/globulin ratio. By multiplying the serum-protein concentration by the plasma volume, an estimate is obtained of the total circulating plasma protein. It is seen that this was 128 g. when the patients were admitted to hospital, compared with 199 g. when they were discharged and 180 g. for the control group. It is also seen that, even though many of the patients were received in a state of acute protein deprivation, the relative decrease in the total circulating plasma protein was less than that of the total circulating Hb, because the relative reduction of the plasma volume was less than that of the blood-volume, and the relative reduction in serum-protein concentration was less than that of the Hb concentration. The improvement in the total circulating plasma protein was both dramatic and rapid. Normal figures were reached at the end of 2–12 weeks, long before normal figures for the total circulating Hb.

TABLE VII—STAGES OF RECOVERY IN PROTEIN DEFICIENCY

Observation	Stage I (0–4 weeks)	Stage II (2–12 weeks)	Stage III (8–16 weeks)
Body-weight	Decreases	Increases rapidly	Increases to normal
Plasma volume	Increases rapidly to normal	Increases rapidly to above normal	Decreases to normal
Blood-volume	Increases	Increases to normal	No change
Hb concentration and hæmatocrit	Decreases or no change	Increases	Increases to normal
Total circulating Hb	Increases	Increases rapidly	Increases to normal
Red-cell concentration	Increases slightly or no change	Increases	Increases to normal
Total circulating red cells	Increases	Increases rapidly	Increases to normal
Plasma-protein concentration	No change or increases slightly	Increases rapidly	Increases slightly to normal
Total circulating plasma protein	Increases	Increases very rapidly to normal	No change
Total circulating albumin	Increases	Increases rapidly	Increases to normal
Total circulating globulin	Increases slightly from normal	Increases to above normal	Decreases to normal
A/G. ratio	Increases slightly	Increases	Increases to normal

TABLE VIII—RATE OF PRODUCTION OF HB, RED CELLS, AND PLASMA PROTEIN

Case	Time observed (days)	Change in total circulating			Change per day in total circulating		
		Hb (g.)	Red cells (cells × 10^{12})	Plasma protein (g.)	Hb (g./day)	Red cells (cells × 10^{10}/day)	Plasma protein (g./day)
5	35	235	9·5	110	6·7	27·1	3·1
7	25	144	6·7	73	5·8	26·8	2·9
10	28	295	12·3	77	10·5	43·8	2·8
24	18	140	3·3	31	7·8	18·3	1·7
25	30	180	7·3	47	6·0	24·3	1·6
26	25	153	5·8	68	6·1	23·2	2·7
28	25	101	4·6	43	4·0	18·4	1·7
31	29	354	12·2	55	12·2	42·1	1·9
32	33	352	11·1	49	10·7	33·6	1·5
34	21	205	6·2	47	9·8	29·5	2·2
36	25	181	3·8	70	7·2	15·2	2·8
				Mean	7·9	27·2	2·3

The total circulating plasma protein increased steadily in all cases, even though, in many, the serum-protein concentration fell at first. The initial rise in plasma volume was so rapid that there was always an increase in total circulating plasma protein. Fig. 3 illustrates these particular points in two typical cases. As in the case of the Hb, it does not necessarily follow that, because the serum-protein concentration falls, the patient is not progressing. In patient 28 (fig. 3) plasma protein was being produced at the rate of 12 g./week, and yet the serum-protein concentration actually fell.

The total circulating plasma protein referred to unit body-weight (Pr/kg.) was slightly less than that of the control series, indicating that plasma protein was not greatly reduced relative to other tissues. Because of the rapid rise in total circulating plasma protein and the slower rise in body-weight, Pr/kg. quickly rose to figures well above normal before it fell again to normal levels. The total circulating plasma protein referred to both unit surface area and unit body-height was also reduced, and in both cases rose very rapidly to normal values.

It is seen that the reduction in the total circulating plasma protein was entirely in the albumin fraction. The total circulating albumin was only 50% of normal, whereas there was no change in the total circulating globulin. On recovery, at first both fractions increased, but the albumin increased more rapidly than the globulin. Then, as time progressed, the increase in total circulating albumin became more rapid, and that of total circulating globulin less rapid, until finally, in many cases, the total circulating globulin, which by now had

The plasma volume referred to unit surface area (PV/sq.m.) was much more constant. It was within normal limits when the patients were admitted to hospital and remained so when they were discharged. During the initial recovery phase (0–4 weeks) it rose slightly on occasions, but the percentage rise was small compared with that of PV/kg.

The plasma volume referred to unit body-height (PV/cm.) was low on admission, 14·4 ml./cm. compared with 17·6 ml./cm. for the same patients on discharge and 15·7 ml./cm. for the control series. Like the absolute plasma volume, PV/cm. first rapidly increased to above normal and then decreased to normal values.

Blood-volume (table III).—The mean total circulating volume of 3514 ml., observed when the patients were admitted to hospital, was considerably lower than either that of the control series, 4779 ml., or that of the same patients on discharge, 5090 ml. This mean figure is of the same order as that reported by Mollison (1946) for the Belsen cases. The low total circulating volume gradually returned to normal (2–12 weeks). This return to normal was *not so rapid as that of the plasma volume (0–4 weeks)*, but it was much quicker than the return to normal of many of the other factors measured. Unlike the plasma volume, there was not a period when the figures for the total circulating volume were greatly in excess of normal.

The blood-volume, even when referred to unit body-weight (BV/kg.), was on the average lower than normal (76·9 ml./kg. on admission, compared with 82·5 ml./kg. on discharge and 86·5 ml./kg. for the control series). Mollison (1946), quoting normal values of Gibson and Evans (1937), states that "blood-volume in severely undernourished subjects is not reduced in proportion to body-weight." In 10 out of the 12 of our cases so studied, BV/kg. on admission was less than that on discharge, and in 15 out of the total of 17 patients BV/kg. on admission was lower than the mean of the control group, all the estimations being done by exactly the same technique. Application of Fisher's "t" test gives: P is less than 0·01 for the difference between the means of the patients on admission and those of the control group, and P is less than 0·02 for the difference between the means of the patients of cases investigated on admission but not followed up and the control group. It therefore seems clear that the total circulating volume is decreased to a slightly greater extent than the other body tissues. BV/kg. returned to normal after first going through a period when it was above normal. This was due to the fact that, on recovery, the total circulating volume increased more rapidly than the body-weight.

The blood-volume referred to unit surface area (BV/sq.m.) was reduced relatively much more than BV/kg. During treatment BV/sq.m. rose steadily to normal values. The relative reduction in blood-volume referred to unit body-height (BV/cm.) was greater still. A normal Indian (control series) has 29·0 ml. of blood for every cm. of his body-height, but the repatriated prisoner, on admission to hospital, had only 20·7 ml., whereas on discharge he had 30·0 ml. Improvement of BV/cm. was continuous throughout the whole of the recovery period.

TABLE V—TOTAL CIRCULATING RED-CELL FINDINGS

Group	No. of cases	Mean red-cell concentration (10^{6} cells/c.mm.) (±S.D.)	Mean total circulating red cells (cells × 10^{12}) (±S.D.)	Mean total circulating red cells per kg. (cells × 10^{10}/kg.) (±S.D.)	Mean total circulating red cells per sq.m. (cells × 10^{12}/sq.m.) (±S.D.)	Mean total circulating red cells per cm. (cells × 10^{10}/cm.) (±S.D.)
Control series	9	5·28 ± 0·48	25·3 ± 3·7	46 ± 4	15·9 ± 1·7	15·3 ± 2·0
Cases on admission	12	2·52 ± 0·39	8·8 ± 1·4	19 ± 3	5·9 ± 0·9	6·2 ± 0·8
Same cases on discharge	12	4·41 ± 0·57	22·2 ± 2·6	36 ± 5	13·1 ± 1·7	13·1 ± 1·6
Cases on admission not followed up	5	1·93 ± 0·82	6·0 ± 2·5	15 ± 8	4·3 ± 2·0	3·7 ± 1·5

Total Circulating Hb (table IV).—It has previously been seen that in the early stages of recovery there was often a phase during which the Hb concentration, before it began to improve, actually fell still further. If the Hb concentration is multiplied by the blood-volume, the total amount of Hb in the circulation can be calculated. It was found that the total circulating Hb rose steadily throughout the whole of the recovery period, even though in the initial stages the Hb concentration may have fallen, for it was at this time, when the Hb concentration was falling, that the increase in blood-volume was greatest. These points are well illustrated *in fig. 2, which gives the Hb concentration*, total circulating Hb, and total circulating volume changes in two typical cases. This is important from the clinical viewpoint, for it means that a patient may be producing Hb into the circulation at a surprisingly high rate—in the two cases illustrated Hb was being formed at the rate of 40·5 and 28·0 g./week—with the Hb concentration actually falling. It follows therefore that, if the Hb concentration of an undernourished patient falls during the first few weeks' treatment, *it does not necessarily* mean that the patient's condition is deteriorating. He may still be elaborating Hb at a very satisfactory rate.

TABLE VI—TOTAL CIRCULATING PLASMA-PROTEIN FINDINGS

Group	No. of cases	Mean plasma-protein concentration (g./100 ml.) (±S.D.) (*albumin + globulin*)	Mean total circulating plasma protein (g.) (±S.D.) (*albumin + globulin*)	Mean total circulating plasma protein per kg. (g./kg.) (±S.D.) (*albumin + globulin*)	Mean total circulating plasma protein per sq m. (g./sq.m.) (±S.D.) (*albumin + globulin*)	Mean total circulating plasma protein per cm. (g./cm.) (±S.D.) (*albumin + globulin*)
Control series	9	6·89 ±0·35 (*4·59 + 2·30*)	180 ±21 (*120 + 60*)	3·3 ±0·3 (*2·2 + 1·1*)	113 ±10 (*75 + 38*)	1·09 ±0·11 (*0·73 + 0·36*)
Cases on admission	12	5·24 ±0·74 (2·63 + 2·61)	128 ±33 (64 + 64)	2·8 ±0·7 (1·4 + 1·4)	85 ±20 (43 + 42)	0·75 ±0·17 (0·38 + 0·37)
Same cases on discharge	12	6·69 ±0·42 (4·25 + 2·44)	199 ±31 (125 + 74)	3·2 ±0·4 (2·0 + 1·2)	117 ±15 (74 + 43)	1·17 ±0·17 (0·74 + 0·43)
Cases on admission not followed up	5	4·82 ±0·65 (3·01 + 1·81)	120 ±34	2·7 ±0·7	82 ±22	0·72 ±0·20

The total circulating Hb when the patients were admitted to hospital was exceedingly low, 345 g. compared with 730 g. for the control series, but by the time the patients were fit for discharge it had risen to 692 g. The total circulating Hb per kg. of body-weight was also greatly decreased on admission, signifying that the loss of Hb *was relatively much greater than the* loss of other body tissues. During the period of treatment in hospital this rose rapidly at first, and then more slowly.

The relative reduction of the total circulating Hb referred to unit surface area was much greater. When the patients were admitted to hospital the total circulating Hb per sq.m. of body surface area was 229 g., compared with 405 g. for the same patients on discharge and 460 g. for the control series. This figure gives some idea of the disability under which *the patients* were suffering during their imprisonment, because the Hb requirement is pro-values far in excess of normal in stage II, back to normal and by the maintenance of the total circulating volume at normal levels. This is accompanied by a rise in the Hb concentration, red-cell concentration, and hæmatocrit, and therefore of the total circulating Hb and total circulating red cells. There is a steady rise in the body-weight and a rise in the plasma-protein concentration; but, because of the fall in plasma volume, the total circulating plasma protein remains the same. There is, however, still a rise in the total circulating albumin, which is balanced by a corresponding fall in the total circulating globulin. This is reflected in the continued increase of the albumin/globulin ratio.

The above description, which is of necessity an over-simplification, is summarised in table VII, and the salient features of the stages of recovery are represented schematically in fig. 4.

RATE OF RECOVERY

The total circulating Hb, the total circulating red cells, and the total circulating plasma protein being known at any given stage in the recovery process, it is possible to judge the rate of recovery in terms of the rate of production of Hb, red cells, or plasma protein.

Table VIII gives the change in total circulating Hb, red cells, and plasma protein in a series of patients at the time of maximal recovery. It is seen that the average rate of Hb production for the series was 7·9 g. a day (or roughly, if the total circulating volume remains constant, 1% a day on the Haldane scale). The average rate of red-cell production was 27·2 × 10^{10} cells per day. This reduces to the astonishing figure of 3 million cells every second. The average rate of plasma-protein production was 2·3 g. a day. Thus, even though every tissue of the body must be suffering from protein deprivation, over 10 g.* of the daily dietary protein intake is converted either to Hb or plasma protein. Of the 2·3 g. a day of plasma protein formed 1·5–2 g. is albumin. On the basis of the calculations of Sachar et al. (1942) this would mean a deposition of tissue protein of about 37–50 g. a day.

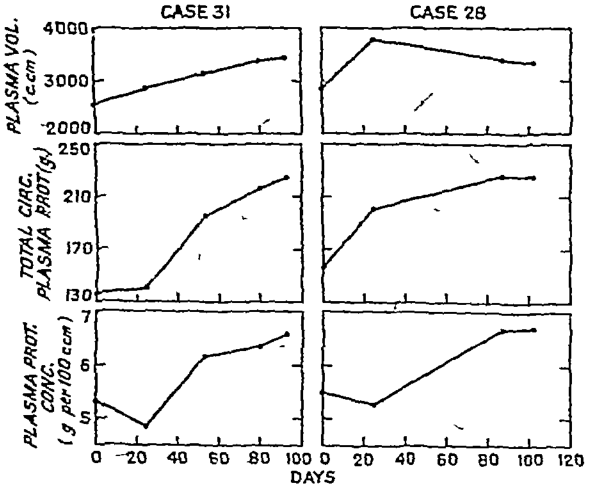

Fig. 3—Typical changes in cases 31 and 28 (see table VIII).

SUMMARY

Plasma- and blood-volume observations were made on Indian prisoners repatriated from Japanese prison camps and on a control series of apparently healthy Indians.

The chief findings in the ex-prisoners on admission to hospital were a normochromic macrocytic anæmia: a reduction in the serum-total-protein concentration which was confined almost entirely to the albumin fraction, and hence a reduction in the albumin/globulin ratio; a reduction in body-weight; little change in plasma volume; an increase in plasma volume referred to unit body-weight, no change referred to unit surface area, and a decrease referred to unit body-height; a reduction in total circulating blood-volume which was also reduced when referred to a unit body-weight, unit surface area, and unit body-height; a reduction in the total circulating Hb, total circulating red cells, and total circulating plasma protein which was also reduced when referred to unit body-weight, unit surface area, and unit body-height. The reduction in total circulating plasma protein was entirely in the globulin fraction.

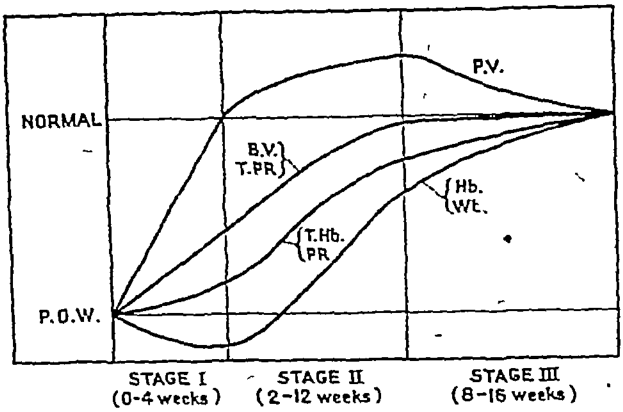

Fig. 4—Schematic representation of stages of recovery: P.V., plasma volume; B.V., blood-volume; Hb, hæmoglobin concentration; PR, plasma-protein concentration; T.PR, total circulating plasma protein; T.Hb, total circulating Hb; Wt., body-weight.

All the above findings returned to normal during treatment in hospital.

The Hb concentration, and sometimes the plasma-protein concentration, often fell during the first four weeks' treatment in hospital. Although this was so, the increase in blood and plasma volume was so great that the total circulating Hb and plasma protein was increased. Therefore it does not necessarily follow that, because the Hb concentration or serum-protein concentration falls during the initial stages of treatment, the patient is not making satisfactory progress.

The rate of recovery of each of the above factors was followed, and from this the pattern of recovery was reconstructed. The recovery process has been divided into three arbitrary stages, which have been described in detail.

The rate of recovery in terms of the rate of production of Hb, red cells, and plasma protein was also observed.

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* This is neglecting the non-Hb protein content of the packed cell volume, which may be considerable.

risen to figures above normal, began to decline. Some interest attaches to the reduction in total circulating albumin because of the finding of Sachar et al. (1942) that the reduction of tissue protein produced by an insufficient dietary intake of protein is directly proportional to the reduction of total circulating albumin. On the basis of nitrogen-loss experiments in dogs, these workers concluded that

$$T.Pr_t = 25 \times Alb_t$$

where $T.Pr_t$ and Alb_t represent the loss in g. of tissue protein and total circulating albumin respectively. The difference between the mean total circulating albumin of the prisoners on discharge and that on admission was 61 g. Application of the above formula would thus give a tissue protein loss of 1525 g.

The formula of Sachar et al. (1942) for calculating the loss of total circulating albumin,

$$Alb_t = 0{\cdot}5\ Wt\ (4{\cdot}6 - Alb_c)$$

where Wt is the normal body-weight in kg. and Alb_c is the serum-albumin concentration in g./100 ml., gives *an estimated albumin loss of 62 g. compared with the* loss of 61 g. measured directly.

When referred to unit body-weight, surface area, or body-height, the figures for the total circulating albumin and globulin do not reveal many points of special interest. It will be noticed, however, that, since the total circulating globulin was normal on admission when the body-weight was reduced, the total circulating globulin, when referred to unit body-weight, was above normal (1·4 g./kg. as opposed to 1·1 g./kg.). As the body-weight increased, the total circulating globulin per kilogramme body-weight fell.

STAGES OF RECOVERY

From the foregoing it is possible to reconstruct the general picture of the pattern of recovery in a protein-deficient patient. For the sake of ease of description this recovery process has been divided into three stages. These are arbitrary and show very considerable variations *in their time relations*. Most of the patients studied, however, demonstrated these stages clearly, and the remainder would, we feel confident, have demonstrated them had blood-volume determinations been done at sufficiently frequent intervals. It must also be remembered that, in some of the patients, the recovery process had already begun during their evacuation to India; in these, stage I had been passed before they were admitted to hospital.

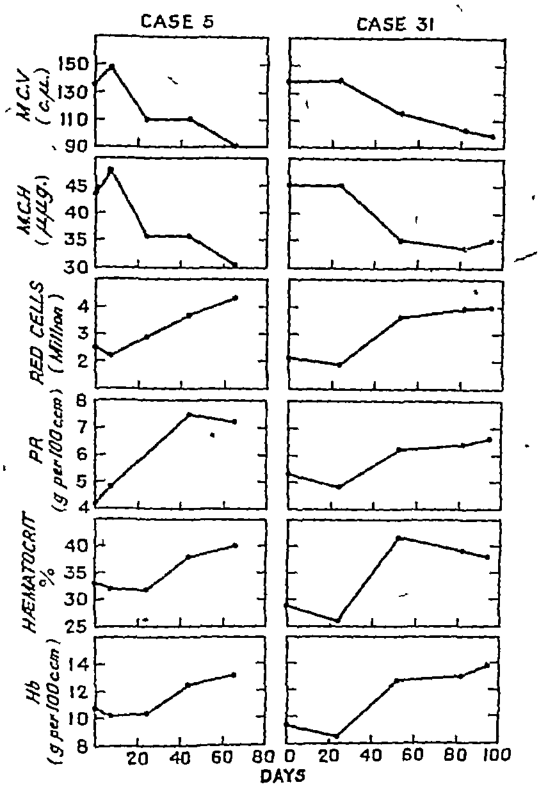

Fig. 1—Typical changes in cases 5 and 31 (see table VIII): Hb, hæmoglobin; PR, plasma-protein concentration; M.C.H., mean corpuscular Hb; M.C.V., mean corpuscular volume.

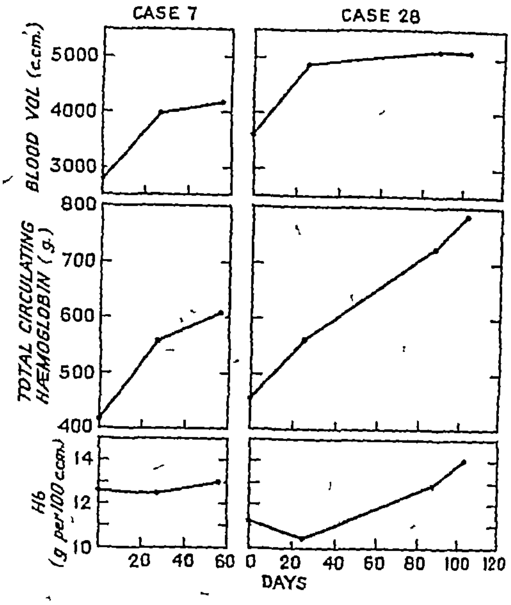

Fig. 2—Typical changes in cases 7 and 28 (see table VIII).

Stage I (0–4 weeks).—This is characterised by the rapid rise in plasma volume to normal. During this period the body-weight at first falls as œdema disappears, and then may slowly rise. The blood-volume rises steadily but at such a rate that, though the Hb concentration, together with the hæmatocrit, usually falls, the total circulating Hb increases. Despite the decrease in Hb concentration, the red-cell concentration may increase, since the M.C.H. is falling as the patient's blood is rapidly becoming less macrocytic. The number of circulating red cells increases, as does the total circulating plasma protein. Because of the rapid rise in plasma volume, the plasma-protein concentration changes but little: it sometimes falls slightly and sometimes increases. The increase in total circulating protein is in both fractions, but more albumin is formed than globulin; so the albumin/globulin ratio increases slightly.

Stage II (2–12 weeks).—This is characterised by the rapid rise of both the total circulating volume and the total circulating plasma protein to normal. The plasma volume, which had attained normal values in stage I, increases rapidly to values well above normal. There is also a rapid increase in body-weight and in total circulating Hb, because both the Hb concentration, which fell in stage I, and the blood-volume are increasing rapidly. The hæmatocrit and the red-cell concentration, and hence the total circulating red cells, are also increasing. The increase in the total circulating protein is in both fractions, but the albumin fraction increases much more rapidly than the globulin; the total circulating globulin does, however, often reach figures well in excess of normal. The albumin/globulin ratio continues to increase.

Stage III (8–16 weeks).—This stage marks the transition from stage II to normal findings. It is characterised by the return of the plasma volume, which had risen to niplegia, dysuria, and many other symptoms have m time to time been attributed to loiasis. There is, vever, little proof that these are due to infestation L. loa. Manson-Bahr (personal communication) has own a patient with a massive infection to develop ltiple cystic swellings all over the body but chiefly the arms; these finally broke down and discharged id filariæ. The dead worms may cause abscesses, but y usually become calcified.

Chronic Calabar swellings are well recognised, and may rsist for over two months. My impression is that they velop early and are only rarely seen in the later stages after the patient's return to a cold climate. They form nore or less ill-defined lesion, usually on the arm below e elbow. Little is known of their pathology, but they thought to arise from Calabar swellings which keep urring at the same site.

PATHOLOGY

The filariæ of *L. loa* differ from those of *W. bancrofti* that they wander about the body, chiefly in the nnective tissues. As a rule they do not obstruct mphatics, but sometimes they cause fairly severe mphatic œdema and elephantiasis. Several observers aintain that in hyperendemic areas they are a common use of hydrocele, varicocele, and hernia. In such eas about 10% of patients coming to operation for rnia and allied conditions have live worms in the gions exposed. In one case Chesterman (quoted by rong 1944) found forty parasites close to the cord. he adult filariæ have been found in almost every part the body, including the heart and pericardium.

A moderate enlargement of lymph-glands is a common nding in infected patients; nearly every patient with any Calabar swellings on the arms will have enlarged pitrochlear glands.

There has been much speculation about the pathology f Calabar swellings. The theories that they indicate the irth of microfilariæ or are associated with the wanderings f the adult can now have little support. Undoubtedly hey are the local anaphylactoid reaction of the host o the loa antigen, and this explanation is borne out by he fact that they have been artificially produced by he injection of a similar type of antigen obtained from *Dirofilaria immitis* into patients with loiasis (Lloyd nd Chandra 1933).

Dead filariæ usually become calcified without suppurating and then are clearly visible on radiography.

Enlargement and chronic fibrosis of the spleen have een found at necropsy, and serial sections have shown nicrofilariæ embedded in fibrous tissue surrounded by nuch cellular infiltration. Chronic malaria may be at east a partial cause of the splenic enlargement in these cases.

Loiasis undoubtedly lasts a long time. *L. loa* is said to be able to live for twenty years, and many observers say that loiasis lasts about fourteen years. Manson-Bahr (1945) records a case in which microfilariæ persisted in the blood for seventeen years.

DIAGNOSIS

A history of visiting an endemic area at some time is essential for diagnosis, since infection cannot take place without a suitable vector.

Calabar swellings are such a constant feature that the diagnosis of loiasis should hardly be considered if there have never been any. Often physical examination will be entirely negative, but the outline of a worm may be seen under the skin, or one may be seen crossing the eye. The diagnosis must be in serious doubt if the differential white-cell count is normal, for eosinophilia is present in every case at some period.

The absence of microfilariæ from the blood is no bar to the diagnosis, since they may be absent for a considerable period even in heavy infections. They should be searched for in thick blood films taken during the daytime. If present they are usually easy to find with a low-power microscope. Either a thick fresh film with overlying coverslip and no stain, or a thick dried film stained with one of the Romanowsky stains, will reveal them. By the first method they are seen to be actively motile. If there is any doubt about the diagnosis, it may be necessary to have stained films examined to differentiate the microfilariæ of *L. loa* from the harmless microfilariæ of *A. perstans*, which is commonly found in some districts of Africa and gives rise to no symptoms.

Should the diagnosis still remain in doubt, skin tests may be carried out. These consist of the intradermal injection of a filarial antigen; an extract obtained from *D. immitis* is the one most commonly used. Or a complement-fixation test may be done on the patient's serum. Both these tests are highly accurate in the diagnosis of filarial infections as a group, differentiating them from other worm infections, but they do not give positive information about the species of filaria involved.

Ease in making the diagnosis correctly is the rule rather than the exception.

TREATMENT

General Treatment.—Prophylaxis must rest on avoiding being bitten by chrysops and any other possible vectors.

There is no known cure for loiasis. A wide variety of drugs have been tried, each in turn being credited with some successes. However, careful observation has shown that, given in doses not toxic to the host, they had no effect on the adult filariæ and little if any on the microfilariæ. Those which have seemed the most hopeful are 'Anthiomaline,' stibophen, methylene-blue, and organic arsenicals.

Microfilariæ can live for a considerable time—indeed, heavily infected blood has been injected intravenously into dogs, and more than a year later the microfilariæ have been found alive in the circulation. By themselves the microfilariæ probably cause no symptoms; therefore their destruction cannot help the host but merely prevents the continuation of a reservoir for the transmission of the disease. Thus, should an effective drug be found for killing the microfilariæ, its only justifiable use can be in an endemic area where vectors are a constant source of danger to other people.

The indiscriminate use of potent drugs in treating loiasis is not only futile but often harmful. I have seen one patient with a severe agranulocytosis following the unsuccessful administration of a toxic drug.

Deep X-ray treatment, to sterilise the female parasites in the tissues, has been advocated by some, but there does not seem to be enough justification for its use in loiasis. This form of therapy appears to have more scope in *W. bancrofti* infections.

Local Treatment.—Calabar swellings do not as a rule require any treatment, but at times local soothing applications may be indicated. Chronic swellings should benefit considerably from daily massage.

Removal of the filariæ should always be attempted when they can be located in a suitable site. This can most easily be done when they are passing over the globe under the conjunctiva. The method is as follows:

> Cocaine, in the form of a 4% solution or lamellæ containing gr. 1/[illegible], should be instilled into the eye only when the parasite has been located in a suitable position for removal. This point is important, because it is essential to have the whole worm in view if the operator is to be sure of removing it. Almost certainly the anæsthetic will arrest the worm in this position. The conjunctiva should be snipped with a pair of very fine scissors parallel with the length of the worm and as near its centre as possible. The worm is then grasped with a pair of fine forceps and removed intact. When no suitable instruments are available, the worm can be removed

LOIASIS

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LOIASIS is caused by the infection of man with the filaria *Loa loa*, whose other names, all associated with the eye, are African eye-worm, *Dracunculus oculi*, and *Filaria oculi humani.*

Loiasis was first observed and recorded pictorially by Pigafetta in 1598 on his journey along the Congo river. In 1770 a worm was removed from the eye of a negress in Haiti by Mongin. In 1777 loiasis was accurately observed by Guyet in Angola, and in 1805 he wrote the first description of the disease. Manson (1891) first demonstrated microfilariæ in the blood of an infected patient. The original discovery of the intermediary host must be accredited to Manson, but it was not until 1913 that Leiper proved Manson's observations to be correct.

Infection by *Loa loa* is limited to Africa, chiefly along the west coast from Sierra Leone to Benguella but also extending inland as far as equatorial Sudan, which shows a high incidence. Probably the areas which show the heaviest infection are the Cameroons and the borders of the Congo river. The condition was formerly common in the West Indies and America but is now only rarely seen there, and the cases recorded are universally held to have been due to infection in Africa. There is no fly vector in the American continent which carries the disease.

LIFE-CYCLE AND DESCRIPTION OF PARASITE

Man is infected by the bite of the mangrove fly, of the species *Chrysops dimidiata* and *C. silacea*, though there is strong evidence that other flies may at times carry the disease.

The female chrysops, which bites during the day, deposits the larvæ on the victim's skin, through which they burrow in no more than a minute. Apparently the larvæ move into the deeper tissues, where they grow into adult worms. Opinions differ about the rate of growth and the time taken by the worms to mature, but it seems certain that they reach their full size within a few months. It is probably some years before they produce microfilariæ, and during this period they wander about the body, passing freely through the connective tissues; their rate of progress may be as much as $^1/_2$ in. a minute.

After a variable period the female filariæ produce microfilariæ, which enter the blood-stream. Some say that at least three years elapse between infection and the appearance of microfilariæ in the blood. It is generally held that the microfilariæ are strictly diurnal, but this fact is denied by some. Possibly there is some confusion with microfilariæ of *Acanthocheilonema perstans*, but it is certain that the microfilariæ of *L. loa* are far more plentiful during the day than the night. Their periodicity is therefore in sharp contrast to that of the microfilariæ of *Wuchereria bancrofti*, which are definitely nocturnal.

To complete the life-cycle of *L. loa* it is necessary for the infected person to be bitten again by a chrysops, whereupon the microfilariæ pass into the insect's stomach with the blood and later migrate to its thoracic muscles. Here they undergo morphological changes without multiplication, and finally pass to the proboscis, where they await their new host. The cycle in the fly lasts 10–12 days.

The adult filariæ are $^3/_4$ to $2^1/_2$ in. long, the females being somewhat longer than the males. They are white and resemble a thick thread of cotton. The microfilariæ are about 300 μ long and about equal to a red corpuscle in diameter.

CLINICAL PICTURE OF LOIASIS

Both sexes and all races, including young children, are liable to infection, and in heavily infected areas some 20% of the inhabitants are infected.

Many writers say that loiasis is harmless and almost symptomless, causing no disability, but I cannot agree with them. For several years after leaving an endemic area it is common for no symptoms to appear, and cases are recorded in which the first knowledge of infection was five years after return to a temperate climate.

Calabar Swellings.—These are by far the most common symptom. They are so named after the town in Nigeria where the disease is rife. Usually there is a fairly sudden onset of a swelling $1^1/_2$–2 in. in diameter, which lasts as a rule three to five days and is most common on the forearm. The swelling may irritate slightly and show minimal pitting and occasionally redness of the overlying skin. Apart from an ache these swellings cause no great disability, unless they are close to a joint or a nerve. They gradually shrink, but at times they seem to move their position. It is said that even in heavily infected cases only a very few swellings will appear each week. In my opinion their number is almost unlimited at any one time—indeed, several may appear together. After the patient's return to a temperate climate the swellings tend to become less frequent and eventually disappear, though the adult filariæ may persist. The swellings may first appear within four months of the patient's arrival in an endemic area, or they may not develop until many years after infection.

Distribution of Filariæ in the Body.—The filariæ most commonly appear near the eyes, for which they seem to have a predilection, and few patients have not at some time had a worm in this region. It is in this area that their movements are most easily felt, and they can often be seen wriggling under the loose skin of the lids. Commonly they cross the eye, passing easily and rapidly under the conjunctiva. While they are in this region they may cause swelling, conjunctivitis, lacrimation, and pain. The worms have been seen in the eye within nine months of infection. They have been removed from an eye thirteen years after the patient has left an endemic area, and live filariæ have been seen fifteen years after the patient's return to a temperate climate. The worms may be seen under the skin in many parts of the body, such as the back of the hands, the nose, the penis, and elsewhere. Their movements when close to the surface of the skin cause paræsthesiæ, creeping sensations, and itching.

Eosinophilia.—This is an absolutely constant finding, but after a long period in a cold climate the count tends to fall almost to normal. The average count is 15–30%, the highest recorded being in a European with a count of 84%.

Psychological Effects.—Most authors do not even mention this aspect of the disease, and I can find only two references to it. Elliot (1920) writes: "The combination of itching, pain, and irritation caused by the movements of the parasite under the conjunctiva are simply maddening." Clothier (1943) writes: "If a worm is not removed but merely driven into the deeper tissues by cold applications, it frequently returns many times to harass a tired and overworked individual until a partial nervous breakdown is the end-result."

The constant creeping sensation caused by the filaria under the skin of the face for hours or even days on end is indeed distressing, and the relief afforded by removal of the worm cannot be adequately appreciated by an observer. The knowledge that probably many more parasites are present in the body, or the discomfort of removing the worm, can in no way detract from the satisfaction felt at seeing the immediate cause of the trouble safely removed.

Less Common Manifestations.—Various skin eruptions, including a generalised urticaria, have been recorded. Nausea, headaches, œdema of the glottis, transient

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A SUITABLE name is required for the painful nodular breast not due to bacterial inflammation, neoplasm, or fat-necrosis. There is no lack of choice of names which have been applied to this condition—e.g., chronic mastitis, cystic mastitis, interstitial mastitis, cystadenoma papilliferum, involution cysts, cystic disease of the breast, Schimmelbusch's disease, mazoplasia, and chronic cystipherous epithelial hyperplasia. It is a reflection on the unsuitability of these names that the one most commonly used is chronic mastitis, a name which is descriptively as unsatisfactory as any, but has been sanctioned by long usage. Before adding another name to this list, therefore, it is necessary to make out a strong case for its exclusive adoption, and I wish to argue the claims of the term "fibro-adenosis" to describe the condition defined above.

What, in medicine, are the requisites of a name? It should tell us as much as possible about the condition in the shortest possible way. It should be easy to remember and pronounce, and suggest familiar associations. Further, it must not commit us to any as yet unproved hypothesis. In looking for a name, therefore, we must first review what is known about the painful nodular breast so as to include in our name as much of the ætiology, structure, and symptoms as possible.

ÆTIOLOGY AND STRUCTURE

Ætiology.—We know nothing of the ætiology of the painful nodular breast except that it is probably the consequence of a hormonal effect; and, since our knowledge is so meagre, all that we need ensure is that the name selected does not commit us to any preconceived theory.

Macroscopical Appearance.—When we examine the naked-eye and microscopical structure of the painful nodular breast we are on sure ground. To the naked eye a section from the affected part of the breast suggests a mass of fibrous tissue ramifying in the breast without definite boundaries, in which there may or may not be cysts containing clear, grumous, or grey fluid. In over a hundred biopsies taken from breasts affected by this condition I have found cysts, sufficiently large to be visible to the naked eye, in a very small proportion of cases. This is a significant finding when we are seeking a name for the condition, for it implies that cyst formation is a secondary, not an essential, change; and this complication should not be indicated in the name as a fundamental part of the picture. The prefix "cystic" may be added, should it be necessary to emphasise this quality, just as we add "cystic" to "fibro-adenoma" when the cystic changes predominate.

Histology.—When we examine the stained section under the microscope, the fibrous quality of the specimen is confirmed. There is intense fibroblastic activity both in the periacinous and subepithelial connective tissues, particularly in the former; but, in addition, epithelial changes are observed. These have been described so accurately and so often elsewhere that it will not be necessary to go into them in detail. Suffice to say here that there is a hyperplasia of the epithelial tissue; the number of acini is increased, and the epithelium of the individual acinus is hyperactive. Dilated ductules become lined with cells many layers thick, and the superficial cells are thrown off as debris into the lumen. Here and there papillomata may project and tend eventually to fill the lumen of the ducts or ductules with a delicate lace-work of epithelium supported by a fibrous stroma. This hyperplasia of the glandular epithelium may properly be called an adenosis. This term has been used by Dawson (1934) to describe only part of the process—i.e., the multiplication of the glandular elements. Nevertheless, it may justifiably be extended to cover the epithelial changes within those elements, a task which it already bears in the connotation of the term adenoma.

Finally, the specimen contains fat.

Were we to consider only the structural picture of the painful nodular breast, the term fibro-adenosis must have an almost irresistible appeal. It describes precisely what is found, it makes no claim which cannot be substantiated, and it emphasises the two primary changes of the condition. But there are other considerations.

SYMPTOMS

The symptoms of this condition are lumpiness and pain. The lumpiness is due to fibrosis or cyst formation; and, as the cysts cause the lumpiness in a minority of cases and then only as a complication of a pre-existing lumpiness due to the fibrosis, the lumpy quality is sufficiently indicated in the term fibro-adenosis, which, as we have seen, may be qualified if necessary by the epithet "cystic."

How about the pain? For some time I considered the possibility of the term "fibrous mastalgia" to describe the condition, but I concluded that this term was too indefinite, made no reference to the epithelial changes which are fundamental, and suggested no link with the allied condition of fibro-adenoma. On closer examination, moreover, the term fibro-adenosis suggests a painful condition. The suffix "osis" implies a diffuse rather than a localised process such as is connoted in the suffix "oma." Vertue (1946) discusses the etymological significance of the suffix "osis" and points out that it denotes action or condition. By his definition "fibro-adenosis" should mean "a condition of fibrotic glandularity," and that is just what we wish it to mean. All diffuse fibroblastic activity in structures supplied with nociceptive nerves is painful, as for instance in "fibrositis," fasciitis, fibrillation of synovia in osteoarthritis, and Riedel's thyroiditis. Further, this "fibroblastic" pain has a tendency to vary with states of the weather, a tendency which is shared by the painful nodular breast. I therefore considered that the term fibro-adenosis, while giving a precise picture of the structural form of the condition, at the same time sufficiently indicated the clinical picture.

RELATION TO FIBRO-ADENOMA

The term further suggests an association with fibro-adenoma, and it will be necessary to justify this association before it can be perfectly acceptable. Let us turn first to the histological and clinical aspects. Histologically, with ordinary methods of staining, the only difference between the painful nodular breast and the painless fibro-adenoma, conditions which may in fact coexist in adjacent parts of the same breast, is that the painful nodular breast contains fat, whereas the fibro-adenoma does not. Fibro-adenoma is, moreover, usually supplied with a well-defined fibrous capsule. Otherwise the fibrous and epithelial changes are precisely similar, as is shown by the accompanying figure, the left-hand column being photomicrographs of sections of the painful nodular breast and the right-hand column of fibro-adenoma.

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with a cutting needle, but the operation takes longer and is more difficult.

When a worm has been located under the skin and can easily be seen, it should be removed by passing a fine stitch under it and tying it securely. This stitch should be inserted without local anæsthetic, because the parasite tends to become obscured by the injected drug. Once it has been firmly secured it may be removed without hurry through a small incision after injection of local anæsthetic.

CASE-RECORD

I reached West Africa at the end of June, 1943, and, after two weeks in Sierra Leone, proceeded to Southern Nigeria, where I remained for the next year working in a casualty clearing station. During this period we were always stationed in the bush, conditions being usually somewhat primitive, since we were under canvas much of the time. The surrounding country was thick tropical forest, and I often made trips into this during my spare time to collect butterflies. There was therefore ample opportunity for being bitten by flies of all sorts. Except for M.T. malaria and bacillary dysentery, my health was good. I was moved to Accra, Gold Coast, in June, 1944, where the conditions by comparison were excellent and civilised.

In July-August, 1944, I first noted the gradual onset of a swelling above the right wrist. This was pronounced to be a sprain, but the swelling gradually spread to involve the whole of the right hand, and writing for more than a few minutes caused cramp. Although daily massage seemed to help considerably, the condition persisted to such an extent that playing any games which involved holding a handle was impossible.

At this stage, and lasting about ten days, a severe neuralgia in the distribution of the right median nerve came on regularly every night, and at no time during this period did I manage to sleep more than twenty minutes at a time. Getting out of bed and moving the hand removed the pain and tingling within a minute or so, but tying the hand up with a sling to the mosquito netting did not help. Later I found that the somewhat excessive intake of alcohol during the evening helped considerably in giving me a restful night. At this time the maximal swelling was in the centre of the palm.

Gradually these unpleasant symptoms passed off, and the nights which I had come to dread became more peaceful. The swelling of the wrist and hand persisted for at least 6–8 weeks. Slight pitting œdema was always present, but apart from the short period mentioned above there was little interference with my work or normal activities.

Within a few weeks of the appearance of the first swelling a regular crop of swellings kept coming and going. In one week in October, 1944, I had 16 swellings, 3 coming in one day. At times they were irritating and the overlying skin red; at other times they appeared to be situated more deeply, causing an ache which usually felt like a bruise and lasted twenty-four hours. By far the greatest number developed on the forearms, but few parts of my body have so far escaped. Throughout the disease the eosinophilia has ranged between 36% and 12%. Repeated search for microfilariæ has always been negative.

I left West Africa in December, 1944, the journey to England taking four weeks. The weather was extremely cold, and with the fall in temperature there was a noticeable decrease in the number of swellings. In fact, by the time that I reached this country I was getting about one every third day at the most.

The night before we docked I noted discomfort in the right eye; and, though I suspected a worm as the cause, I could see nothing abnormal, and the feeling passed off. Next evening there was a repetition of this symptom, followed shortly by a creeping sensation on the globe. There was no difficulty in seeing the filaria under the conjunctiva, and it was removed intact with a needle after cocainising the eye. The procedure took some twenty minutes and was unpleasant but not really painful. Any unpleasantness was well worth the sense of relief which I felt on knowing that the worm had been removed. A mild conjunctivitis persisted for several days.

During the following months Calabar swellings developed at an average of about two a week. A second filaria made its first appearance about the last week in June, 1945, near the left eye, and for the next two and a half days it wandered round the eyelids, sometimes passing across the bridge of the nose but always returning to the same eye. It gave the impression that it was anxious to find the conjunctiva but could not do so. During this time it caused no true swelling, but often I could see it clearly under the loose skin of the lids, and throughout the day and the night I was constantly aware of its presence, as it seldom remained in any one position for more than a few moments.

After consultation with an ophthalmologist it was decided that, should the worm appear in the upper lid again, an attempt should be made to remove it. This was most ably carried out in the following manner. A stitch was passed under the filaria when it next appeared, and the suture was tied firmly. Local anæsthetic was then infiltrated and the whole worm removed intact, the small wound being closed with a suture. There was a moderate degree of swelling of the orbital tissues which lasted several days. I cannot recommend this method of removal as simple or completely painless, and the possibility of a portion of the worm being left behind and thus causing suppuration near the inner canthus must be borne in mind.

A third worm appeared near the right eye in August, 1945. Like its predecessor, it spent some days wandering round, but it differed in the fact that at one time it coiled itself in the outer aspect of the upper lid and formed a small Calabar swelling. Next morning it continued its movements, again crossing the nose but returning to the eye a few hours later. Several people have advocated the removal of the worm while it is crossing the nose, but I took most careful note of both these worms, and at no time was it really possible to discern them under the skin in that position.

At this time I had to go to London and was therefore unable to remain near medical assistance, should the worm appear under the conjunctiva. Later in the day I was fortunate enough to be in a London hospital, when I suddenly experienced the most acute pain deep in the right eye. This pain extended up over the frontal region to the top of the head. It was grossly aggravated by even the slightest movement of the eyes, and it was the worst pain that I have ever experienced. No worm had been visible or felt to be moving for about half an hour before the onset of this pain. These symptoms persisted for one and a half hours and then equally abruptly ceased, leaving nothing more than an ache, which was worst when the eye was turned. Fifteen minutes later the filaria could be felt crawling over the inner aspect of the *conjunctiva, having apparently emerged* from the inner canthus. It was rapidly and most efficiently removed by the sister in charge of the ophthalmic department.

The fourth worm was removed from my right eye after wandering round that region for over two weeks. Like the others, it seldom seemed content to stay quiet in one place, and throughout this period it was an almost constant source of annoyance and discomfort. Owing to lack of suitable instruments its removal was possibly somewhat slow, necessitating three lamellæ of cocaine. This dosage appeared to paralyse it, and there was little urgency in removing it, as it became almost motionless under the conjunctiva.

As I write this, my right hand and wrist are slightly swollen, having been like this for over a month, but there are no localised Calabar swellings.

The course taken by the Calabar swellings throughout the last nine months is of interest, as during the hot summer months they were most frequent but never exceeded three in a week. During the cold weather they have been distinctly uncommon. Even their character has altered, in that they are more transient, and indeed, if I did not know that I had the disease, they might pass unnoticed.

SUMMARY

Loiasis is a chronic condition, not amenable to any specific treatment, and may well be encountered in this country for years to come.

Removal of the worms should always be attempted when they are crossing the eye.

The mental distress which the filariæ cause in their wanderings should not be lightly disregarded.

Treatment with toxic drugs is not justifiable in any circumstances, since the possibility of permanent damage or disability resulting from the disease is almost negligible.

My own case-record is given in full, but it covers only a brief period of a long disease. It does, however, show most of the important points and is remarkable in that already four filariæ have been removed.

References at foot of next page

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How about the pain? For some time I considered the possibility of the term "fibrous mastalgia" to describe the condition, but I concluded that this term was too indefinite, made no reference to the epithelial changes which are fundamental, and suggested no link with the allied condition of fibro-adenoma. On closer examination, moreover, the term fibro-adenosis suggests a painful condition. The suffix "osis" implies a diffuse rather than a localised process such as is connoted in the suffix "oma." Vertue (1946) discusses the etymological significance of the suffix "osis" and points out that it denotes action or condition. By his definition "fibro-adenosis" should mean "a condition of fibrotic glandularity," and that is just what we wish it to mean. All diffuse fibroblastic activity in structures supplied with nociceptive nerves is painful, as for instance in "fibrositis," fasciitis, fibrillation of synovia in osteoarthritis, and Riedel's thyroiditis. Further, this "fibroblastic" pain has a tendency to vary with states of the weather, a tendency which is shared by the painful nodular breast. I therefore considered that the term fibro-adenosis, while giving a precise picture of the structural form of the condition, at the same time sufficiently indicated the clinical picture.

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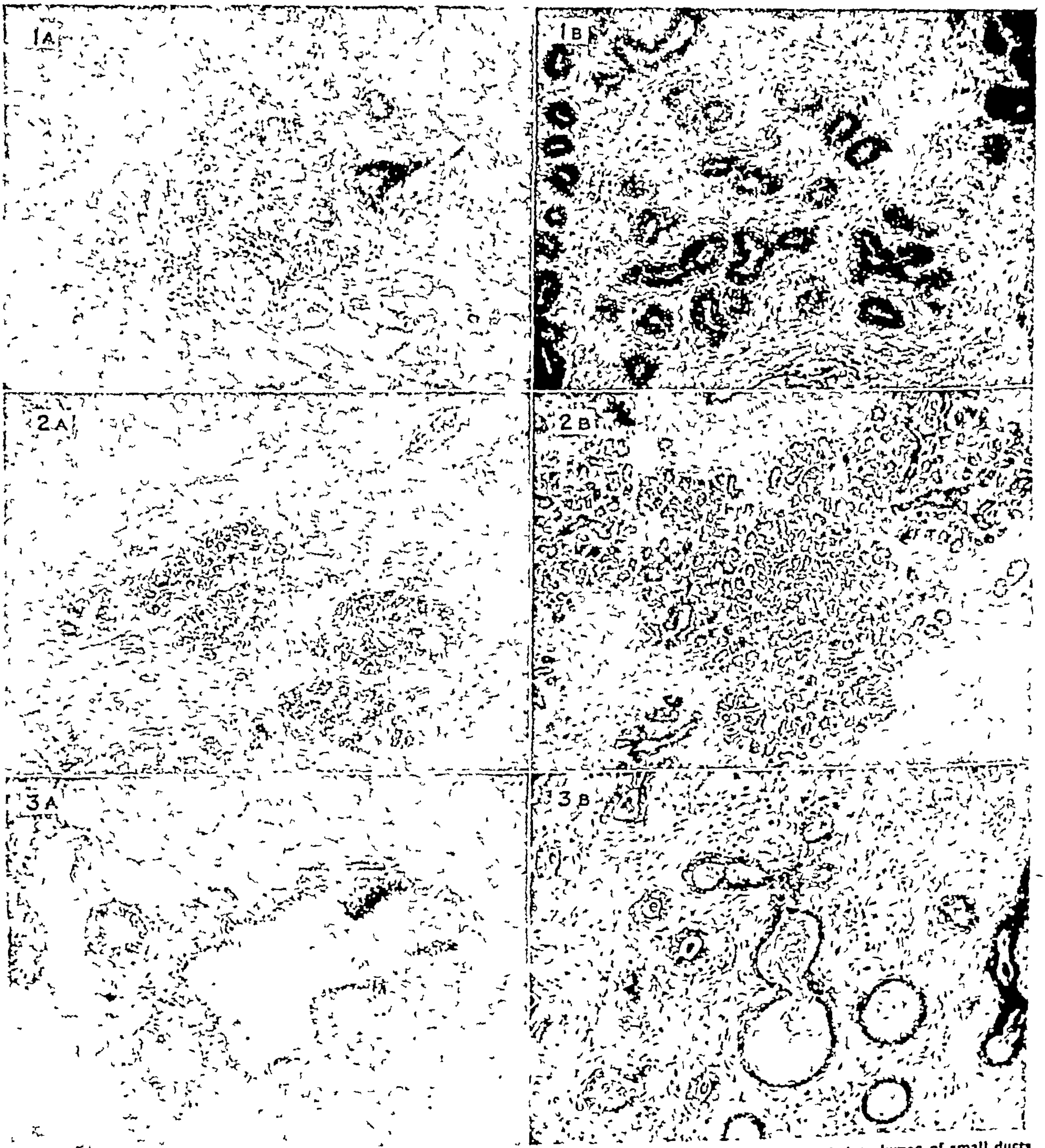
It is true that the epithelial changes are inclined to be more advanced more commonly in what we may agree temporarily to call fibro-adenosis, and this is a point to which I shall return later. The presence of fat in the fibro-adenosis indicates how diffuse it is. The process infiltrates and incorporates all the structures in the organ, including the fat and the nerves; hence its painful nature. Fibro-adenoma, on the other-hand, is localised. It probably arises in one acinus and, generating a formidable fibrous-tissue barrier, is everywhere exclusive of the remaining breast tissue. It expands by pushing the surrounding structures out of the way rather than by incorporation; thus it comes about that it contains no fat, excludes all nerves, and is painless. It is submitted that these differences, comparable to those existing between endometriosis and endometrioma, are nicely comprehended in the terms fibro-adenosis and fibro-adenoma.

In discussing the ætiology of fibro-adenosis I had to admit that our knowledge was scanty and inexact; the same must be said of our knowledge of the ætiology of fibro-adenoma. If, however, we are ignorant of this ætiology we have grounds for suspecting that the unknown cause is the same or similar in the two conditions. If it



Photomicrographs of fibro-adenosis (A) and fibro-adenoma (B): 1, early epitheliosis, with desquamation of cells into lumen of small ducts (note fat-cells along the right-hand margin and bottom edge of A, and absence of fat in B) (× 130); 2, alveolar arrangement common to all hyperplastic conditions of the breast (note fat-cells above the alveoli in A, and absence of fat in B) (× 78); 3, early cystic dilatation of ducts, with hyperplasia of lining epithelium and desquamation (note ducts are embedded in fat in A, and there is no fat in B) (× 130).

The time seems to have come when the physician, confronted by the patient convalescing from an acute rheumatic attack, must seriously consider instituting sulphonamide prophylaxis. The great objection to such a course in general practice is the need for frequent blood-counts to forestall toxic reactions. In a scattered rural community, such as that from which the patients under review are drawn, this difficulty is almost unsurmountable because of the distance from a pathological laboratory. Also, it is not always possible to keep the necessary close supervision over patients engaged in their ordinary occupations. It was hoped that penicillin might offer a way out of these difficulties and still provide a safe and effective alternative to the sulphonamides in the prophylaxis of acute rheumatism.

The findings in this small group of patients, who had acute rheumatism preceded by throat infections and were treated with penicillin by mouth, show a considerable reduction in the incidence of both pharyngitis and rheumatism in comparison with an untreated group of similar types of patients over twelve months. It is hoped that these findings will lead physicians with laboratory facilities to investigate this form of prophylaxis.

SUMMARY

A group of ten rheumatic patients were treated prophylactically with penicillin by mouth for a year, and the clinical findings were compared with those in an untreated group of similar patients.

Rheumatic manifestations were five times more frequent, and throat infections six times more frequent, in the control group than in the treated group.

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Reviews of Books

Hypometabolism

A clinical study of 308 *consecutive cases.* ESBEN KIRK, chief physician, Holstebro District Hospital, Denmark; SVEN ANCHER KVORNING, assistant, pharmacological department, University of Copenhagen. Copenhagen: Munksgaard. London: W. Heinemann. Pp. 83. 7*s.* 6*d.*

HOLSTEBRO is a country district in north-west Jutland, and until recently there was no organised medical service there. During the years 1940–42, 308 patients with basal metabolic rates below 88% of the normal were admitted to the district hospital, and this small monograph describes the analysis of these data. No indication is given of the number of patients with normal metabolic rates who were admitted in the same periods, so the authors are really only concerned with the reasons for the low B.M.R.s, and the symptoms to which they may have given rise. Only 18 of the 308 patients had genuine myxœdema, but 11 more had had treatment for exophthalmic goitre; 41 are attributed to undernutrition due to gastro-intestinal disease, anorexia nervosa, and vegetarianism, and the reason for the low B.M.R. remained undiagnosed in 108. Over 30 signs and symptoms were investigated in each of these patients, and the greater part of the monograph is taken up with tables showing the frequency with which such things as chilliness, decreased sweating, and impaired memory appeared in the patients in each of the diagnostic groups. This part of the book is almost unreadable and can be recommended only for reference. The authors give their findings for these symptoms in a control group, and conclude that the hypometabolism detected in many of these patients has no pathological significance. This really amounts to saying either that the normal rating is too high or that normal people may have B.M.R.s above and below the accepted range of normality. The monograph will have a limited appeal but it may be found useful by those concerned with the various manifestations of undernutrition seen in many parts of Europe today.

Practical Methods for the Microbiological Assay of the Vitamin B Complex and Essential Amino-acids

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MANY bacteria are nutritionally exacting towards a variety of vitamins and amino-acids, and this fact has been made the basis of methods of estimation of these growth substances.

In principle, the method consists in taking a medium which is nutritionally satisfactory in all respects with the exception of the one substance which is to be assayed. The amount of growth of an organism which is nutritionally exacting towards that substance will then depend upon the amount of that substance which is added to the medium, and a "standard" curve can be constructed to represent the growth which occurs in relation to the amount of assay substance present. The amount of this substance in an unknown solution can then be estimated by determining the amount of growth which it will promote at various levels of concentration of the unknown. The method thus involves: (1) preparation of a satisfactorily nutrient medium in which growth will be conditioned *solely* by the amount of assay substance added; (2) preparation of a standard inoculum; (3) removal of assay substance from medium and inoculum to give a satisfactory blank in the absence of added factor; (4) construction of an accurate and reproducible response curve; (5) quantitative recovery of assay substance from materials to be assayed; and (6) an accurate method of observation of the growth of the organism or of some consequence of growth such as fermentation acid.

Dr. Barton-Wright gives an elementary outline of the media, organisms, and practical methods involved in such studies for the assay of various vitamins and certain amino-acids; but his account is misleading about this difficult technique, which is still under investigation. He claims that "microbiological assay with the lactic acid bacteria is straightforward and presents no great difficulties," which is about on a par with saying "life is simple." The technique of this type of assay has only been developed within the last few years, and the little experience so far obtained serves mainly to emphasise how complicated interpretation of results may be. Results can be turned out so rapidly and easily that the method encourages a deceptive sense of accuracy in the operator; consequently a book of this kind should carry full warning of the likely errors.

The analyst undertaking assays of amino-acids, for example, must consider: how many estimations are necessary for each point on the curve in order to get a statistically accurate result; what degree of scatter can be expected and is permissible; how quantitative are the extraction procedures used and how has this been determined; what is the effect of the presence of peptides on amino-acid analysis; what percentage of assays with neurospora mutants show a reversion to wild type; what is the effect of salt content or buffering capacity of assay material; and how is the size of the inoculum controlled and standardised? This book does not answer these queries and does not hint that such questions arise.

Die Scheuermannsche Krankheit

J. E. W. BROCHER, dozent, University of Geneva. Basle: Benno Schwabe. Pp. 91. Sw. fr. 11.

THIS monograph is more than a description of adolescent kyphosis. As a disciple of Schmorl, Dr. Brocher has tried to correlate the radiological signs of disk pathology with clinical symptoms, and has produced an interesting study of Scheuermann's disease. He rightly stresses the frequency with which this apparently benign condition gives rise to chronic pain and disability in later life, as the result of arthritic changes in the mobile segments of the spine above and below the immobile and painless kyphos. The less common but more disabling lumbar form of the disease is given the prominence it deserves. On ætiology he has little new to offer us, but those inclined to attribute all low-back pain to posterior prolapse of the intervertebral disk might do worse than study this carefully written monograph.

1947 marks the 150th anniversary of the foundation of

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who hope that this year will confirm and strengthen the ties between their many customers and themselves. They hope, furthermore, to overcome some of the difficulties which beset them in the past year, enabling them to offer greater supplies of their products in 1947.

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Vitamin Therapy—its uses and limitations

CONVALESCENCE

The period of debility following acute illness—as, for example, influenza and pneumonia—calls for special care, because of the tendency to relapse and the lowered resistance to other infections. Modern work indicates that this state is due in no small measure to sub-normal nutrition from the restricted food intake during illness and also partly to the increased utilisation of certain food factors during the infection.

COMPLEVITE

a *single* supplement for *multiple* deficiencies

The recommended daily dose provides.

vitamin A	4,000 i.u.	calcium	160 mg.
vitamin D	300 i.u.	iron	68 mg
vitamin B_1	0.6 mg.	iodine manganese copper	not less than 10 p.p.m. each
vitamin C	20 mg.		

References: Shortage of space precludes list of references, but full documentation may be obtained on application to Clinical Research, Dept 6B

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The time seems to have come when the physician, confronted by the patient convalescing from an acute rheumatic attack, must seriously consider instituting sulphonamide prophylaxis. The great objection to such a course in general practice is the need for frequent blood-counts to forestall toxic reactions. In a scattered rural community, such as that from which the patients under review are drawn, this difficulty is almost unsurmountable because of the distance from a pathological laboratory. Also, it is not always possible to keep the necessary close supervision over patients engaged in their ordinary occupations. It was hoped that penicillin might offer a way out of these difficulties and still provide a safe and effective alternative to the sulphonamides in the prophylaxis of acute rheumatism.

The findings in this small group of patients, who had acute rheumatism preceded by throat infections and were treated with penicillin by mouth, show a considerable reduction in the incidence of both pharyngitis and
rheumatism in comparison with an untreated gr
similar types of patients over twelve months.
hoped that these findings will lead physicians with l
tory facilities to investigate this form of prophylax

SUMMARY

A group of ten rheumatic patients were t
prophylactically with penicillin by mouth for a
and the clinical findings were compared with th
an untreated group of similar patients.

Rheumatic manifestations were five times mo
quent, and throat infections six times more fre
in the control group than in the treated group.

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study this carefully written monograph.

THE LANCET

LONDON: SATURDAY, FEB. 15, 1947

Crisis and Recovery

THE Proprietors of THE LANCET regret that restrictions in the use of electric power will prevent normal production and distribution of the journal during the next two or three weeks. Everything possible will be done to minimise inconvenience thus caused.

Our thoughts inevitably go back to the General Strike of 1926, when our weekly issue was reduced to a single sheet; and it is natural to compare the two crises. Today's, though less acute, is more serious, because the country has less reserve of strength. But it has a redeeming feature: instead of two hostile groups facing one another, we now see a whole nation facing mankind's proper and eternal enemy—the scarcity of means to live. If opinions differ widely, as they do, on how best to keep the wolf from the door, we are at least united in wanting to drive him far away. By any method this will take time. When HITLER boasted that if Germany was defeated she would bring us down with her, he came all too near the truth: at best there must be a long period during which even our present standard of living will remain in danger. Our resources have been exhausted by war; and once again, for the third time in a generation, some of our friends doubt our capacity to make the necessary response. But for the third time it will be made. As at the end of the war in Europe, we recall Mr. CHURCHILL's saying that the mettle of a nation, as of a man, is proved by what it can do when it is tired. What we have to do now, though irritated and dispirited and perhaps underfed, is to work for material security and prosperity. But even this is not enough: we have also to work for social justice. To pursue simultaneously recovery and reform is difficult, yet neither the quantitative nor the qualitative aim will succeed unless we attempt both We cannot truly serve ourselves unless we serve what we believe to be civilisation; for recovery from sickness depends largely on hope of better things to come

Treatment of Toxic Goitre

SINCE we are ignorant of the primary cause of toxic goitre, treatment aims at the reduction of thyroid hypersecretion. Until 1943 this was achieved satisfactorily only by subtotal thyroidectomy. But since then favourable results have been obtained by purely medical means. Antithyroid drugs, notably thiouracil and its methyl derivative, have proved capable of reducing thyroid function with much the same certainty as the extirpation of thyroid tissue.

Both methods, surgical and medical, have their advantages and drawbacks, and their relative merits cannot be finally assessed on the basis of a mere three years' experience with thiouracil. On another page Professor HIMSWORTH and his colleagues make an interim comparison of about 90 thiouracil-treated patients with an equal number treated surgically in a previous period. From the patients' point of view there is no doubt that most prefer to get well by taking tablets rather than by undergoing a major operation. Moreover surgical treatment means admission to hospital or nursing-home, whereas this is often unnecessary with drug treatment, provided close supervision can be arranged. As to the safety of the two methods, HIMSWORTH found the mortality-rates about the same—2%—but the rates with both treatments are now probably lower than this. The 2% mortality for thyroidectomy done by the expert is a figure from the prethiouracil era; with preoperative detoxication by thiouracil, and perhaps also the avoidance of long domiciliary treatment with iodine, the mortality should be still further reduced. Agranulocytosis accounts for all the thiouracil deaths, and these should become very rare with early recognition and treatment with penicillin, which controls infection till the leucopoietic system has recovered. In their surveys of several thousand cases of thyrotoxicosis treated medically VAN WINKLE and others[1] and MOORE[2] found that the mortality from agranulocytosis was less than 0·5%, with a total incidence of 2·5%. They could find no relationship between the daily dose of the drug and the incidence of agranulocytosis, but the doses given in their cases were on the whole higher than we now know to be necessary. The smallest effective dose is the one of choice. Apart from fatalities, there are some complications in both treatments. With thyroidectomy there may be myxœdema, tetany (rare but distressing), injury to the recurrent laryngeal nerves, and other complications inseparable from any major operation. With thiouracil there are mild or moderate toxic reactions which may make it advisable or necessary to abandon the drug.

Once thyroidectomy is successfully accomplished little is required in the way of aftercare, though account must be taken of recurrences in later years even with a nine-tenths removal of the goitre. With antithyroid drugs treatment cannot be discontinued as soon as symptoms are under control—it must be continued for a long time, perhaps for years, until remission occurs. This remission may be long or short, lasting some months or up to two years, but we still cannot claim that a permanent remission can be obtained. It is perhaps a matter of controlling thyroid secretion until the abnormal pituitary stimulus, or some other disturbance a stage beyond that, has died away, or possibly until the thyroid itself has become relatively unresponsive to higher stimuli It is clear that this is a lengthy process, and too long for the endurance of some patients.

It is too early to say that drugs will supersede thyroidectomy or even that they are a satisfactory alternative. The drugs now being used in this country—thiouracil and its methyl derivative—are reasonably safe when given with proper precautions, and they are almost certain to be improved on in time. The biochemistry of all antithyroid drugs is in an early stage, but we may expect before long that they will be prescribed with as little fear of toxic reactions as are the sulphonamides.

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1. Van Winkle, W. jun. et al. *J. Amer. med. Ass.* 1946, 130, 343.
2. Moore, F. D. *Ibid*, p 315.

VARICOSE VEINS
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There is strong evidence that 'Ethamolin', exerts a *lasting* beneficial effect in the sclerosing treatment of varicose veins. Treatment is effected with a minimum of discomfort to the patient, and the total amount injected is normally less than 6 cc. 'Ethamolin,' an aqueous solution of 5 per cent monoethanolamine oleate with 2 per cent. benzyl alcohol, produces a firm adherent thrombus. There is no fear of sloughing in the event of accidental leakage from the vein. Being powerfully bactericidal, 'Ethamolin' reduces the risk of infection to a minimum.

With the growing recognition of 'Ethamolin' as a safe and efficient sclerosing agent, the need for operative treatment of varicose veins becomes increasingly rare.

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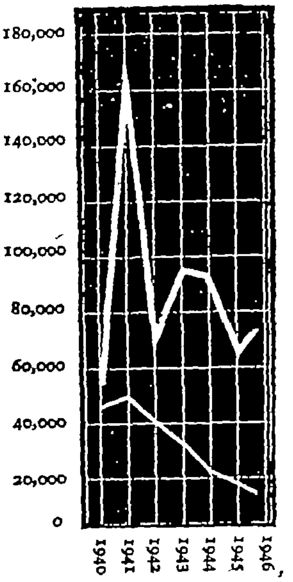
The success of the campaign for diphtheria immunisation focuses attention upon the gravity of the figures relating to whooping cough.

For this reason, and for the efficient convenience of doctor, parent and child, Glaxo Laboratories have introduced a new preparation in which the antigens of diphtheria and whooping cough are combined. Named "Diphtheria Prophylactic A.P.T. *plus* Pertussis Vaccine (Alum Precipitated)", this preparation enables *simultaneous* prophylaxis against both diseases to be condensed into a course of three injections (0.5 cc., 0.5 cc., and 1.0 cc.) at monthly intervals. Each cc. contains, in equal proportions, the customary Diphtheria A.P.T. (at least Lf 25) and 20,000 million H. pertussis alum-precipitated.



Left *Thick line* Whooping cough cases notified. *Thin line* Diphtheria cases notified.

Vital statistics embodied in this graph (England and Wales) were supplied by the Minister of Health in the House of Commons on 16th October 1946 (Hansard 1946, 197, 427, 227).

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Prefrontal Leucotomy

When Moniz published his monograph on prefrontal leucotomy ten years ago we pointed out that it is not timidity or conservatism that holds up advance in the treatment of mental illness.[1] Since then, more than a thousand patients in Great Britain, and probably a similar number in the United States, have had this *drastic* operation done on them. From statistics collected here, which are reviewed on another page, the Board of Control conclude that "remarkable improvement in behaviour follows in a large percentage of cases who have had severe symptoms with poor prognosis and have failed to respond to other methods of treatment." This resembles the conclusion reached by those who have reported similar mass figures in the U.S.A.—notably Ziegler[2] and Freeman and Watts.[3] A recent acid comment on these statistics is not, however, without pertinence for the Board of Control's figures:

> "Unfortunately, aside from their value as vital statistics, it is impossible to assess the validity of these findings. *At no point have there been other than* superficial attempts made to standardize the criteria for the pre-operative and post-operative clinical status of the patients. Not a single patient has been adequately studied. For a *moral and social responsibility* to do this, there has been substituted a phenomenal array of case statistics. Unfortunately the pyramiding of unknowns is scarcely a pathway to knowledge."[4]

Halstead, Carmichael, and Bucy, in this uncompromising passage, are taking for granted more rigorous standards of "adequate study" than *clinicians commonly satisfy or administrators expect*; and though, as the board point out, the returns they summarise were mostly compiled during the distractions and shortages of the war, and represent remarkable and praiseworthy effort on the part of those who supplied them, this makes it all the more necessary to interpret the results cautiously. It would be churlish to quarrel with the board's interesting report for not answering some crucial questions, which mass returns from forty different hospitals could not possibly elucidate—the postoperative changes in personality, for example. *It is essential* however that the inevitable crudity and uncertainty of such figures as these should be recognised, and that they should be classed and valued as vital statistics rather than as trustworthy data which permit the therapeutic range, the indications, and the risks of the operation to be judged It is easy to infer too much from lumping together disparate reports, just as it is easy, at the other extreme, to generalise falsely from the intensive study of a single instance or a small series. The former extravagance is perhaps the commoner when a *method of treatment has been in* use for some years, and it may be seen in a recent pronouncement on leucotomy: "if further reports confirm the high percentage of desirable results, it should become a routine procedure in mental hospitals."[5] The report of the Board of Control is free from such intemperance, and its last word is a plea for caution: "we are of the opinion that the operation should be carried out only after careful consideration of each individual case by experienced psychiatrists"

Another moral, and perhaps a less obvious one, to be *drawn from this report is that when a severe new* method of treatment is to be tried in psychiatry, or anywhere else in medicine, those employing it are under an obligation to carry out their share of the therapeutic experiment with something of the discipline they would accept if they were participating in a laboratory experiment—planning, executing, and recording it systematically, and frankly surrendering a little of their clinical independence so that the rightness of the therapeutic hypothesis may be more surely tested.

Traumatic Paraplegia

During the late war it was the standard practice of British and American surgeons to perform an early suprapubic cystotomy for all cases of traumatic paraplegia. The paraplegic has therefore arrived at a special centre with a cord lesion and an open bladder wound. Riches[1] now believes that the primary cystotomy can be delayed 24–36 hours without fear of irreversible pressure effects on bladder or kidneys, *an interval within which most cases can now reach* a special centre. Guttman[2] goes further and believes that many paraplegics can be treated throughout without a suprapubic cystotomy, provided they reach the special centre for their primary treatment.

The paraplegic after primary treatment presents five major problems—the urological, the neurological, *the orthopædic-ambulatory*, and the dietetic, and the plastic problem of the decubitus ulcer. It is on the control of the urinary tract that the prognosis of life chiefly depends. The greatly improved methods of recent years are best reflected in the mortalities, which at most centres here have been about 5–10% over the first five years. In the war of 1914–18 the figure was nearer 40% The critical urological question is whether the patient should be condemned to a permanent suprapubic life. Riches has described the excellent results, in terms of watertight closure and freedom from *infection and stone*, which can follow a high suprapubic cystotomy with an oblique tract and a small tube. Nevertheless, the highest standards of social and economic rehabilitation are impossible while the patient is condemned to a suprapubic tube. In the U S.A the policy of Prof. Donald Munro at Boston has been more or less generally adopted in the Army paraplegic centres, where about 1200 of these patients have been treated. This school regards a permanent suprapubic as a confession of surgical failure Chiefly by the use of tidal drainage they aim *in each case at the institution of* an automatic bladder, without dribblings or residual urine. Those who have visited the paraplegic centres at Staten Island, Atlantic City, White Sulphur Springs, and Toronto, have reported that about 90% of the cases show this result, and are voiding urine per urethram. It is clear, too, that this policy of closure of the suprapubic drainage is not reflected in a higher mortality than has been obtained in this country. The mortality in the first year after reaching special centres in America has

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1. *Lancet*, 1937, i, 156.
2. Ziegler. L H. *Amer. J. Psychiat.* 1943, 100, 178.
3. Freeman, W., Watts, J W. *J. ment. Sci.* 1944, 90, 532
4. Halstead, W. C, Carmichael, H. T., Bucy, P. C. *Amer. J. Psychiat.* 1946, 103, 217.
5. Kalinowsky, L. B., Hoch, P. H. Shock Treatments, New York, 1946, p. 227.

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1. Riches, E. W. See *Lancet*, Jan. 4, p. 23.
2. Guttman, L. *Ibid.*

been 1–2%.[3] There are some resistant cases which do not develop an efficient automatic bladder on tidal drainage, and in these cases, which show residual urine, well-marked trabeculation, and a trigonal fold across the internal meatus, the neck of the bladder has been resected. For the same type of case Lieut.-Commander HOEN, U.S.N., in Long Island, divides the anterior root of S.4 on one side to weaken the tone of the compressor urethræ. Both these procedures must still be considered experimental and awaiting full evaluation. The efficient application of tidal drainage for paraplegics is a most laborious and exacting procedure. For its routine and continuous use in large groups of patients over a period of weeks an exceptionally high standard of devotion in the medical staff at all levels is needed if the best results are to be obtained. But MUNRO and many others have now shown that most paraplegics can acquire an automatic bladder in two or three months by the thorough use of the tidal-drainage method, which not only can eliminate infection and check stone formation but in giving the patient voluntary control over micturition completes his reablement. The value of streptomycin against bladder infections is not yet settled. The antibiotic is undoubtedly effective against many of the common gram-negative organisms found in the urinary tract of these patients. However, during the first year of its use in the U.S. Army paraplegic centres many recurrences were reported, and acquired resistance in urinary organisms was often observed. Streptomycin must be given early and in very heavy dosage to be effective, and even then a single catheterisation can reinfect and undo the work of a whole course of the drug. Its chief value appears to be in the treatment of the acute infections or reinfections, when treatment must also be directed towards establishing and removing the primary cause of the infection.

The neurological problem comprises, in addition to the study of all the phenomena seen in paraplegia, the relief of pain and of spasms. Both here and in the U.S.A. intrathecal injections of alcohol have been shown to relieve these symptoms in selected cases. In perhaps one case in ten a chordotomy or rhizotomy may be indicated for the relief of persistent pain. The special value of a rhizotomy is that it permits a direct inspection of the cord lesion, which in some incomplete cases may be caused by pressure of bone or foreign body, the removal of which may effect a cure. In this war there were no reports of successful regeneration after the suture of divided caudal roots, or after the even more enterprising procedure of transposing dorsal roots above the lesion into the spinal canal and suturing them there to distal caudal roots.

It was a characteristic feature of the war's paraplegic casualties that they were more wasted than other wounded men. Their fall in weight seems to be chiefly the result of protein-loss, from the bedsores and the infected bladder. As much as 50 grammes of protein a day has been recovered from the dressings of a single large bedsore. Correction of the negative nitrogen balance is vital in the treatment of these patients. It is accomplished by intensive protein over-feeding. Up to 150–200 g. of protein may have to be taken daily for weeks on end. In this dietetic scheme concentrated milk-shakes play a large part. The beneficial effects of this generous diet are seen in every aspect of the patient's condition—in the urinary infection, in the healing of the ulcer and of the nerves, and in the patient's morale.

GUTTMAN, whose accurate descriptions of the gross anatomy and pathology of bedsores have greatly clarified our understanding of their progress and healing, stresses the adverse effect of the continued presence of adherent sloughs on the patient's general condition. He has drawn attention to the undermined edges, the sequestrating bone, and the burrowing sinuses with undrained pus pockets which are often seen, if looked for, in the early stage. At this stage ad-hoc surgery, for the removal of sloughs and sequestra and the adequate drainage of deep pockets, is essential; but radical reparative surgery may be disastrous if done before the patient's nitrogen balance has been restored, the edge of the ulcer has been sealed off by an epithelial response, and cultures have ceased to grow hæmolytic streptococci. The later alternatives in treatment of these ulcers are conservative dressings, free grafts, and repair by flaps of skin and fat. GUTTMAN has shown that, in favourable cases under expert treatment, moderate-sized ulcers can heal spontaneously in about three months. But many bedsores take much longer to heal, and all of those treated conservatively or by free grafts end up with a scar of thin epithelium on a dense fibrous base. This scar is commonly insensitive and unstable and must be protected for the rest of the patient's life. Such an end-result—at any rate when the ulcer is large—does not compare favourably with those obtained with big rotation flaps of skin and fat. At the Halloran Hospital on Staten Island, CROCE and his colleagues[4] in the U.S. Army covered sacral defects measuring as much as 18 × 12 cm. with local rotation flaps whose good vascularity and subcutaneous fat provided a more stable repair than could be obtained by natural healing. There is the further advantage that some of these flaps cut from sensitive areas may carry with them over the sacrum a degree of sensibility.

It is the object of treatment to make the patient independent of an armchair life. To do this walking is obtained by the use of crutches and braces. The lower the lesion the more trunk muscles are available and the more successful and stable is the gait, which may be either the "tripod" or "one-two" variety. But for walking with crutches to be possible at all power of grip must be present; C 8 must therefore be intact. The remarkable results obtained at Stoke Mandeville are illustrated by the fact that nearly half their patients have been discharged and half of these have found employment. Special training in such crafts as watch-making and photography is of particular value to patients with paraplegia. There is obvious value, too, in seeking, as has been done in the United States, the coöperation of the motor trade to make the adjustments necessary to enable the paraplegic to drive a car. With such cars driving lessons can become part of the reablement training at the special centre.

Few injuries present more complex therapeutic problems than paraplegia. Among war casualties the disability ranks next to blindness with loss of two limbs. Successful results by modern standards demand the integrated attentions of a number of specialists. The paraplegic centre must be under the clinical direction of one of these specialists—neurologist, urologist, or orthopædic surgeon—who must coordinate the work of the others in the treatment of the individual patient. This means that the centre should be sited at a hospital which has other special centres under the same roof, such as orthopædic, neurological, urological, or plastic. It is this organisation and the clinical devotion of the medical and nursing staffs, rather than any special form of therapy, which have yielded such successful results on both sides of the Atlantic.

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[3] Clarkson, P. War Office Report, March, 1946. Abridged in *Guy's Hosp. Gaz.* 1946, 60, 1509, 1511, 1513.

[4] Croce, E. J., Schullinger, R. N., Shearer, T. P. *Ann. Surg.* 1946, 123, 53.

Annotations

FOOD AND THE MINER

THE general policy of the Ministry of Food throughout the late war was to allow the maximum rations to all consumers rather than to give more to some at the expense of the remainder.[1] The special needs of heavy workers, such as miners and agriculturists, who have no access to canteens or "packed-meal" schemes, and so have to carry their midday meals with them to work, were partly met by a grant of extra cheese, and when bread-rationing was introduced last year these people received more bread units than the normal consumer. At the beginning of November, 1946, underground miners were allotted an extra ration of meat "in recognition of the efforts required to secure the maximum possible output of coal"[2]; and at the same time the allowance of meat to canteens was increased. These special rations are, of course, based on the fact that heavy muscular work uses up more food than lighter work, and that production is dependent on calorie intake. During the war the setting-up of industrial canteens and British Restaurants played an important part in maintaining health and output. These canteens made some discrimination in favour of the heavy worker, and there were two categories of rations, A and B, for canteens in heavy industries, both of which were more generous than that under which food was supplied to restaurants.

The Kaiser-Wilhelm Institut für Arbeitsphysiologie, to give it its full name, did some useful research at Dortmund before the war on the physiology of work, much of the expense of its upkeep being borne by the mining industry.[3] During the war, to avoid the bombing, the institute was evacuated partly to Bad Ems and partly to Diez. One of the many researches carried out by the staff has now been described by Kraut and Muller,[4] and this deals with the relationship between food and production, especially of coal. In the summer of 1943 rations in Germany had to be decreased far below the actual requirements. Kraut and Muller divided the calories contained in food into two groups—those necessary (1600–1800 per day) to maintain the body during strict rest, and the "work calories" needed for muscular activity of any kind. Experiments on a group of men building an embankment showed that output varied directly with the number of work calories in their rations. When a bonus of cigarettes was offered for increased output the relation between output and available calories was upset at once: the men lost weight in trying to do too much on the available food. A second investigation in 1943 was done on a group of 31 miners between 20 and 30 years of age. During a training period a daily total of 2800 calories, allowing 1200 work calo secured a daily output of 7 tons of coal per man— each ton of coal was equivalent to about 170 w calories. When given 400 extra calories a day the increased their output to 9·6 tons a day, but by t expending only 155 work calories per ton they los six weeks an average of 1·2 kg. in body-weight.[1] W they were given a further 400 additional calories output again increased slightly—to 10 tons per da and the men slowly regained their original weights.

The calorie consumption of coalminers in the R before the war varied from 3600 to 4800 a day, an the first year of the war the average daily ration 4200 calories. In the second year rations were cut the output dropped, though there was a time-lag be this result was observed. Kraut and Müller are convin that the fall in coal output was primarily due to t ration cuts. They maintain that each kind of w requires a fixed number of calories and that no acti can be continuously greater than the appropriate cal intake. If output is forced the workers lose weight this in itself lowers their capacity. A regular contro body-weight in industrial workers is a good meas of their calorie supply. Rationing of food, on this vi also means the rationing of industrial production.

An unpublished study of the diets of miners in vari British coalfields was carried out by the Ministry of F in 1944. This showed that underground workers w getting 3500–4500 calories daily. There have been more recent figures, and it is possible that increa mechanisation is reducing the miner's expenditure physical energy. A study of present-day diets body-weights might be illuminating.

GONOCOCCAL ARTHRITIS

IN considering obscure infective arthritis there is excuse for failure to exclude gonococcal infection by s simple tests as examination of an early-morning uret smear taken before micturition, and of the first u specimen of the day. Yet such tests are often omitt partly perhaps because it is not always recognised t the clinical and radiographic features of gonococcal rheumatoid polyarthritis may be identical. Some inter ing points emerge from a recent analysis of Service ca of infective arthritis by King and colleagues.[1] Exclud gonorrhœa, a quarter of the patients had non-spec genito-urinary infection. Involvement of a single jo was equally uncommon (less than 20%) in the gonococ and non-gonococcal cases. While the heels and plan fascia were affected with equal frequency in both typ gonorrhœa turned out to be the prime cause of infect Achilles tenosynovitis; arthritis of the metatar phalangeal joints was most commonly not gonococcal.

King and colleagues advise rest in bed for all patien whether febrile or not, and whether or not the affect joints are weight-bearing. Local heat is comforting, b splintage for more than a short period easily leads stiffness. Urethral irrigation is not yet obsolete in de ing with stubborn foci of infection, but prostatic massa must be practised with restraint and only after the su acute stage, since early vigorous treatment sprea infection. While the sulphonamides (and for th matter penicillin) did not prove very effective agai the arthritis, they were valuable, in combination wi fever therapy, in clearing up resistant genital infectio and were routinely used for this purpose. Artificial induced pyrexia, which is the great standby in deali with these joints, is most easily obtained by intraveno injection of T.A.B. vaccine; this is not without its dange and calls for skilful nursing, for it must be applied car and often, and the dosage pushed boldly to the limit

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1. Ministry of Food Pamphlet: Our Food Today. No. 2: The Industrial Worker. H.M. Stationery Office. 1945.
2. Supplement to above, 1946.
3. British Intelligence Objectives Subcommittee Final Report 83: Item no. 24. H.M. Stationery Office. 1945.
4. Kraut, H. A., Muller, E. A. *Science*, 1946, 104, 495.

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1. King, A. J., Williams, D. I., Nicol, C. S., London, J. *Brit. ven. Dis.* 1946, 22, 1.

safety so that the bursts of fever follow closely with only a day or two of remission; transitory signs of liver damage are not uncommon. Of the patients receiving this treatment, 90% of the gonococcal and 69% of the other cases made a complete and permanent recovery.

Assessment of results with hyperthermy—mechanically induced hyperpyrexia—was more difficult because this method is usually reserved for late and resistant cases. The unit of dosage is eight hours at 106° F, preceded by two days of sulphonamide therapy. Of 130 patients who were given this treatment, about half had one such session and the remainder two or three. Each patient wears a B.L.B. mask throughout, breathing 5% carbon dioxide in oxygen during the induction, pure oxygen during the session, and the carbon-dioxide mixture again for two hours after the treatment. A litre of 5% glucose-saline was given routinely at an early stage of the proceedings. There was only one death in this series, but here again minor liver damage is not rare. The immediate response to the first dose, and the rapid restoration of function, are a great fillip to morale. It is sometimes difficult to decide whether recurrent joint irritability is due to persistent active infection or merely to the inevitable results of inflammatory damage. In this series 57% returned to full duty in their initial category, and 17% had to be down-graded. Of the 26% who were regarded as failures and discharged as unfit, many later made an excellent recovery in civil life. After several years 72% of the whole group of hyperthermy cases had made an excellent functional recovery; and though the recovery-rate was higher in the gonococcal than in the non-specific cases—76% as against 65%—the latter figure is high enough to hearten those who have been gloomy about the prognosis of chronic infective polyarthritis.

We may conclude that artificially induced hyperpyrexia of one kind or another is the treatment of choice for gonococcal arthritis and for metastatic arthritis from a non-specific genito-urinary focus of infection; T.A.B. vaccine, vigorously used, gives excellent results in the early stages, but hyperthermy is better for late and resistant cases.

DRYING PROTEIN

In a report to the Medical Research Council[1] Dr. Greaves discusses the technical problems met in drying protein materials, particularly serum and plasma, and describes the rapid growth of the M.R.C. drying unit at Cambridge during the war. A relatively simple "pilot plant," modelled on that of Greaves and Adair and producing 48 200 ml. bottles of dried serum a week, developed into one with a normal weekly output of 2500 400 ml. bottles of dried plasma, or in emergency twice as many. The experience gained in designing, building, and operating this large plant, which is now published as a whole for the first time, will be of great value to those engaged in similar work.

The degree of dryness achieved is of fundamental importance if proteins are to be properly preserved; but Greaves emphasises that, unless the containers used for the dried material are airtight, moisture may be taken up during storage and cause denaturation of the dried material, rendering it unfit for use. Thus dryness alone is not all: sealing must be perfect if preservation is to be satisfactory over any considerable length of time, especially in hot humid climates. Accurate observations on the storage qualities of dried-protein materials in relation to their initial residual moisture content, their storage conditions (especially temperature and humidity), and the length of time they are kept under these conditions, could not, unfortunately, be made during the overcrowded war years, and it is to be hoped that this gap will now be filled, so that one will then be able to forecast with assurance the "performance" to be expected from dried-protein material in any given circumstances.

Freeze-drying is the method of choice for preserving most therapeutic substances, and extension of its use in peace-time may be expected. Materials in the medical field which Greaves thinks are best preserved in this way include biological standards, therapeutic immune sera prepared in animals, immune and convalescent human sera, diagnostic antisera, human plasma for transfusion, unstable drugs, hormone preparations, bacteria, viruses and yeasts, vaccines, and human milk. Many of these substances are packed in small amounts, whose freeze-drying presents difficulties not encountered in drying larger quantities. Greaves concludes his survey by describing the "centrifugal vacuum spin-freezer" evolved to overcome these difficulties.

This is a worthy record of the technical progress made in the M.R.C. drying unit, under the stimulus of the war. The unembellished lists of figures representing the work accomplished by the unit give no indication of the anxieties, difficulties, and frustrations which had to be overcome before the plant got into its stride.

SOME LUTON FAMILIES

Luton is "a new, expanding industrial town, an urban island in a rural sea." It is also a town that takes its social problems seriously and shows enterprise in getting them investigated. Mr. C. G. Tomlinson[1] has added another good survey to those of Dr. Grundy and Mr. Titmuss and the various reports of the Luton school medical officer. Its interest is general in that the "social problem group" is carefully discussed.

Mr. Tomlinson distinguishes from his "problem families" three other groups who have come to grief: (1) "biological casualties," individuals or families who by reason of age or infirmity are unable to take proper care of themselves; (2) "social casualties," families whose efficiency and circumstances have greatly deteriorated because of the death of husband or wife, or because of the physical disability of the wage-earner or housewife owing to acute or chronic illness or too frequent pregnancies; and (3) "problem individuals," such as solitary migrants, prostitutes, habitual criminals, and delinquents. The true social-problem group he classifies as families who for none of these reasons "require a substantially greater degree of supervision and help over longer periods than is usually provided by existing social services." Thanks to this clear analysis his estimate of the incidence of social-problem families is much lower than any given by other workers, and the idea of the "submerged tenth" is dispelled by his figures. While he himself points out that London, South Lancashire, and other "reservoirs of human wreckage" may yield higher figures, in Luton at least, the proportion is more like a submerged hundredth.

The factors important in creating the problem family are, he finds, subnormal mental capacity, adverse family influence during childhood, broken families, absence of the husband in the Forces, alcoholism, and mental disharmony. In the 167 families studied these factors were found singly or in combination, or, in a small number of cases, coexisting with "social casualties." Mental disease as opposed to mental deficiency does not seem to be a causal factor. Only one case is mentioned in which a parent was admitted to a mental hospital, and in that case the family is said to have deteriorated owing to her absence rather than her illness. Moreover, most of the families exhibiting mental deficiency are not problem families; so that to be subnormal mentally is by no means a necessary first step towards becoming a social problem. The conclusion is that there is not really any distinct social group to be picked out: "On the contrary, the lesson seems to be that each problem family presents a unique complex of circumstances which can only be fully understood when regarded in its entirety." Encouraging though it may be to conclude that the incidence of problem families is low, nevertheless the absolute number, even in a relatively privileged town like Luton, is quite large enough to need some special measures.

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[1] Preservation of Proteins by Drying, with special reference to the Production of Dried Human Serum and Plasma for Transfusion. By R. I. N. Greaves, M.D. *Spec. Rep. Ser. med. Res. Coun., Lond.* no 258. H.M. Stationery Office. Pp. 54. 2s.

[1] Families in Trouble. Charles G. Tomlinson, B.A. Admin., senior administrative officer, Public Health Department, Luton. Luton: Gibbs, Bamforth. Pp. 44. *3s. 6d.*

Mr. Tomlinson wants a combination of prevention and therapy. He favours voluntary sterilisation, though here he seems to disregard his own findings which provide little evidence of any inherited stigmata. The case for contraceptive measures rests on quite different grounds, and the inclusion of birth-control advice in the case-work organisation seems fully justified. Nursery schools, he thinks, can and do help to prevent fecklessness spreading from parents to children; and, however expensive these may appear, money spent on inculcating good habits and giving the child some experience of a happy life is soundly invested. On the therapeutic side, Mr. Tomlinson describes with admiration the work of the pacifist service units in Manchester and Liverpool, and appeals for more workers willing to attack the problem as they did—by going in person to scrub away the filth and mend and patch the derelict home and furniture. Anybody who undertakes constructive work for such people must recognise their "obtuseness of mind and degenerate habits" and to try to discover the means of overcoming the resistance that has already defeated innumerable attempts to help them. "To wash one's hands of those who do not respond willingly to the help which they are offered is to evade the whole issue and leave the worst cases untouched."

For its purpose *Families in Trouble* could hardly be better. It belongs to what has been called the Beatrice Webb school of medicine, and is altogether worthy of that school.

VITAMIN B AND BLOOD VELOCITY

THE circulation-time now has an important place in the assessment of heart-failure. The latest agent to be recommended for the test is the vitamin-B complex.[1] Its value for this purpose was discovered by chance through a woman to whom it had been administered parenterally complaining of a taste on her tongue like that of a "chewed-up vitamin tablet." The preparation consisted of 10 mg. each of thiamine hydrochloride and riboflavine, 5 mg. of pyridoxine hydrochloride, 50 mg. of calcium pantothenate, and 250 mg. of nicotinamide, dissolved in 5 ml. of sterile isotonic saline. House-officers and nurses who were given this preparation confirmed that the onset of the taste was abrupt, intense, and unmistakable. Descriptions of the taste ranged from that of a brewer's yeast tablet to one of stale fish with a warm sensation on the tongue and in the throat.

The test is carried out by rapidly injecting 5 ml. of the solution into the antecubital vein, and noting with a stop-watch the time between the beginning of the injection and recognition of the taste. In a control group of 50 healthy adults the average arm-to-tongue circulation-time was found to range from 9·8 to 10·3 sec. The figures for patients with heart-failure were: congestive failure without treatment (15 cases), 28–53 sec.; congestive failure controlled by digitalis (10 cases), 9·8–13·4 sec.; heart disease without congestive failure (10 cases), 9·9–31·0 sec. Few side-reactions were noted: 2 patients complained of epigastric fullness, 4 of feeling unusually warm, and 1 of bladder tenesmus twenty-four hours after the injection. The possibility of serious reactions in patients who are hypersensitive to thiamine[2] should however be borne in mind. Further work is being done to determine which component of the complex is responsible for the characteristic taste.

These results compare favourably with those obtained by other methods. Unfortunately, as with many other means of measuring circulation-time, the result depends on the patient's acuity; with an intelligent, coöperative patient the error is probably small, but with an ill or less intelligent patient there is bound to be a lag before he detects or indicates that he has detected the taste.

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[1] Swenson, R. E. *Amer. Heart J.* 1946, 32, 612.

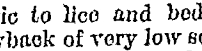
[2] See *Lancet*, Feb. 8, p. 223.

GERMAN INSECTICIDES

THE spoils that fall to the victors in a modern war are usually meagre; moreover, the vanquished enemy remains as a liability. All that can be extracted in the way of reparations seem to be some scientific secrets. The investigations of the Allied Intelligence Service have revealed some interesting research in the German chemical industry. The work on insecticides, like that in other fields, was uncovered in all stages from preliminary laboratory tests to large-scale manufacturing methods.[1] On the whole, chemical research was more efficient than the biological testing methods, some of which were rather crude.[2]

It seems that the Germans had known of the value of D.D.T. for some years and were experimenting in two directions—to simplify its manufacture and use, and to find a substitute which was not subject to Geigy's patents. A simplified mixture of D.D.T. analogues, about a quarter as insecticidal as D.D.T.[3] but easy to emulsify, was produced under the name 'Lausetο.' This was used extensively to proof clothing for the German forces against lice. In their efforts to find substitutes, the German workers tested a number of compounds chemically analogous to D.D.T. The most promising were 'Gix' (in which fluorine replaces chlorine in the *para*-phenyl positions) and 'Me 1700' or dichlor-diphenyl-dichlorethane; both have about a third to a sixth of the insecticidal power of D.D.T.[3] Me 1700, sometimes known as 'D.D.D.' or 'T.D.E.,' has been manufactured commercially in America, where tests have shown it to be highly toxic to mosquito larvæ.[4] On the whole, however, these analogues do not compete with D.D.T. in general utility.

Another type of compound which was shown to have high insecticidal powers was the organic sulphones. The dialkyl sulphones are very toxic to mammals as well as to insects, but the replacement of one alkyl group by an aromatic group gives a much safer, though no less insecticidal, compound. A number of substances of this type were tested, the most promising being, apparently, chlorphenyl-chlormethyl-sulphone,



which was given the name 'Lauseto Neu.' This is actually more toxic to lice and bed-bugs than D.D.T.; but it has the drawback of very low solubility in kerosene (about $^1/_4$%).[3] The Germans used it in the form of powders, dispersions, and emulsions; they were in any case so short of mineral oils during the war that little could be spared for insecticides. The value of these sulphones as insecticides deserves to be further explored; their toxicity to mammals must, however, be investigated before they are used here in practice.

In the absence of nicotine, the Germans evolved for agricultural use a substance known as 'Bladan,' the tive ingredient being the hexa-ethyl ester of tetra-hosphoric acid—$[(C_2H_5O)_2PO]_2PO$. This compound is, owever, believed to be less satisfactory than the natural roduct. In addition, a considerable number of organic trogen and phosphorous compounds were tested as secticides. Many of them were produced in connexion ith research on chemical warfare and are still on the cret list: none combines high insecticidal power with asonably low toxicity to mammals.

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[1] Combined Intelligence Objectives Subcommittee. Item no. 24, File no. XXIII-20; Item no. 24, File no. XXVI-73. H.M. Stationery Office. 1945.

[2] Kilgore, L. B. *Soap*, 1946, 22, 122.

[3] Busvine, J. R. *Nature, Lond.* 1946, 158, 22.

[4] Deonier, C. C., Jones, H. A. *Science*, 1946, 103, 13.

One programme was directed to discovering mosquito pellents, and, although the test method seems to have een rather crude, one very effective substance was ound and called '50/181.' This is trichloracetyl hlorethylamide ($C.Cl_3CO.NH.C_2H_4Cl$), whose effectiveess has been confirmed by S. R. Christophers in some ork which has not yet been published. The Germans sed it in the following formula: trichloracetyl chlorthylamide 7·5%, calcium chloride 1·25%, magnesium hloride 1·25%, absolute alcohol 60%, water 30%. It is aid to be innocuous when applied to the skin, but this ould require further investigation.

BATTLES LONG AGO

Nowadays, if the water-supply or sanitation of a big own goes wrong for an hour or two the citizens feel that heir rights are being infringed, and say so in bitter letters o the press. Yet only a hundred years ago legislation o provide these amenities was held to be an attack on he liberty of the subject.

Mr. Asa Briggs has lately reviewed[1] the passionate lifferences which ushered in the birth of our public-health system. The filth created in our towns and cities y the industrial revolution was the main argument f Chadwick and his colleagues—Dr. Southwood Smith, Ashley the philanthropist, Bishop Blomfield, Viscount Morpeth, and many others—and their method was to nake the facts known. Chadwick published reports on anitary inadequacies and abuses, and reached the conclusion that by knowing the general lay-out of a town he could tell where the worst epidemics would occur; Southwood Smith found that "wherever the Commissioners of Sewers have not been, there fever is prevalent"; and in Sheffield James Heywood and William Lee told how, "with awful precision," they could detect by inspection alone the unhealthy parts of the town. Everywhere filth and squalor were associated with unnecessary deaths and murderous epidemics. Southwood Smith summed up the debasing effect on the human mind:

> "There is a point of wretchedness, which is incompatible with the existence of any respect for the peace and property of others; and to look in such a case for obedience to the laws, when there is the slightest prospect of violating them with immunity, is to expect to reap where you have not sown."

The facts could hardly have been stronger; and by 1848, when Morpeth was introducing the Public Health Bill, they were very widely admitted. But the fight had merely shifted ground: it was now a debate on methods. "There were interests everywhere that had a stake in dirt and disease." The Bill, criticised as un-English, was said to embody an alien principle of centralisation, to endanger local pre-eminence, to permit an objectionable assumption of power by the Government, to be more like a Russian ukase than an English Act of Parliament. Reports on the towns, it was said, were exaggerated (though the facts in *Our Towns*[2] published nearly a hundred years later make it clear that they could not have been); the smoke clause would disable industry and make the manufacture of coke impossible; dirt, disease, and crime had no connexion with each other; water-closets had nothing to recommend them; and the whole thing was too expensive.

Mr. Briggs—though he himself resists the temptation—says we can hunt for parallels and differences if we wish. It is hard to refrain, for some of the arguments of the opposition have such a familiar ring. It is reassuring, at least, to know that one much-questioned innovation in the health field turned out so well.

MENTAL NURSING

If general nursing is facing serious difficulties at present, the situation of the mental nursing service is yet worse. Dr. A. Allan Bell, medical superintendent of Dundee Mental Hospital, recently reported to the city's mental-health committee that in the daytime he had only eight nurses looking after seven wards of 30–40 patients each; and that the nurse sometimes had to leave a ward wholly unattended while she took a meal. Many senile and sick patients in these wards cannot possibly receive the nursing attention they need.

Invited to send us his personal opinion, Dr. Bell praises highly the nurses who have stuck to their work under these trying conditions. Most of them have been in the hospital through the war, when overcrowded blacked-out wards increased the strain and anxiety of their work. This branch of nursing, he believes, is neglected because of the "prejudice, fear, and awe felt by the community against mental patients and mental hospitals." Even general-trained nurses share this prejudice; and he points out that though general nurses might profit by a period of experience in mental hospitals, that would not make mental nurses of them. The mental nurse has a different approach to the problems of mental disorder: "she has had her character so moulded and formed during her early years of training that no matter what her own particular personality may be she will continue to show the same sympathy and devotion to her patients, however difficult or aggressive these may be, thus displaying the value of well-organised sentiments in helping the emotional difficulties of others." It is interesting that Dr. Bell distinguishes this as a quality of the good mental nurse, and finds it undeveloped in the general run of State-registered nurses. There will be exceptions in both groups, naturally; but there is certainly some reason for supposing that this tenderness towards patients is more commonly fostered by mental than by general training; and yet it should be the chief attribute of every nurse.

In his staffing difficulty, Dr. Bell is turning to the new recruitment service started in Scotland under the Nuffield Hospital Trust; but as a long-term policy, he would like to see a well-planned regional mental-health service, each region having its own psychiatric administrator. The hospitals in the region would exchange staff, so that mental nurses, after training in a mental hospital, would be drafted to observation wards, psychiatric wards of general hospitals, child-guidance clinics, centres for the care of the aged, mental convalescent homes, and reablement centres. They would be of special value in the field of social psychiatry, and some might perform the history-taking duties of psychiatric social workers (who are almost unobtainable). They could certainly do much for the families of mental patients, helping them through difficult periods with recovered members, and encouraging them to seek early treatment when signs of breakdown threatened.

The next session of the General Medical Council will open on Tuesday, Feb. 25, at 2 P.M., when Sir Herbert Eason, the president, will take the chair.

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1. Public Opinion and Public Health in the Age of Chadwick. Published by the Chadwick Trust, and obtainable from the lecture secretary, 204, Abbey House, Westminster, London, S.W.1.
2. Our Towns. London. 1943; see *Lancet*, 1943, i, 631.

Reconstruction

ORGANISATION FOR OLD AGE

AN INSTITUTE OF GERONTOLOGY?

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The present arrangements for the care of the aged sick are inadequate. All over the country doctors and social workers echo the question, " What can we do for our old folk ? "

Once this was a problem for the relations only ; now it concerns the whole community. Medical practitioners are anxious to get elderly patients into hospital ; medical superintendents want to discharge them and free beds for other cases ; almoners seek homes, domestic help, or nursing care for those no longer able to look after themselves. Outside the hospital sphere social workers, welfare committees, religious bodies, and charitable organisations make patchwork attempts to cater for the growing number of old people. Yet, in spite of all these efforts, the care of the aged sick and infirm remains unsatisfactory. Organisation against old age is long overdue.

WORK IN HAND

First let us consider some of the societies interested in this matter. On the purely medical side pride of place must be given to the Club for Research on Ageing. This body, whose members are scientists or doctors, is occupied with fostering research and investigation into senescence. Gerontology in the abstract is the chosen field for its labours. Its approach to old age is impersonal and not concerned, except incidentally, with the human or social aspect.

When we turn to the care of sick persons, most of the work is done by general practitioners, who gradually acquire considerable skill in geriatrics. Unfortunately, little of this is transmitted to younger generations, most of it dying with the doctor. During recent years the municipal " chronic " hospitals have undertaken the care of large numbers of old people ; but, according to the hospital surveys, few of these are comparable in efficiency with the average general hospital. In fact, the Institute of Almoners paints a gloomy picture of the conditions existing in some of them. The voluntary hospitals, which do not cater for the long-stay case, treat relatively few elderly patients.

It seems, therefore, that there is a great gulf between those who perform research into problems of senescence and those who look after the aged sick. The needs of the one are unknown to the other, and research is rarely carried out in hospitals for chronic sick. At the same time, the unrecorded clinical wisdom of the practitioner is lost. Hence little advance has been made in this branch of medicine during the last fifty years. It may be said of geriatrics that " the harvest truly is plenteous, but the labourers are few." There is need for more interest in the diseases of old age, more teaching of geriatrics, and a higher status for those who work in this sphere.

To bridge the gap between the medical and social aspects of gerontology, we have the work of the Nuffield Foundation. This promotes research on the one hand and collects social-welfare data on the other. Its beginnings in this field are full of promise. As the one organisation with adequate funds to perform its task, the Nuffield Foundation can be a fairy godmother.

Apart from this, there are numerous societies interested in the care of the aged. One of the most notable is the National Old People's Welfare Committee, sired by the National Council for Social Service. In the first place it promotes the formation of local old people's welfare committees all over the country. These perform very useful work and fulfil a long-standing need. Secondly, it is trying to coordinate the programmes of philanthropic and religious bodies which would otherwise compete or bid against each other for charity and public funds.

In the domain of housing, several schemes have already been put into practice. These vary from special municipal flats and cottages to colonies for the aged, such as the Whiteley Village Trust and the Victory and Churchill Homes of the Church Army. The Old People's Homes Committee of the Family Welfare Association performs valuable work, keeping in touch with various homes, hostels, and almshouses, and trying to find suitable vacancies for homeless old folk. A recent development has been the provision of hostels for the elderly who need more care and attention than they have in their own dwellings. Perhaps the best examples of these are the Hill Homes at Highgate, where some 150 old men and women live under sympathetic supervision in comfortable quarters. There has also been a renewal of interest in almshouses, and a new association has been formed in London to promote their well-being.

Another development is the formation of clubs for old folk, where meals and social amenities are available for a small subscription. The best known of these is the Darby and Joan Club at Streatham. For those who live in their own homes the Ministry of Health system of home-helps and the Women's Voluntary Services arrangements for the provision of ready-cooked meals are a boon and a blessing.

The organisations mentioned above are only a selection of those engaged in this branch of welfare work ; the National Old People's Welfare Committee has no less that 34 separate bodies represented on it. Therefore we cannot say that there is a lack of interest in the problems of old age.

DEFECTS AND DEFICIENCIES

When we come to consider the results of all these busy activities, defects and deficiencies begin to make their appearance. For instance, there is not enough provision for the infirm old person who needs nursing care or supervision at home. Lack of staff causes the nursing-homes either to refuse such cases or to charge high fees. The chronic hospitals consider them fit enough to be discharged, but they are not always equal to the task of caring for themselves. Home-helps and ready-cooked meals go somewhere towards their needs, but such cases are numbered by hundreds, not by tens. The Old People's Homes Committee does good work within its limits but gets swamped by floods of applications. The Church Army and other bodies interested in the provision of housing tend to work in relative isolation. The Institute of Almoners can act for patients in a hospital, but its knowledge and resources are not so readily available to the private practitioner. As yet there is no central bureau to correlate all the information and tap the various sources of help and expert knowledge. If a doctor or social worker is seeking assistance for some elderly person, it is often necessary to approach organisation after organisation, committee after committee, and secretary after secretary. First one and then another will plead shortage of funds, lack of accommodation, or a long waiting-list.

We see therefore, both in medicine and in social welfare, that there is a great shortage of facilities to meet the needs of old folks today, and that the existing organisations do not work together as they might. More homes, more hostels, and more hospital beds are wanted—more nurses, more doctors, and more welfare workers. Further, we must have contact between those who look after the elderly when they are well and those who care for them when they are sick. The coordination begun in the social sphere by the National Old People's Welfare Committee and the Old People's Homes Committee must be widened and extended to cover the realms of medicine and social service. In the United States the Gerontological Society attempts to perform this necessary duty as regards the scientific and economic aspects of old age, and the American Geriatric Society fosters an interest in the medical and nursing care of the aged. But a combination of medical, scientific, social, and economic efforts is needed if a real advance is to be made. There is a case for the foundation of an Institute of Gerontology in this country to relate the activities of all workers, medical or social.

AN INSTITUTE OF GERONTOLOGY

Let us consider how such an institute might be of service. In the first place, a central body would be able to extend the work of the Club for Research on Ageing and the Old Age Research Committee of the Nuffield Foundation. It could also organise teaching and encourage publication of original work on gerontology. Though there are now two American journals devoted to the subject, no British periodical of this kind exists. The issue of such an organ would supply a want long felt by those interested in old age. While knowledge of geriatrics was thus being disseminated through the profession, special hospital units could be set up in suitable centres. This suggestion was made by the authors of the Ministry of Health Hospital survey of the London Area and has much to commend it. In no other way will the care of the aged become an active, effective, and respected branch of medicine.

With research, teaching, literature, and practice thus encouraged, the social-welfare aspect of gerontology can be brought into line. There is at present an emergency bed service in London which can arrange urgent admissions to hospital on behalf of any doctor. With a similar central bureau, domestic help, convalescent homes, physiotherapy, and a bed in some hospital or hostel could as readily be found for the senile. Such an institute as that envisaged could make good use of the information already collected, hence only staff work would be necessary to give many old folk their freedom from fear. It seems a small price to pay for a very great blessing.

Some may think that an appeal for the foundation of an Institute of Gerontology is premature. After all, the subject is comparatively young, and only a few doctors are interested. In less than two years the new National Health Service is likely to be operating; hence some think that the Ministry of Health should be left to grapple with the problems and difficulties which have arisen. But these are the very reasons for prompt action. The young plant of gerontology must be watered and fertilised. All the present interest in the subject must be harnessed while it is still fresh. As for the National Health Service, it is a challenge to act while voluntary initiative can be effective. Before long, every new proposal will have to be referred to the mandarins of Whitehall. An organisation in being before 1948 would have a better chance of survival than one arising after that date. The need for it is urgent enough. At present the doctors' surgeries and the municipal hospitals' beds are choked with elderly patients needing help. Now is the time to act. Let us get ready to deal with the difficulties which beset old age. *Nunc floreat gerocomia.*

"... To find a truth and have it repudiated and neglected ... is one of the bitter things for the discoverer, and often an incalculable calamity for the world. In 1827, Melier, a young intern in a Paris hospital, expressed the belief that inflammation in the right iliac fossa depended upon disease of the vermiform appendix. He reported undoubted cases of appendicitis confirmed by autopsy. He described gangrene, perforation, concretions, and peritonitis. He ... believed that if the diagnosis could be made, operation was demanded. The great Dupuytren arose in discussion and destroyed that young surgeon."—Dr. EDWARD A. SCHUMANN in a presidential address to the American Gynecological Society (*Amer. J. Obstet. Gynec.* 1946, 52, 881).

Special Articles

PREFRONTAL LEUCOTOMY

REPORT ON 1000 CASES

IN 1945 the Board of Control started an inquiry into the results of prefrontal leucotomy. A questionary was sent to all county and borough mental hospitals in England and Wales, to all registered hospitals, and to most of the private mental institutions; from the replies received the board has published a report[1] on the results of this operation in 1000 cases of mental disorder.

THE OPERATION

In prefrontal leucotomy the frontothalamic tract, which connects the prefrontal area of the frontal lobe of the brain with the thalamus, is divided; and after this division the nucleus medialis dorsalis of the thalamus degenerates.

The crude intention of the operation, which was introduced by Egas Moniz in Lisbon in 1935, is to break the connexion between the patient's thoughts and his emotions, thus relieving mental tension and taking the sting out of experience. Emotional tension is an important symptom in many types of mental disorder, especially in melancholic and obsessional cases. The schizophrenic, though he appears unemotional, may be dominated by the emotion associated with his hallucinations and fantasies. It is for such cases that the operation is commonly used. The report notes that according to Freeman it can also be used to lessen mental distress from intractable physical pain.

Operative risks include death from hæmorrhage, immediately or later (19 cases in the series), or from a complication such as bronchopneumonia (4 cases), meningitis (3 cases), or cerebral abscess, respiratory failure, subdural hæmatoma, or empyema (each 1 case); the development of epileptiform fits or other postoperative symptoms; and changes of personality.

The surgeon cannot be certain of cutting the frontothalamic fibres.

> The report quotes a case, recorded by A. Meyer, of successful prefrontal leucotomy performed on a schizophrenic of 5 years' standing. This patient did extremely well, becoming happy and unworried; but when he died of carcinoma of the œsophagus 18 months later, autopsy revealed that the frontothalamic fibres had not been cut and the nucleus medialis dorsalis had not degenerated.

It is therefore possible that damage anywhere in the brain might have a beneficial effect in some cases; even so, as Meyer says, "it would be difficult to conceive of a theoretically and practically more rational place for the operation than Moniz has suggested."

STATISTICAL RESULTS

Of the 1000 patients 348 were males and 652 females. Cases were grouped broadly for statistical purposes under the following diagnoses: schizophrenia; manic-depressive insanity; neurosis, (*a*) obsessional, (*b*) other; postencephalitic states; mental defect; epilepsy; various.

Patients discharged recovered amounted to 24·8%, and patients discharged improved to 10·5%—making together 35·3% of cases treated. Among these, 9·3% relapsed. Patients who improved but remained in hospital amounted to 32·3%, and 3·7% of them relapsed. Only 1% were worse after the operation; 24·8% remained in hospital unchanged. Of 6% who died, only half (30 cases) died as the result of the operation; in 19 of these hæmorrhage was the cause. Fits were reported after

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[1] Prefrontal Leucotomy in 1000 Cases. London: H.M. Stationery Office. Pp. 31. 6d.

Medicine and the Law

Unlawfully Practising Dentistry

A MAN described as a "dental mechanic" was fined on each of three summonses for unlawfully practising ntistry, and was ordered to pay two guineas for costs, Frome petty sessions last month.

A witness gave evidence that she had a cracked upper ate and went to the defendant's shop where he fetched me plaster and took an impression; he told her that e charge would be £2 10s. She tried the new plate, it it was loose. He took another impression, but the sult was still unsatisfactory, and later two more npressions were taken. The solicitor who prosecuted behalf of the Dental Board explained to the bench at it is an offence under the Dentists Act, 1921, for a rson to practise dentistry if he is not registered in the entists' Register set up by statute. The 1921 Act pressly states that the giving of "any treatment, lvice or attendance as preparatory to or for the purpose or in connexion with the fitting, insertion or fixing of tificial teeth" shall be deemed the practice of dentistry. he defendant said he had been in the business for 33 ears. If the dentist had made the set correctly in the rst instance he would not now himself be before the ourt. He had tried to do a favour, and this was his ward. He claimed to have been a practising dentist 1921. This claim, of course, gave him no defence to e charges, as he had not taken advantage of the enerous provision under section 3 of the 1921 Act hich allowed the registration of persons who had been ngaged in the practice of dentistry as their "principal eans of livelihood" for any five out of the seven years receding July 28, 1921.

The case illustrates once more the statutory privilege hich Parliament has been willing to confer upon the entist, as also upon the architect. It is strange how ften the medical practitioner is accused of enjoying a ke monopoly.

Public Health

Scarlet Fever in Nairobi

SCARLET fever is rare in the tropics. In Kenya there ave been isolated cases; but no epidemic had been ecorded until last year, when Fleming[1] observed 19 ases in a European school at Nairobi; the illness was aild, and there were no deaths. Beta-hæmolytic streptoocci of group A were isolated from the throats of all the patients. The recent return of children from overseas, nd the consequent overcrowding of schools, may have ontributed to the outbreak.

Infectious Disease in England and Wales

WEEK ENDED FEB. 1

Notifications.—Smallpox, 0: scarlet fever, 1135; whooping-cough, 1890; diphtheria, 176; paratyphoid, ; typhoid, 6; measles (excluding rubella), 13,501; neumonia (primary or influenzal), 1278; cerebrospinal ever, 83; poliomyelitis, 12: polioencephalitis, 1; ncephalitis lethargica, 2; dysentery, 61; puerperal yrexia, 126; ophthalmia neonatorum, 52. No case of holera, plague, or typhus was notified during the week.

Deaths.—In 126 great towns there were no deaths from enteric or scarlet fever, 6 (2) from diphtheria, 2 (1) from measles, 13 (4) from whooping-cough, 92 (9) from diarrhœa and enteritis under two years, and 148 (23) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 215 (corresponding to a rate of 25 per thousand total births), including 30 in London.

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[1] Fleming, A. McK. *E. Afr. med. J.* 1946, 23, 348.

In England Now

A Running Commentary by Peripatetic Correspondents

"THE good wishes of all go with them," says the account of the Royal departure. Most certainly this is so. After years of war-time restrictions and enforced insularity, the people of this country sail in fancy with the Royal family for the continent of sunshine and plenty, "the land of apricots and antelopes," where success waits upon the enterprise which freedom breeds.

The voyage to South Africa has excited extraordinary interest. Every stage of the preparations has been closely watched—the assembly of the fleet of cars, the shipment of the special train, and the rehearsals of embarkation at Portsmouth. We have read all the accounts, have listened to the broadcasts, and have shared in the excitement which the Princesses have enjoyed. The anatomy and physiology of the *Vanguard* is known to almost every man, woman, and child. Who does not admire Captain Agnew and the men he commands; who is not familiar with his cabin on the bridge, the galleys and guns, and the wardrooms and messrooms; who has not pried into the larders and pantries, and counted all those barrels of rum? We have even seen over the Royal apartments, and admired the loose covers and reading-lamps. We picture the family in their naval dining-room and know that they will fare well and enjoy their voyage. The bulletins of progress through the stormy Bay of Biscay were anxiously followed; now while they sail on under blue skies the happy music of the ship's band is wafted across to us in winter-bound Britain. Not only are we with them on the ship but we are awaiting them in sunny Cape Town.

Many of us would be glad to sail with them, perhaps to feel the sun once more after two almost summerless years, to taste again real food, not frozen and feigned but fresh and unfettered by coupons and points; or to escape for a while from a homeland of fuel crisis, austerity, and buff-coloured forms. Claustrophobia and insulaphobia are widespread. Who, if so bidden, would not hasten off to a convention in Europe, or make a tour of the American medical schools; who does not furtively glance at the advertisements in those adventuresome last pages of *The Lancet* and the *B.M.J.*, playfully imagining himself in the Dominions or Colonies living the full life under a smiling sun and a clear sky with a job to do and a fortune to seek? Lust for easy opportunity and adventure is compelling; in our flight of ambition we each shoulder the mantle of Cecil Rhodes and seek out the horizon.

* * *

When I was an A.M.O. at a private mental hospital there was a patient, a manic-depressive barrister, who took a dislike to me. When he saw me coming on my morning round he would half turn his face to the wall and address an imaginary court: "May-it-please-you-me-lud, gentlemen of the jury, this horrible monstrosity you see advancing towards you is indicted of the most terrible crime, to wit, of having . . ." The crime varied from day to day, but was generally of a kind not mentioned even by the Sunday newspapers. I used to stand and listen for a few minutes, fascinated by his eloquence and ringing scorn and by the amplitude of his facial expression—withering contempt, righteous fury, man-to-man satire, disgust. After a few minutes I would interrupt him, "Good morning, Mr. Doe," and he would turn to me with all the sunshine of his charm, "Ah, good morning, good morning, doctor, how are we today?"

I had an inside cabin on that troopship opposite the bathrooms. Nor did that enable me to get a bath when I wanted, all the chosen minutes between 7 and 8 were for the majors and colonels, and from 8 to 8.30 for the sacred ablutions of generals. In the hot weather they kept the door on the hook, which meant that I got their steam and another grievance, but there was one consolation—I could lie in my bunk and watch the reflexion of their faces while they shaved. Frowns and fury and the wrath of gods swept across those lathered countenances like gales on snowy tundras or thunderstorms on stubble. Sometimes they even articulated words like "blast" and "damn" and had to calm down to do the upper lip. Generally speaking, the higher the rank the greater the disturbance. I even took notes, contemplating a thesis for my M.S.A., "The Phenomenon of the Morning Hate." But what reminded me of Mr. Doe was that if the next on the bath list made expectant noises without, the sunshine immediately broke through: "Sorry, am I a bit late? Sorry, old boy. Shan't be a minute."

Why do I now recall these two episodes from the far and middle distant past? Because one who is near and dear to me this morning said, "Why do you make those funny faces when you shave?" "But, my darling . . ."

* * *

"Andrew arrived whole, hale, and hearty at 5.30 A.M. today. He inherits his mother's blood-groups—rhesus-negative—but thanks to his heterozygous father all goes well." So ran my message to a medical friend announcing my son's arrival. The reply may be helpful to my many colleagues who are struggling to master the rhyme and rhesus of this hæmolytic disease of the newborn. Scotland's expert vouches for its scientific accuracy.

Man Andrew, it would seem to me
Your homozygous mother
Has genes which must be cde,
While heterozygous father
Is CDe and cde.

Throughout your anxious pregnancee
They knew, poor devils, you might be
Small cde, big CDe,
Or homozygous cde.

If number one, there might be free
Agglutinins to big CD
Which might precipitate (oh gee!)
Erythroblastic tragedee.

Thank God your rhesus pedigree
Is cde and cde.

(I think your father must agree
To this genetic family tree
Before I add my Q.E.D.)

* * *

Perhaps I am wrong. I treat all my patients as intelligent people who can look at themselves objectively, and with suitable explanations I discuss all the aspects of their complaints with them. They are paraplegics resulting from the war. One of them, a Pole, of the highest courage and command of English, called me to his bedside while he was having a rigor. He asked me to put him into the next world. I discussed the pros and cons of euthanasia with him at length, and, having covered the religious and common-sense aspects, wound up with my own feelings and the legal position, finally stressing his lack of confidence in me should the request be a failure. At this point, he looked up at me and said, "Doc, you've got hold of the wrong end of the stick. I want to be moved into the next ward."

* * *

Listening to A. A. Milne's *Other People's Lives* on the radio set me thinking on its personal application. Being new in practice I wonder at the interesting medical conditions some patients harbour without complaint. "Never let them touch it, Missis," was Dr. X's advice 30 years ago to an elderly lady with a malignant-looking goitre. "My heart's never regular," says a chronic fibrillator, "I take a bit of digitalis when I feel dizzy." Should I alter the routine of these perfectly satisfied patients? Might I not turn them into medical successes but social failures?

* * *

Life's Little Compensations.—The Minister of Food has made an order to remove the price control of cherries. He also announces that the standards of strength of vinegar are the same today as before the war.

Letters to the Editor

SAUERBRUCH CINEPLASTIC AMPUTATION

SIR,—May I, as chairman of the meeting of th Standing Advisory Committee on Artificial Limbs, hel at Roehampton on Jan. 14, submit the following observations upon the article by Mr. R. K. Magee in your issu of Dec. 21?

Our committee appreciate the advantages which th operation, when successful, can give to the patient, bu there are certain drawbacks which have still to b overcome.

Cinematisation of an amputation stump was firs conceived by Dr. G. Vanghetti in 1897–98 after th return of Italians from the Italo-Abyssinian war. Following experimental work upon chickens the findings wer first put into practice in 1900 by an Italian surgeon—Ceci, of Pisa. Further work was carried out by othe Italian surgeons and later by Sauerbruch in German The possibilities of the procedure were not generall accepted until the 1914–18 war when it was again use more especially at several centres in Italy, and to som extent in Germany.

Several types of cinematisation have been suggeste each varying in the method by which function is produce in the prosthesis, and in the particular motive forc obtained from the musculature employed in the stum The better-known methods include:

1. *The club*—a projecting portion of bone or muscle, covere with skin and employed to activate and retain the prosthesis
2. *The loop*—formed by joining extensor and flexo tendons, covered with skin and similarly employed.
3. *The tendon tunnel*—somewhat similar to the loo method.
4. *The muscle tunnel*—a skin tunnel constructed throug the belly of a muscle; in this tunnel was placed an ivory pe to which the prosthesis could be attached, and by which could be activated.
5. *The pseudarthrosis motor*—a portion of the distal en of the bone in the stump being separated but having it tendons and musculature left intact to activate and contr the prosthesis.

Results of the work carried out up to this date wer given in Professor Putti's lecture, published in *The Lanc* of June 8, 1918, and in the *British Medical Journal* together with published articles by Dr. Vanghetti an others. It appears that the muscle-tunnel method gav the more satisfactory results. A few cases were treate in England by this method after the first world war, bu the results were for the most part unsatisfactory. Th operation was revived during the late war by Sauerbruc in Berlin, and by Leibsche and others in Munich.

Acting upon a recommendation of the Standin Advisory Committee, following a combined committe meeting with some American surgeons who had visite Berlin and Munich, the Ministry of Pensions sent delegation of surgeons and limb surgeons to Germany t investigate and report upon the results of this operatio and on the type of prosthesis supplied to the patient who had undergone this treatment.

On their return the members reported that Sauerbruch working in Berlin, was carrying out his original skin tunnel method, and that the prosthesis supplied had no materially altered in design or usage. In Munich a mor advanced technique was employed; the distal ends o the tunnelled muscles were freed from their insertions and this gave a greater range of movement, with mor power. The diameter of the skin tunnel had been considerably increased, allowing easier insertion of the ivor peg by the patient, and permitting better hygiene of th skin in the tunnel. Two well-known English surgeons witnessed the operative procedures on several patient at two centres, whilst a technical surgeon inspected th workshop where the prostheses were made and fitted.

A demonstration was given by about twelve patient who had been fitted with the usual prosthesis, the desig of which had not been improved upon. The greate number of these patients were afterwards seen in the workshop, where it was found that they had taken off the prosthesis to go home, saying it was rather heavy and irritated the skin tunnel after some usage. *Direct inquiries* ere made in many centres regarding the period for which prosthesis had been worn. how many skin tunnels had roken down, and how many patients had required eamputation. No records or data could be obtained.

The recent meeting of the Standing Advisory ommittee unanimously decided that before any ecommendation could be formulated it would be ecessary to produce a better-designed prosthesis. as the eight of the present apparatus was considered to be xcessive, while the artificial hand at present available as not satisfactory. The research department of the linistry of Pensions was instructed to give this work the ighest priority: some thought had already been given o the matter. and a prototype model of a prosthesis was hown to the members at the meeting. This model lemonstrated how the hand could be taken off the arm quite easily, and several of the normal appliances at present issued to amputees could be fitted to the arm. These appliances would enable the wearer to do finer work than was possible with the Continental type of non-detachable hand. The normal flexor and extensor ontrol would operate these appliances. Further work is being carried out, and the committee hope that with more efficient and lighter appliances a great range of function can be obtained from this type of reconstruction.

Liverpool. T. P. McMURRAY.

PERITONEAL DIALYSIS

SIR,—Dr. Fine's comments (Jan. 18, p. 120) are of interest and importance. He rightly points out that in the case we reported (Nov. 23) recovery was due to the diuresis which followed and was possibly the result of renal decapsulation. Unless any treatment of uræmia is followed by restoration of renal function it must be accounted a failure. If peritoneal dialysis is not to fall into disrepute there must be some hope of recovery in the cases selected for treatment. In our case the known removal of a small amount of urea (7 grammes) by peritoneal dialysis was followed by a sharp fall in the blood-urea level and great clinical improvement before diuresis set in. We cannot help feeling that even if double this amount of urea were removed and unaccounted for because of gross leakage of the dialysing fluid the clinical improvement of the patient justifies Dr. Fine's assertion that "measurement of urea excretion is only a convenient way of measuring the excretion of all diffusible retention products." The clinical improvement of our patient suggested that more than urea was extracted.

Dr. Fine and his colleagues have used continuous peritoneal irrigation in preference to intermittent rinsing. We have felt that when continuous irrigation is used a channel may easily form between the entrance and exit tubes, and but little of the peritoneal surface may be available for dialysis. In recent cases we have run 2 litres of fluid into the peritoneal cavity in 15 minutes, the fluid being retained for 2 hours and then drawn off. Analysis at short intervals shows that the urea content of rinsing fluid reaches that of the blood at the end of 2 hours. Using this technique we have extracted 30 g. of urea in 18 hours and have found that the urea content of the rinsing fluid may actually exceed that of the blood, an observation which has not yet been explained.

We believe that the main dangers of peritoneal dialysis in order of importance are first, gross interference with water metabolism and chemical balance of the body fluids, and secondly, peritonitis. Many cases of anuria are already waterlogged by enthusiastic hydrotherapy, and the use of improperly constituted rinsing fluid may increase the generalised œdema. On the other hand, as Mr. Rob and Dr. Richardson (Feb. 1, p. 195) point out, hæmoconcentration may easily be brought about, with results perhaps less devastating than those that follow rapid absorption of water. There is no reason to suppose that a rinsing fluid suitable for all cases at all times can yet be devised. and it is our opinion that adjustments should be made if indicated by clinical or biochemical study. We feel this to be an argument in favour of intermittent as against continuous irrigation.

In our cases peritonitis has not been prominent and penicillin has now been excluded from the rinsing fluid lest it have an irritating effect on the peritoneum, which by causing exudation might interfere with free osmosis. All the precautions recommended by Dr. Fine, however, must be taken into account. In some cases pain has been a prominent feature, and, rather than resort to morphine with its possible dangers in uræmic patients, we have used small quantities of 'Novocain' which have both a local and general effect.

With regard to the irrigating tubes, our experience runs parallel with Dr. Fine's—that rubber is unsatisfactory. Having tried steel we have recently used plastic polyvinyl, which is less uncomfortable, can be fitted more snugly to the abdominal wall, and is unlikely to cause dangerous pressure on intra-abdominal organs. The nature of the rinsing fluid may have more to do with the formation of adhesions than the chemical constitution of the tube. Much experimental work on the constitution, structure, and placing of the tubes, and on the nature of the rinsing fluid, still needs to be done.

While we believe with Dr. Fine and his colleagues that the peritoneum with its large surface is the ideal barrier across which to make intimate contact with the blood and body fluids, we are sure that Dr. Kolff's method deserves the closest attention by those interested in the treatment of uræmia by extrarenal dialysis. His method and apparatus, while brilliant in conception, seem to us cumbersome in application and therefore not likely to be universally adopted. The intimate contact with the blood-stream and body fluids which the artificial kidney and peritoneal dialysis allow has possibilities far beyond the treatment of uræmic states. Much experimental work and biochemical and clinical research must be undertaken before the method can be appraised and put on a footing safe enough for general adoption.

RONALD REID
J. B. PENFOLD
Colchester. R. N. JONES.

NURSING AND THE DOCTORS

SIR,—While it is true that nothing can make nursing one of the easiest of the many careers open to women today, some of us are doing all we can to eliminate old-fashioned discipline as far as the repute of the profession and the safety of patients allows.

But may I point out how often doctors are responsible for adding unnecessarily to the difficulties of the nurse's life? The morning and evening routine of washing and bedmaking, the serving of meals, and the tidying of the ward must go on whatever happens, and it is not helpful to have the medical staff invading the wards when every pair of hands is needed for these humdrum but essential tasks. (Incidentally, it is pointless for the Medical Research Council to condemn the practice of uncovering wounds within an hour after ward cleaning if surgeons insist on doing rounds before 10 A.M.) Rounds are often prolonged into the patients' dinner hour, or even begun then. The nursing staff is then depleted. some having gone to their own lunch, and often the upshot is that the ward sister forgoes her own meal to attend the doctor.

Surgeons who curse the nursing staff in the theatre and hurl their instruments about may relieve their feelings in this childish way, but courtesy and tradition prevent the nurses from retaliating in a like manner. Senior members of the medical staff who have the status and salary of lecturer to the nurses sometimes reel off the same discourse they give to their medical students, or cut their lectures at the last moment. Here is an example:

> At this hospital, about 25 miles out of London, attached to and partly staffed by a voluntary teaching hospital, a surgeon wished to give his lectures at 5 P.M. on the day that he operates. Since some of the nurses are on night duty I stood out for 6 P.M., so as not to curtail their sleep; and finally we compromised on 5.30 P.M. Learning at tea-time, one operating day, that the surgeon still had a partial gastrectomy to do, I asked whether I should postpone or cancel the lecture so that the night staff need not be called or the day staff spared from the wards. A message came back that the surgeon would be free by 5.30. The class assembled, some nurses who had had a day off returning from town for the purpose. At 5.55 P.M. the surgeon sent a message cancelling the lecture.

Certainly it is undesirable that nurses should have lectures while they are on night duty and on days off. but incidents of this kind help to make the recruitment of sufficient staff impossible; and lack of nurses means lectures in off-duty time.

Again, we can all sympathise with the wish of the doctors to open more beds, but while there are barely enough nurses to fulfil existing commitments it is unfair to add to their load, especially when they are living under conditions which should not be tolerated now the war is over.

In this converted mental hospital student nurses seconded from their London training school are sleeping in two-bedded cubicles with inadequate privacy, heating, and sanitary arrangements. The vast wards keep them occupied in domestic work for a large part of their day. There are no social or cultural amenities, and no transport to the station; and no attempt is made to compensate nurses for the cost of taxis and train fares to London, or to adjust their pay so that it is comparable, when such expenses are paid, with that of their colleagues in the parent hospital, where they too were accepted for training.

It is new for nurses to be articulate about their conditions, and it is of course inconceivable that they should resort to the strike as a weapon; but for that very reason they should not be exploited. Doctors could press for the block system of training; and by their manners and general attitude could acknowledge nursing to be not an ancillary but a complementary profession to medicine. We do not, of course, forget or fail to appreciate the many doctors who have been good friends of the nursing profession and faithfully served its interests in training schools and on committees.

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BODILY CHANGES DURING ABREACTION

SIR,—An alleged example of somatisation during abreaction was described by Dr. Moody in your issue of Dec. 28. In 1934 the patient, who was suffering from somnambulism with aggressive behaviour, had had his hands tied behind his back during sleep, as a precaution. On waking in a dissociated state he had tried unsuccessfully to free his hands. In 1944 this incident was abreacted under narcosis, when indentations resembling rope marks appeared on his forearms.

The detail given is insufficient to exclude the possibility that these marks were produced mechanically. Since the patient was under constant observation he might not have been able to use a rope; but marks resembling rope marks can be made by tightly pulled folds of cloth. The patient is said to have tossed and turned on the couch with his hands behind his back. If he was wearing sleeves, could he not have pulled them tightly round his arms without intending trickery? Folds of a sheet could also be used to make marks like those made by a rope. These possibilities are not mentioned in the account of the case.

St Benedict's Hospital, London, S.W.17. M. WALKER.

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SIR,—Among other matters to be discussed with the Minister of Health about the new health service should be the cost of medical education. It is generally admitted that the sons and daughters of doctors are peculiarly fitted to follow their parents' profession, and it is anticipated (rightly or wrongly) that there will be a general reduction in the income of general practitioners, as well as a loss of capital associated with loss of the right to buy and sell practices. It is already a great financial strain on a doctor to educate his children at a university, and, unless the Government is prepared, at this stage, to express the intention of financing the medical education of suitable entrants there will be great reluctance on the part of general practitioners to enter the new service. We are not suggesting, of course, that such grants should be limited to the children of doctors; they should be open to all suitable candidates.

The Goodenough Committee reported that in the years preceding the war about £700,000 was paid to university medical schools by the University Grants Committee and local authorities. But local support to students is obviously unequally distributed in different areas, some local authorities giving very little to any university students; and medical students as such have very few special scholarships allocated to them. Many local authorities confine their grants to students from the authority's secondary schools. Unless there is a national scheme providing equal and adequate grants there will be an added difficulty in obtaining doctors to work in areas where their children's future is likely to be handicapped by poor educational facilities.

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2. I have seen more than two hundred cases of thrombo phlebitis, or tropical phlebitis as I prefer to call it, and i none of these was there clinical evidence of lymphogranulom venereum. In the few European cases I have on recor this condition could be definitely excluded.

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I think Dr. Coutts will agree to the unique characte of the lesion when he reads Dr. Lendrum's descriptio of it in a paper which should appear during the summer

Luanshya, Northern Rhodesia. A. C. FISHER.

THE OUTLOOK FOR PHYSIOLOGY

SIR,—In his interesting lecture of Jan. 18 Prof. Lovat Evans touches indirectly on two points that seem to m to demand further consideration. First, why is not preliminary course in pathology given to preclinica students in the London hospitals as it is given to thos at Oxford and Cambridge? To arrive in the war knowing a few rudiments of disease processes must be distinct advantage to the new clinical student. Secondly why is pharmacology taught so early instead of being left to the period of clinical instruction? I submit that it is putting the cart before the horse to attend, for example, a lecture on the action of digitalis before one has eve entered a medical ward and seen its effects on auricula fibrillation.

In short, is not pathology taught too late in the curriculum and pharmacology too early?

J. B. GURNEY SMITH.

STAMMERING AND HANDEDNESS

SIR,—In view of racial differences in the incidence of stammering and the fact that I have not been able to find any published report of its incidence in Greece, I examined 1133 pupils of the Greek elementary schools of Nicosia, Cyprus; 574 girls and 559 boys between the ages of seven and fourteen years. There were 21 cases of stammering (1·85%): 5 girls (0·44% of the total children and 0·87% of the girls) and 16 boys (1·11% of the total children and 2·85% of the boys). The sex-incidence of stammering was 3 boys to 1 girl (16 to 5). Among these 21 stammerers 5 were left-handed. Not one of the right-handed stammerers gave evidence of left-handed tendencies. Among the non-stammerers 48 (4·2% of the total school population) were left-handed. They fell into three groups as follows: left-hand writers 9, ambidextrous writers 6, and right-hand writers with characteristics of left-handedness 33. There was no history of physical trauma or infectious disease as a precipitating factor in the stammerers.

From the average ages of their respective classes and from their teachers' reports the standard of intelligence of the stammerers was assessed as follows:

Above average	5 cases
Average	5 ,,
Below average	11 ..

The tendency to stammer appeared in all cases on attempting to pronounce *k*, *p*, *t*, and *f*: and in about a third of the cases stammering was caused on trying to pronounce *i* (with no consonant preceding or following). *r*, *m*, *l*, and *s*. By palpation of the epigastrium I found clonic and tonic spasms of the diaphragm in 14 cases. Other respiratory disturbances which I observed were reading and speaking during inspiration in 15 cases, hoarseness in 3. and shallow inspiration in 20. When the children read in unison with others, the stammering disappeared in 16 cases and diminished in 5. Tonic spasm of the lips was observed in 5 cases. movements of deglutition in 5, and movements of the whole body in 3. during reading and speaking.

All these investigations were made in the presence of normal pupils, in the usual atmosphere of the school-child. The teachers confirmed that all the children who stammered during investigation were stammerers in normal school life.

The incidence of stammering in these Greek-speaking Cypriot children (1·85%) is higher than in other European countries (Belgium 1·4%, Hungary 1·02%, Sweden 0·8%–1·0%) and in U.S.A. (0·87%). This finding contradicts the belief that the incidence of stammering is higher in races with a high cephalic index than in those with a low index, because in Greeks the cephalic index is low (Stephanos 1884, Gedeon 1931). Probably the differences in incidence of stammering among different nations are due to racial factors or to the difficulty in pronunciation of their languages. Thus, according to many investigators, stammering is unknown among the Chinese, whose language consists of monosyllables.

Nadoleczny (1926) found that the sex-incidence of stammering was 74 boys to 26 girls (3 to 1). My observations confirm this.

Travis (1931) reported many cases in which the stammering appeared as a sequel to the change of handedness; but in the present investigation 33 out of 53 left-handed children were at the beginning of their school life left-hand writers and changed to right-hand writers after training, without the slightest manifestation of stammering. This accords with the opinion of Seth and Guthrie (1935). However, there is a relationship between stammering and left-handedness, because the incidence of stammerers among these left-handed school-children (5 out of 53) is about ten times higher than among the right-handed pupils (1·5%). The explanation seems to be that left-handedness and stammering are two different manifestations which appear in a nervous child, neither of them causing the other.

Gutzmann (1928) found stammering in near relations of the stammerers in 26·8% of his cases, whereas Lampadarios (1923) reported 38·7%. I found it in 4 of my 21 cases; but in these cases the stammerer was in contact with a stammering relation (more often the father than the mother). So, possibly, stammering may be imitative rather than hereditary.

According to Seth and Guthrie (1935) the stammering occurs at all levels of intelligence but much more frequently among mentally retarded children. This statement accords with my observation that 11 of the 21 stammerers were of subnormal intelligence.

I wish to thank Dr. T. Dervis, O.B.E., chairman of the school committee of Nicosia, for permission to publish this letter.

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Nicosia, Cyprus. KYPROS CHRYSANTHIS.

VARICOSE VEINS

SIR,—I agree with Dr. Rowden Foote that varicose veins are a national problem. The figures in his letter of Jan. 11—the first figures, I think, published in this country—are startling: 5 million people in Britain incapacitated in some degree by a condition which in a large proportion of cases can be cured in a fortnight!

In these days of national drive for maximum production it is essential that this treatment be available. As Dr. Foote says, it is not realised that 1 in every 4 women over forty-five has varicose veins. (The proportion is not so high in men.) In the present state of the country, here is another opportunity for our profession to render a signal national service. These patients can be operated on and out of hospital in 48 hours, and back at work in a fortnight.

It seems to me that it is the duty of surgeons to show our profession that this is a fact, and to be ready to organise the necessary clinics for the diagnosis and the treatment. I suggest that the first step is for our teaching hospitals to set up separate departments for varicose veins and their complications in order to train men in their three aspects—medical (constitutional conditions such as anæmias, œdemas, and diabetes), dermatological (many patients first come to hospital with itching, dermatitis, eczema, and ulceration), and finally surgical, for the operations, injections, and various bandages.

When enough men are trained in this triple specialty, the other hospitals (or possibly the Minister of Health) can institute clinics staffed by this new type of specialist. Beds can be turned over three times a week (e.g., admission Sunday afternoon, operation Monday, discharge Tuesday noon, and repeat twice by Saturday noon). The treatment of varicose veins should not be relegated to the outpatient department or to the junior staff, but should be upgraded.

London, W.1. HAROLD DODD.

SOLUBLE SULPHONAMIDE COMPOUNDS

SIR,—In his letter of Jan. 4 Dr. Banks discusses the advantages of a soluble, neutral (and therefore non-irritant) sulphonamide. May we observe that in 'Albucid Soluble' (30% solution for intravenous injection) we present such a preparation? A solution of the sodium salt of sulphacetamide, this has a pH of about 7·4, and is thus non-irritant to the tissues. The high solubility and neutrality of buffered solutions of soluble sulphacetamide explain their efficacy in eye infections and inflammation of mucous membranes. When administered systemically, sulphacetamide has not so wide a range of therapeutic activity as several other sulphonamides, but its potency in some infections (e.g., *B. coli* infection of the urinary tract) has been established.

London, W.1. BRITISH SCHERING LTD.

EX-SERVICE ADMINISTRATORS

SIR,—The note of warning from your peripatetic *correspondent of Dec. 7 is all too timely*, and is emphasised by the news that a number of members of the Indian Medical Service will not continue to serve under the new Indian Constitution. Every private sympathy will be felt for our colleagues who have had planned careers upset by events beyond their control. Unfortunately, they will be returning to this country at a time when the policy of the land is to recruit a large number of medical administrators. Willy-nilly, the older men must be regarded as potential Bevan-fodder as Senior Officers Used to Handling Men.

As long ago as 1943 the talk of senior officers in the Services was of a Nice Little Job in the State Medical Service to eke out their pensions: now, in addition, comes the indication that in some things the leisurely gait of the Indian scene may colour our lives. For the demobbed the picture is familiar: the old reverence for red tape, the inevitable ignorance of conditions of general practice in this country, and (in many cases) the lack of opportunity for recent clinical experience is likely to give us a cautious and uninspiring administrative framework calculated to discourage and destroy any attempt to produce a wholly civilian service of a new and different kind.

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Apart from the unsuitability of the senior officer from the Service medical departments for the responsibility of administering a civilian medical organisation, it is well to inquire into the threat to the economic standards of the civilian medical practitioner. Retired officers are already in receipt of a pension designed to provide a suitable standard of living without other resources. This being so, their employment in the National Health Service, where they must inevitably act as a reservoir of cheap medical man-power, may be used by the Treasury as a lever to impose a lower scale of salaries on those of us who have to work for our living, and who need an appropriate rate of pay.

BURMA STAR.

SERVICE AND FREEDOM

SIR,—As it is often stated nowadays that in a Government service the independence of doctors must be crushed, their enthusiasm damped, and their merits ground down to a level of dull mediocrity, it is well to cite a few examples of the contrary.

Membership of the Indian Medical Service did not prevent A from bringing to the notice of the nearest military authority a glaring example of the suffering of the sick and wounded in Mesopotamia; nor did the threat of arrest by that authority stop him from neglecting all proper channels and going direct to a civilian who could and did take action that led to the appointment of the Mesopotamia Commission. That commission closed a black chapter in the history of the medical services, and laid foundations on which Maude and Marshall were able later to build their victories.

Nor did service in the I.M.S. prevent B from protest against a Government demand that he should operate on Mr. Gandhi in gaol—a protest so unanswerable that he was allowed to take Mr. Gandhi out of the gaol into his hospital.

If A and B did feel the curb, their independence had certainly not been crushed.

A Government service which, from an establishment of about seven hundred officers, produces three presidents of the Royal Society of Tropical Medicine and Hygiene, each of them a F.R.S., cannot be fairly accused of grinding its officers' merits down to a level of dull mediocrity. That one of these three embarked, as the cynics said, on the search for a third pension, but in fact upon a difficult and fruitful research into one of the long-hidden secrets of malaria, at an age when many are embarking for another, less fortunate, voyage, shows that Government service, even when prolonged far beyond the normal span, need not damp enthusiasm.

That stupid formality—I will not say stiff and starched, for his shirt was both—is inseparable from Government service is also a common statement, which my interview with the director-general, I.M.S., when seeking a commission, does not support. When he received me, the D.G.'s dress was a shirt and sock-suspenders; socks and trousers were added during the interview. Before his braces had been buttoned on to his trousers the D.G. said: "I'll have a wire sent telling you where and when to report." I'm pretty sure I have got the timing right, because he certainly had not put on his waistcoat before he shook hands and said goodbye.

This calls to mind a more historic incident, during the Indian Mutiny, when a young officer came without his sword to call on Sir Colin Campbell. Sir Colin, dressed in a towel, greeted him with, "Damn it, sir, you may come without your trousers, but you shall wear your sword." An incident which suggests that, even in those days of stocks and pipeclay, red tape had a high coefficient of elasticity.

Edinburgh. J. B. DE W. MOLONY.

TREATMENT OF TUBERCULOSIS

SIR,—I have no desire to enter into a discussion on the merits of amphetamine or as to whether the teachings of Trudeau and Marcus Paterson obtain better results than are achieved by surgical interference. It frightens me, however, to think what emphasis may be placed by tuberculous patients, some doctors, and perhaps the lay press on the utterance of a distinguished radiologist when he says (for the second time): "We also know that by far the greater majority of the people who contract *tuberculosis recover from it* without the disease being specifically treated or even recognised except by chance or mass radiography . . ."

Over many years, my patients have died of tuberculos or, with treatment, partially or wholly recovered. Some, I am sure, recover on their *own; but what multitudes* fail in this and enter hospital too late to receive material assistance. Can Dr. Brailsford (Feb. 8) be thinki of phthisis (i.e., postprimary progressive tuberculos of the lung)? If so, and if he can produce evidence f his statement, how eager we should be to have it.

But I suspect that by "the people who contra tuberculosis," he means the very many who undergo primary infection and in most instances recover from i except for the hard mineral elements which he is able see in his X-ray photographs. If so, I believe, wit respect, that he should by saying so avoid doing disservice to this particular cause.

Colindale Hospital, London, N.W.9. J. V. HURFORD.

BOVINE PLASMA FOR TRANSFUSION

SIR,—I should like to reply to your annotation bovine plasma[1] and the letters of Mr. Edwards[2] an Mr. Hughes.[3]

Colloid Osmotic Pressure.—Your annotation sugges that the osmotic pressure of prepared calf plasma (P.C.P is less than that of human plasma. With this Mr. Edwar agrees, stating that calf serum when heated to 100° exerts none, while Mr. Hughes thinks that heating w increase the osmotic pressure. Through lack of suitab apparatus I have been unable to follow the changes osmotic pressure during the preparation of P.C.P clinically, P.C.P. seems to exert sufficient osmotic pressu to remain within the vessels, and its administration hypoproteinæmic œdema is followed by diuresis. I not doubt Mr. Edwards's statement that plasma treate by his method and heated to 100° C loses its osmot pressure,[4,5] but my method differs from his in th amounts of formol and ammonia added. It would interesting if his experiments were repeated using m method of preparation.

Antigenic Properties.—From Mr. Edwards's letter an paper, heating to 100° C appears unnecessary, sin agglutinins and hæmolysins are inactivated at 72° This is agreed, but some antigenic properties are retain after heating at this temperature. With formolised ca serum heated only at 72° C it is possible to indu fatal anaphylactic shock in guineapigs, and to bri about anaphylactic reactions in man. Mr. Edwards do not report any anaphylactic accidents in his cas receiving despeciated bovine serum. I attribute th finding to the fact that few of his patients received mo than one transfusion of his bovine serum. Had he bee treating, instead of surgical cases, patients sufferin for example, from nephrosis or hepatic cirrhosis an requiring repeated transfusions at intervals of 5–7 day he might have observed typical anaphylactic crises, an obtained positive Prausnitz-Kustner tests.

I have evidence which suggests that my method ma not entirely preclude the possibility of an occasion reaction in man to P.C.P., but I am certain that, whi hypersensitiveness to repeated injections of bovi plasma heated only to 72° C is frequent, more than 10 ampoules of P.C.P., many of them given at intervals the same patients, have never produced a reactio of an undoubtedly anaphylactic nature: one reactio studied by me was due to sensitiveness to formol. I th feel justified in stating that P.C.P. is not antigenic.

Fate of P.C.P.—I do not know the fate of P.C.P. i the body. Occasionally slight albuminuria (sulpho salicylic acid test), lasting a few days, has been seen afte its administration. I consider it probable that most of is metabolised in the body, and I hope to investigate th problem.

Toxicity.—Mr. Hughes adds to the criterion "non toxic" a further criterion, the absence of the syndrom attributed to macromolecular substances such as gum acacia. I have not investigated this point. I can onl

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1. *Lancet*, 1946, ii, 355.
2. Edwards, F. R. *Ibid*, p. 437.
3. Hughes, R. A. *Ibid*, p. 579.
4. Edwards, F. R. *Brit. med. J.* 1944, i, 73.
5. Gutfreund, H., Ogston, A. G. *Biochem. J.* 1946, 39, 186.

in 1934. On the histological side he produced noteworthy work on nævocarcinoma and on Paget's disease. Other useful contributions included his papers on erythema induratum, in which he discussed cases of this disease in middle-aged persons, his findings, with G. A. Harrison, on xanthomatosis, and his study of the Fox-Fordyce syndrome. Always looking out for something new, he demonstrated a form of impetigo due to *Demodex folliculorum*, and another form of dermatitis which he termed dermatitis colonica, and which he attributed to toxic absorption from the bowel.

Other appointments which came to Whitfield were those of professor of dermatology at the Royal Army Medical College, and dermatologist to St. Dunstan's. He was Lumleian lecturer at the Royal College of Physicians in 1921 and served as a councillor during the three following years. Both the French and Hungarian societies of dermatology elected him a corresponding member. Presidency of the section of dermatology of the Royal Society of Medicine in 1919–21 was followed by work as honorary secretary of the British Association of Dermatology and Syphilology in 1924 and as president of that body in 1927.

During all these years his energy and enthusiasm never flagged, despite a chronic and painful infirmity which often made movement difficult. This had undoubtedly been aggravated by his labours during the 1914–18 war when he helped his hospital by acting as general physician in charge of outpatients. This in addition to his appointment to the Prince of Wales Hospital for Officers, and evenings spent looking after the general practice of a great friend who had joined the Army.

"It is difficult," writes a colleague, "to name any one feature of his character as dominant, but unselfishness was one of his most prominent reactions to life. No trouble was too great to take when he found an enthusiastic class. Often his demonstrations were crowded by the presence of postgraduates from the Dominions and Colonies. To them he revealed the secret of his own success, for his first rule insisted on close and complete examination of the patient. With 'old patients' he was equally scrupulous, re-examining them time and again and always searching for new evidence which might modify his previous views.

"His wide knowledge of numerous subjects was a source of wonder to those listening to his expositions. The allied sciences were always studied carefully, and often he would suggest the wisdom of reading such-and-such a book on physical chemistry or on botany. The latter was perhaps his favourite hobby, and he spent many happy days as a practical gardener at his home in Beaconsfield. He was a good lawn-tennis player in his earlier life, and later enjoyed golf. But even in these games he was always questing for some physiological or anatomical or psychological reason for skill or lack of it."

Dr. Whitfield married Margaret, daughter of the late Charles Tuttle, of Rochester, N.Y., and she survives him. They had a son and two daughters.

RICHARD EAGER

O.B.E., M.D. ABERD.

Dr. Richard Eager, who died on Feb. 2, was born in June, 1881, near Ipswich, where his father was medical superintendent of St. Audrey's Mental Hospital. He was destined to follow in his father's footsteps, like him graduating at Aberdeen University and taking up a career as a psychiatrist. He took his M.B. in 1905 and his M.D. in 1912.

During the 1914–18 war he was a major in the R.A.M.C. and did important work at various neurological military hospitals on the psychological effects of head injury. He contributed various articles on the subject to the medical press, and their value was recognised when he was honoured with the O.B.E. In 1919 he returned to the Devon Mental Hospital where he had been an assistant medical officer since 1906. His war service had meant much to him and added a great deal to his professional knowledge, so that he was well equipped in 1922 to follow Dr. A. Davis as medical superintendent at Exminster.

As the head of a large hospital Eager showed his ability as clinician and administrator. His one passion was the welfare of his patients; it was both his career and his hobby, and nothing was allowed to stand in the way of what he considered was due to his patients. He set about modernising the hospital, equipping it with up-to-date plant and all that was needed to make it an efficient unit. This involved hard work and long hours, but he was doing what he wanted to do, and that for him was satisfaction enough. He was a pioneer in rehabilitation along the lines of occupational therapy, and he made his hospital one of the best-known for enlightened treatment. He was alive to the need for the early treatment of mental illness and believed that psychotherapy should be taken to the patients outside the hospital. Hence his keen interest in outpatient clinics and the establishment of one in the city of Exeter at a time when they were few and far between in the country. His passion for efficiency was manifested also in his desire for a highly trained nursing staff, and to this end he published his well-known *Hints to Probationer Nurses in Mental Hospitals*.

Eager spent fourteen years as a medical superintendent, every one of which was marked by his enthusiasm; so when he retired in 1936 as a comparatively young man it was inevitable that he should continue his life work in a private capacity. He joined the staff of the Royal Devon and Exeter Hospital as their first consultant in psychiatry, and built up a practice round his outpatient clinic. He retired only a few months ago.

Richard Eager had a forceful personality and a warm-hearted appreciation of his fellow men. He was kindly and obliging, especially to the young, whom he delighted to help. He was a popular superintendent, for he was fair and not afraid to champion the under-dog. His great characteristics were conscientiousness and tenacity of purpose. He carried out his schemes to their logical conclusions and nothing would turn him aside once he had set his heart on a certain line of conduct.

He loved good company and he will be missed by a large circle of friends who knew his quiet sense of humour.

He is survived by his widow, a son, and a daughter.

S. M. A.

RUDOLF JAKSCH

M.D. PRAGUE

Prof. Rudolf Jaksch, who died on Jan. 8 at the age of 91, belonged to the company of medical eponymists, for through his classical description of infantile pseudoleukæmia published in the *Wiener Klinische Wochenschrift* in 1889 this condition became known as von Jaksch's disease. English readers will also recall his *Clinical Diagnosis*, which was translated from the sixth German edition in 1907.

Born in Prague, he was educated there and at Strasbourg, and after taking his medical degree in 1878 he held junior hospital appointments at Prague and Vienna till he was appointed privatdozent at Vienna in 1883. Four years later he was called to Graz as professor extraordinary for children's diseases. In 1889 he returned to Prague as professor and director of the second medical clinic at the German university, and he held this post till he retired in 1925. His interests in medicine outside pædiatrics were linked with medical chemistry, and he published important papers on the chemistry of the blood and urine. After the first world war he dropped his hereditary title of Ritter von Wartenhorst.

DR. EDITH GHOSH

"Amid the horrors of the famine of 1943 in Calcutta," writes H. I. W., "Dr. Ghosh's house was a haven of solace and culture. Many British Servicemen, including myself, used to go weekly to meet friends and to hear glorious music. She never asked questions about us, but was always a gracious, friendly, and unassuming hostess. Most of us knew little more of her than this—that she realised the difficulties of life for us at the time, and did what she could to lighten the weight of those heavy days."

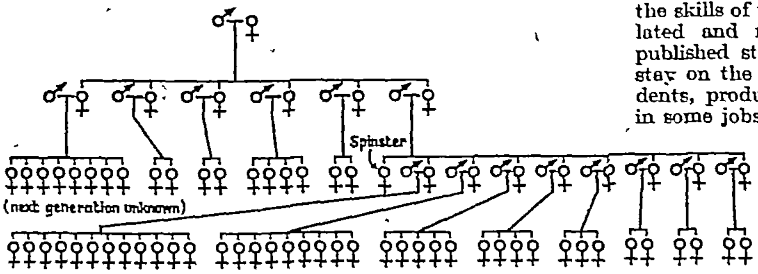
Notes and News

LADY TATA MEMORIAL TRUST

The trustees of the fund invite applications for grants and scholarships for research in diseases of the blood, with special reference to leukæmia, in the academic year beginning on Oct. 1, 1947. Grants of variable amount are made for research expenses or to provide scientific assistants to senior workers. Scholarships are awarded as personal remuneration: their normal value has been £400 per annum for whole-time research, with proportionate adjustment for work on a part-time basis, where this has been approved. The grants and scholarships are open to workers of any nationality, and in any country in which it will be possible to make payments in the coming academic year. Applications must be submitted before March 31, 1947, and the awards will be announced in June. Further particulars and forms of application may be obtained from the secretary of the scientific advisory committee, c/o Medical Research Council, 38, Old Queen Street, London, S.W.1.

MONSTROUS REGIMENT OF WOMEN

The sex-ratio in man is about 104 males to 100 females; but this figure naturally prevails only on a statistical plane. Small families commonly consist of sibs of one sex, possibly for a couple of generations or so, merely from chance. But Lienhart and Vermelin[1] have reported a French family in which 72 pregnancies produced 72 daughters in three generations. The genealogical table is incomplete, F3 not having been fully worked out (see figure). It is suggested that this is an instance of inheritance of an abnormality transmitted through the females, especially since none of the 15 husbands was consanguineous. But what is the abnormality? The first suggestion is that a lethal gene killed the male embryos at a very early stage (there is no history of abortion in the family); but this hypothesis is unlikely to explain the entirely female character of F2 and F3 (so far as it has been worked out). A second explanation is that the secretion of the genital passages or the constitution of the ovum is such as to cause death of spermatozoa carrying male sex. An experiment by Lienhart[2] seems to support this view. He treated rabbits' testes with X rays, with the result that the descendants were all does, suggesting that the Y chromosomes had been killed by irradiation. A third explanation may be based on work done by Vandel[3] on a species of crustacea (trichoniscus), some of which produce only males, others only females, and others both sexes. L'Héritier and Teissier,[4] working on drosophila, suggested that under certain experimental conditions the ova carried a "genoid" (F), which determined female sex. Consequently all the ova of the treated flies carried X (F), with the result that both the XX (F) and XY (F) gametes produced females. In the next generation an XY (F) female drosophila would produce two types of ova: X (F) and Y (F), the latter not being viable.



72 pregnancies producing 72 daughters in three generations.

It is well known that when both parents have a sex-linked abnormality all the children inherit it. But in the present family it is unlikely that the 15 non-consanguineous husbands had the same sex-linked abnormality as the great-grandmother. Haldane[5] has described *partially* sex-linked inherited characters, in which there is a strong tendency for all males to be abnormal and all females normal, or vice versa. In the present family all the gametes determining male sex might be so abnormal as to be non-viable. Haldane considered that the X chromosomes had two parts: one determining sex and carrying genes determining the recognised sex-linked characters, such as hæmophilia; and the other carrying the partially sex-linked characters, such as retinitis pigmentosa. One can imagine a further abnormality, so carried, preventing viability.

THE DISABLED IN AMERICA

In view of the recent report of our own care of the disabled[1] it is interesting to see how Americans are tackling the same problems. The rate of employment of physically disabled in the United States has more than doubled in the year since a campaign was started to make all these handicapped people self-supporting. In October, 1945, an Employ the Physically Handicapped Week was founded by Act of Congress to advertise the campaign, and last year a second week of the kind was held. There are some 28 million people in the United States disabled by disease, accident, or war, of whom about 2 million received their injuries in the recent conflict. It has been estimated that 1 in 7 of the male working population is disabled to an extent requiring vocational reablement or special placing. The Act establishing the national "week" invites the participation of governors of States, mayors of cities, heads of government departments, as well as leaders of farming, scientific, professional, and other organisations. Ninety organisations of national scope, with membership ranging from a few thousand to several millions, are coöperating in the drive to employ the disabled. The U.S. Employment Service maintains 1800 local offices, where the skills of the handicapped and the jobs available are tabulated and matched. The Civil Service Commission has published studies showing that the physically handicapped stay on the job better than others, have fewer serious accidents, produce with determination, expect no favours, and in some jobs are more efficient than people without physical defects. The commission's "Operations Manual for the Placement of the Physically Handicapped" is widely distributed, and during one week each year publicity devices are used to carry the significant facts home to the employer.

This government-sponsored campaign has been a greater success than was at first expected. During October, 1945, the first month of the campaign, some 11,000 handicapped people were employed; and in August of last year nearly 20,000 found work. Some 83% of the handicapped now being employed served in the recent war.

INTESTINAL EXPLOSIONS

It has long been known that the alimentary tract can produce explosive gas. Beatson[1] and McNaught[2] each mentioned a case in which a man's breath caught fire on blowing out a match, and Martin[3] and East[4] each reported a case in which a man belched while lighting his tobacco and singed his whiskers. The experimental ignition of flatus has also been practised. It is not surprising, therefore, that surgical electrical instruments have caused explosions within the intestinal canal. Lieberman[5] reported a case of explosion of intestinal gas during diathermy of a rectal polyp; and last year Moutier[6] reported to the Société de Gastro-entérologie de Paris that, as he was starting to perform an intrarectal electrocoagulation, and though he had taken the precaution of plugging the rectosigmoid junction, there was an explosion which caused the patient to collapse and gave her hiccups for a quarter of an hour. There was no tenderness of the rectum and no abdominal rigidity. Laparotomy two hours later revealed an extensive ecchymosis at the rectosigmoid junction. The patient recovered without sequelæ. In the discussion which followed, suggestions were made that, in such operations, the intestinal gases should first be aspirated, and that an improvement in design of the instruments should eliminate the risk of sparks. It was stated that a legal judgment had

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1. Lienhart, R., Vermelin, H. *C.R. Soc. Biol. Paris*, 1946, 140, 537.
2. Lienhart, R. *Ibid*, 1938, 127, 301.
3. Vandel. *C.R. Acad. Sci., Paris*, 1939, 208, 1682; 1940, 210, 550.
4. L'Heritier, Teissier. *Publ. Lab. Ecole norm. sup., Zool.* 1945, 1, 35.
5. Haldane, J. B. S. *Ann. Eugen., Camb.* 1936, 7, 28 (cited by Cockayne, E. A. British Encyclopædia of Medical Practice, London, 1937, vol. vi, p. 452).

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1. See *Lancet*, 1946, ii, 839.

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1. Beatson, G. T. *Brit. med. J.* 1886, i, 295.
2. McNaught, J. *Ibid*, 1890, i, 470.
3. Martin, A. A. *Lancet*, 1902, ii, 991.
4. East, T. *Ibid*, 1934, ii, 252.
5. Lieberman, W. *Rev. Gastroenterol.* 1944, 11, 259.
6. *Pr. méd.* Oct. 12, 1946, p. 670.

previously been made in a similar case, the verdict going against the surgeon, and that therefore the patient or relations ought to be warned of the risk. It was also said that the explosive gas was not methane but a mixture of hydrogen and oxygen. In McNaught's[2] case the gas from the stomach was found, on analysis, to contain hydrogen 28%, air 9·2%, carbon dioxide 56%, and methane 6·8%.

Explosions can also take place inside the bladder. Kretschmer[7] and Hambleton et al.[8] have reported their occurrence during transurethral electroresection.

MORELL MACKENZIE

Mr. Scott Stevenson's book on the late Sir Morell Mackenzie[1] deals almost entirely with controversies centring on his treatment of the Emperor Frederick III of Prussia. He professes to give an authentic account of the whole unhappy story of this major episode in Morell Mackenzie's life, and does so fully and convincingly. It is a regrettable tale of professional wrangling, jealousy, and bitterness, on the whole best forgotten, but one from which the author thinks Mackenzie emerged with credit. From detailed analysis of the evidence he concludes that the accusations made by Mackenzie's German colleagues, also in attendance on the royal patient, and others, had no substance in fact. Mackenzie's first diagnosis certainly proved to be mistaken; but the mistake was an honest one. Though hasty and quick to resent reflections on his professional capacity, he was also generous and open-handed. It is a relief to turn from this unhappy story to his professional and social life at home. Here he earned the gratitude of patients by his skill and his understanding of those under his care. He founded the Hospital for Diseases of the Throat, and his treatise on diseases of the throat became a classic.

MEDICINE AND THE RENAISSANCE

"I HAVE no other means left for my maintenance but to turn physitian," wrote the poor monk dispossessed by Henry VIII. One of the early effects of the Renaissance in England was the Reformation, bringing with it the destruction of 110 hospitals. It was only on his deathbed that Henry VIII made the "comprehensive agreement with the citizens of London which led to his posthumous, if unmerited, distinction as first founder of the 'Royal Hospitals'." But Sir Arthur MacNalty, in the Thomas Vicary lecture for 1945, now published as a little book,[1] has better things than this to tell of Tudor medicine; and he does it with his usual thoroughness and grace. That time of plagues saw the beginnings of public health, thanks to the wisdom of such men as Sir Thomas More, Sir Thomas Elyot, and Dr. Andrew Boorde; and the revival of medicine began with the introduction of examinations, in London by the Bishop or the Dean of St. Paul's aided by doctors and surgeons, and in the provinces by the Bishop of the diocese with such expert persons as he might think convenient. Sir Arthur's account brings to life the vivid, human, cruel times, and the men who lived and worked then to found modern medicine.

TWO FILMS FROM AUSTRALIA

THE Scientific Film Association screened recently two films presented to them through the New South Wales committee in postgraduate medicine, with whom they are operating an exchange scheme. *Neurological Sequelæ of Deficiency Disease seen in ex-Prisoners-of-war* presents in simple manner a collection of cases received from Changi Camp. Examples of foot-drop, pot-belly, retrobulbar neuritis, nerve deafness, aphasia, and other disorders of motor and sensory nerves, of the types described in these columns,[1] are shown. (16 mm., sound, 27 min.)

Operation for Hydatid of the Liver is a first-class record in colour, showing clearly and without haste the outstanding features of an operation rarely seen in this country. Two small daughter cysts in the peritoneum are first removed, and then a huge liver abscess is cleared out. The two small cysts are opened, one being found to be dead and the other full of live hydatids; the small bladders are demonstrated, and then a single scolex is seen under the microscope. The commentary is good throughout, and the whole film a model of an unambitious operation record. (16 mm., sound, colour, 22 min.)

The New South Wales committee is collecting a library of medical films from overseas as well as encouraging home production. These two examples may lack professional polish, but they are far better than our amateur counterparts. The Australians seem to have achieved the happy mean between worthless records and highly expensive studio productions; we in Britain could learn a lot from them.

PLASTIC STOMACH-TUBE

Dr. FRANKIS EVANS writes: I can recommend a new type of Ryle's tube which is made of P.V.C. base plastic tubing. The ordinary rubber Ryle's tube can only be passed on a conscious patient, whereas the plastic tube is so made that varying degrees of rigidity can be obtained, depending on the temperature at which the tube is kept. At ordinary room temperature the plastic tube is sufficiently rigid for it to be passed into the stomach of the unconscious patient. This is of great benefit to both anæsthetist and surgeon. If the tube is to be passed on a conscious patient it need only be placed in warm water for a few minutes and it will be as soft and pliable as rubber. The tubes can be boiled repeatedly and show no signs of cracking or other deterioration. They have been made for me and can be obtained from Messrs. A. L. Hawkins, New Cavendish Street, W.1.

Royal Society of Medicine

No diary cards can be issued for the present, but meetings will be held as usual.

Royal Sanitary Institute

At a meeting to be held at the Town Hall, Llandudno, on Friday, Feb. 28, at 2.30 P.M., Dr. J. Glyn Jones will read a paper on Tuberculosis Under the New Health Services. On Friday, March 21, at St. William's College, York, at 2.15 P.M., Dr. Fraser Brockington will speak on the Work of Local Authorities under part III of the National Health Service Act.

Association of Surgeons of Great Britain and Ireland

The annual meeting of the association will be held at Oxford from July 3 to 5. The provisional programme includes a discussion on the Surgical Relief of Pain (excluding sciatica), to be opened by Mr. J. H. Kellgren, Prof. Geoffrey Jefferson, and Prof. J. Paterson Ross. There will also be a discussion on Ulcer and Cancer of the Cardiac End of the Stomach and Lower End of the Œsophagus, when the opening speakers will be Mr. P. R. Allison, Mr. T. Holmes Sellors, Mr. Vernon Thompson, and Mr. N. C. Tanner. Further information may be had from Mr. H. W. S. Wright, hon. secretary of the association, at 45, Lincoln's Inn Fields, London, W.C.2.

Penicillin Prescriptions under N.H.I.

The number of penicillin prescriptions under National Health Insurance was 52,850 last August, and incomplete returns for September show a rise of 4–5%, states Mr. A. W. Thompson, chief pharmacist to the Ministry of Health, in a bulletin to members of the Pharmaceutical Society. "As it is clear," he says, "that there will be more than 600,000 penicillin prescriptions during the first year, the additional cost to the Drug Fund must be over £70,000, unless the use of penicillin preparations substantially reduces the number of prescriptions."

Distribution of Drugs

Manufacturing chemists are perturbed by the terms of the Transport Bill, which affords them no exemption from the general ban on delivery by manufacturers' vehicles beyond a 40-mile radius. The manufacturers contend that drug transport is a skilled job, and that the ban will result in waste of time and space; they claim that drugs should be exempted as they were during the war and as meat is under the Bill. A deputation from the Wholesale Drug Trade Association was told on Feb. 6 at the Ministry of Transport that it was unlikely that complete exemption would be conceded; the Ministry thought that manufacturing and wholesale druggists would in practice have no difficulty in obtaining permits from the licensing authorities. The deputation expressed apprehension that there might be no uniform practice among these authorities.

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[7] Kretschmer, H. L. *J. Amer. med. Ass.* 1934, 103, 1144.
[8] Hambleton, B. F., Lackey, R. W., Van Duzen, R. E. *Ibid*, 1935, 105, 645.

[1] Morell Mackenzie. By R. Scott Stevenson, M.D. Edin., F.R.C.S.E. London: W. Heinemann. Pp. 194. 15s.

[1] The Renaissance and its Influence on English Medicine, Surgery, and Public Health. London: Christopher Johnson. Pp. 30. 5s.

[1] See Cruickshank, E. K. *Lancet*, 1946, ii, 369. Burgess, R. C., *Ibid*, p. 411. Mitchell, J. B., Black, J. A. *Ibid*, p. 855.

SPONTANEOUS COMPRESSION OF BOTH MEDIAN NERVES IN THE CARPAL TUNNEL

SIX CASES TREATED SURGICALLY

W. Russell Brain
D.M. Oxfd, F.R.C.P.
PHYSICIAN TO THE LONDON HOSPITAL AND THE MAIDA VALE HOSPITAL

A. Dickson Wright
M.S. Lond., F.R.C.S.
SURGEON TO ST. MARY'S HOSPITAL AND THE MAIDA VALE HOSPITAL

Marcia Wilkinson
B.M. Oxfd, M.R.C.P.
MEDICAL REGISTRAR AT THE MAIDA VALE HOSPITAL FOR NERVOUS DISEASES

In this paper we describe 6 patients, all middle-aged or elderly women, who suffered from bilateral median neuritis due to compression of the nerves under the transverse carpal ligament at the wrist. They were treated by surgical division of the ligament. This operation appears to have been performed on only three occasions previously (Woltman 1941, Zachary 1945), and in those three patients the compression of the nerves was due to fracture or arthritis. In our 6 patients the compression arose spontaneously, but unaccustomed manual work may have helped to cause it. We have seen 8 other patients in whom the lesion has not yet been verified. Most of these add no fresh features, but allusion will be made to one, in whom the compression was secondary to fracture of the scaphoids and osteo-arthritis. The syndrome presents several points of interest in relation, particularly, to its pathogenesis, to the symptoms of slow compression of a mixed peripheral nerve, and to the diagnosis of partial thenar atrophy.

PREVIOUS OBSERVATIONS

Ramsay Hunt (1909, 1911, 1914) drew attention to syndromes which he described as "the thenar and hypothenar types of neural atrophy of the hand." The hypothenar type, which he ascribed to compression of the deep branch of the ulnar nerve, does not concern us further. He reported (1911) three examples of the thenar type. In two the wasting was bilateral, in the third unilateral. The limitation of the wasting to the abductor pollicis brevis, the opponens pollicis, and the outer head of the flexor brevis pollicis, together with the absence of sensory loss, led Hunt to place the lesion, hypothetically, in the thenar branch of the median nerve, which he supposed to be compressed where it passed over the palmar border of the transverse carpal ligament. Later (1914), however, he attributed the paralysis to a lesion of the thenar branch beneath the ligament. Marie and Foix (1912) reported ten examples of "isolated non-progressive atrophy of the small muscles of the hand," with four necropsies; but in only two of their patients was the wasting limited to the thenar eminence, and these were not among those on whom a pathological examination was made. Marie and Foix concluded that the lesion was in the spinal cord and was a localised destruction of anterior-horn cells, mainly of the 8th cervical segment.

A year later, however, Marie and Foix (1913) reported a case in which the lesion was in the median nerve.

> Their patient was a woman, aged 80, admitted to hospital with a cerebral vascular lesion and found to have also bilateral wasting of the *thenar eminences. Unfortunately, sensory* testing was impossible.
>
> Outside the central nervous system there was no lesion except in the median nerves, which showed, immediately above the transverse carpal ligament, a thick and firm nodular swelling or neuroma, while beneath the ligament there was a narrowing due to a "strangulation" which contrasted with the swelling above.
>
> Microscopically the swelling was characterised by great overgrowth of interfascicular and intrafascicular fibrous tissue, with destruction of myelin sheaths. At the level of the ligament there was still much intrafascicular fibrosis, but it was less marked than above. Weigert-Pal stain showed that the myelin sheaths diminished progressively from the upper limit of the neuroma and disappeared at the level of the ligament.

It was clear that the thenar atrophy in this case was due to an interstitial neuritis at the level of the ligament, causing a strangulation of the nerve beneath the ligament and a neuroma above it.

Brouwer (1920) reported 14 cases. His first 4 patients were tailors; 2 of his female patients did much washing, and 3 had arthritis. Brouwer emphasised the importance of occupation, and considered that the thenar muscles, being of recent phylogenetic development, were especially liable to undergo degeneration as a result of trauma.

Harris (1926) described wasting of the thenar muscles due to neuritis of the median nerve caused by intermittent pressure on the ball of the thumb by an instrument such as a trowel-handle or a scrubbing brush. He also mentioned wasting of the abductor and opponens pollicis as a result of motor neuritis secondary to arthritis of the trapezio-metacarpal joint at the root of the thumb.

Lhermitte and de Massary (1930) reported a case of senile non-progressive thenar atrophy, without sensory loss, associated with an atrophy of the posterolateral group of cells in the anterior horn of the 6th cervical segment of the spinal cord on the affected side.

Dorndorf (1931) reported 16 cases of isolated paralysis of the ball of the thumb. All his patients were women at or near the menopause. He was inclined to attribute the disorder to ischæmia, without reaching a conclusion about the site of the lesion. If it were in the median nerve, he thought the absence of sensory loss must be attributed to a higher resistance of sensory fibres or to a selective damage to the motor fibres.

Wartenberg (1939) reported 7 cases of "partial thenar atrophy." His paper included an anatomical report on the muscular branch of the median nerve to the thenar eminence by Saunders, who has found that this branch arises independently from the volar aspect of the median nerve beneath the middle of the transverse carpal ligament. It then proceeds distally beneath the ligament to its distal border, to pass through a definite canal in the lateral attachment of the ligament to the trapezium. After this it is reflected to pursue a recurrent course to its division to supply the individual muscles. In this part of its course the position of the nerve is variable in its relation to the flexor brevis muscle. Winckler (1930) has reported a case in which the thenar branch actually pierced the anterior carpal ligament. Wartenberg observes that these facts show that the thenar branches of the median nerve may be so unfavourably placed in a normal person as to be subject to trauma by the ordinary use of the hand. Nevertheless he concludes that the evidence that such is the cause of the thenar atrophy is unconvincing. The occurrence in some patients of paræsthesiæ not necessarily confined to the distribution of the median nerve suggests the presence of some unknown nocuous factor to which Wartenberg supposes the thenar muscles to be specially susceptible owing to their late development in the evolution of man.

Moersch (1938), who reported another case, accepted Hunt's view that the motor branch was injured as it passed over the distal edge of the anterior carpal ligament.

Woltman (1941) reported 2 cases of median neuritis with both motor and sensory symptoms. The first patient had acromegaly, and her hands eventually improved after X-ray treatment of the pituitary. The second patient had unilateral median neuritis, secondary to arthritis of the wrist, with motor, sensory, and trophic symptoms which disappeared after section of the transverse carpal ligament.

Zachary (1945) reported 2 cases similar to the last. His first patient had bilateral motor and sensory symptoms corresponding to the distribution of the median nerves in the hand, and X rays showed old fractures of both scaphoids, with osteoarthritis. The left median nerve was operated on by Prof. H. J. Seddon and found to be compressed in the carpal tunnel. An unexplained feature in this case, to which allusion will be made below, was loss of extension of the index and middle fingers. The second patient had an old malunited Colles's fracture and developed symptoms of median neuritis at the wrist more than twenty years later. Again the nerve was found to be compressed in the carpal tunnel, and paræsthesiæ and pain were relieved within two days of operation.

REPORTS OF CASES

I

A married housewife, aged 49.

History.—Three years ago she started to have a tingling and burning pain in the right hand, *involving mainly the thumb and 2nd, 3rd, and* 4th fingers. The pain did not extend above the wrist. At the same time her right hand felt numb. The numbness and tingling gradually got worse.

A year ago she noted wasting of the muscles at the base of the right thumb and also developed pins-and-needles and occasional numbness in the left hand. The pain was worse at night and on carrying anything heavy.

Past History.—During the war she had been doing an increased amount of housework.

Examination.—Right hand: wasting and weakness of abductor brevis and opponens pollicis and slight impairment to light touch and to two-point discrimination over the median distribution.

Left hand: slight weakness of abductor pollicis brevis. Slight impairment to pinprick and light touch over the palmar aspect of the 2nd and 3rd fingers, the loss to pinprick being more pronounced. Two-point discrimination: normal. Reflexes present and equal. No tenderness at wrist. No other abnormal signs in the central nervous system.

Radiography.—Cervical spine normal. Wrists, no abnormality detected.

Operation (August 1, 1946).—General anæsthesia. The right median nerve at the wrist was found to be enlarged and flattened above the carpal ligament, and was about three times the size of a normal nerve. A small vessel ran down the anterior side of the nerve, disappearing 1 in. above the carpal ligament. The bundles of nerve-fibres were separated by (? œdema) fluid, and in the carpal tunnel the nerve was thickened and swollen. There was no definite groove corresponding to the upper end of the carpal ligament.

Left nerve: similar in appearance to right nerve, but the changes were less well marked (fig. 1).

Follow-up.—August 17: subjectively there was a considerable improvement. She no longer complained of the burning pain and only occasionally had a tingling feeling. There was still some numbness of the tips of the fingers.

Feb. 3, 1947: no pain; occasional tingling in right hand, none in left. Hands feel stronger but no subjective improvement in sensation. Wasting and weakness of right abductor pollicis brevis less, otherwise no change in voluntary power. Sensation: right hand, no change in anæsthesia or tactile discrimination, analgesia limited to distal two-thirds of digits supplied by median nerve; left hand, slight hypæsthesia over median distribution, hypalgesia over distal half of index and middle fingers only.

II

A married tailoress, aged 37.

History.—Five years ago she noted that her left thumb was becoming weak, and that she could not button up her coat properly. Her thumb felt numb and cold, and she had some numbness of her 2nd and 3rd fingers. When she carried a heavy bag she had a feeling of numbness extending up her forearm to her elbow.

Three and a half years ago she noticed wasting of the muscles at the base of her left thumb. She attended a hospital and was told that she had progressive muscular atrophy.

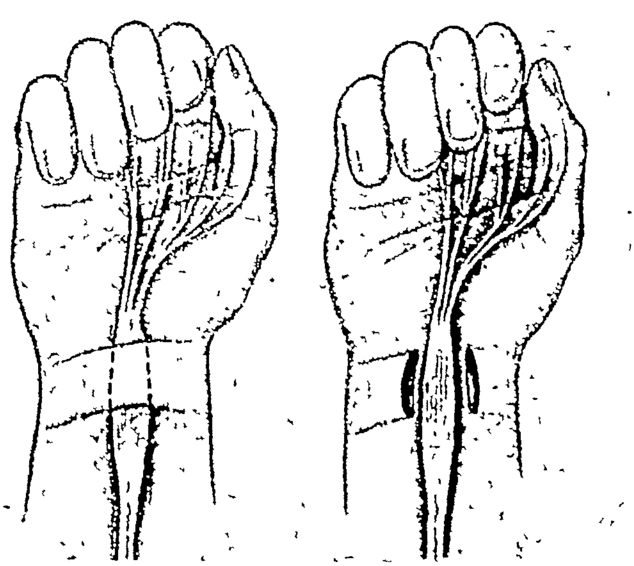

Fig. 1—Case I: median nerve flattened and enlarged under carpal ligament.

Three years ago the thumb and 2nd and 3rd fingers of her right hand became numb and the muscles of the right thumb wasted, and she had an itching feeling in her fingers.

For the past three years there has been no progression in her symptoms, but she still has pins-and-needles, numbness, and itching, and cannot sew because of the weakness and clumsiness of her thumb and fingers.

Past History.—On one occasion she was thrown to the ground by a bomb exploding close by, and she fell rather heavily on her outstretched hands.

Examination.—Well-marked weakness and wasting of both abductor pollicis brevis and opponens pollicis muscles. Slight hypalgesia and hypæsthesia over the thumb and 2nd and 3rd fingers of both hands. Two-point discrimination and joint sense normal. No other abnormal signs in the central nervous system.

Radiography.—Wrists and cervical spine: no bony lesion seen.

Operation (Sept. 19, 1946).—The left median nerve was found to be pale and swollen to about twice its normal size. The swelling extended for $^{3}/_{4}$ in. above the carpal ligament. The right nerve was also swollen but was slightly pink under the carpal ligament. In both nerves the nerve bundles could be seen distinctly. The carpal ligament was divided on both sides.

Follow-up (Jan. 23, 1947).—She had lost the feelings of numbness extending up the forearm to the elbow and had no pain or paræsthesiæ in the hand. There was still gross weakness and wasting of the abductor pollicis brevis on both sides, but power in the opponens pollicis on both sides was almost normal. There was slight hypalgesia over both hands of the same distribution as before, and an area of hypalgesia about 3 cm. in diameter on the palmar aspect of the left hand just distal to the end of the scar. Appreciation of light touch and tactile discrimination were normal.

III

A married housewife, aged 67.

History.—Six months ago she began to get a feeling of pins-and-needles in the tips of the 2nd and 3rd fingers of each hand. Later these fingers and the thumb became weak.

Five and a half months ago she was awakened at night with severe pains in the palms of her hands. These pains persisted and were always worse at night.

Five months ago the numb feeling spread from the tips of her fingers to the palms of her hands, and she was unable to hold or pick up small objects, such as needles. When she touched an object she got a pricking feeling in her fingers, although they felt numb. At night she had a burning feeling in her hands, and during the day her hands felt cold.

Three months ago she noticed that her hands were getting thinner.

Past History.—During the war she has had to do an increased amount of housework. No history of trauma.

Examination.—In both hands weakness and wasting of opponens pollicis and abductor pollicis brevis. No weakness of flexion or extension of the wrist. Hypalgesia, hypæsthesia, and impairment to two-point discrimination over distribution of median nerves. Slight defect of postural sense in the terminal phalanges of 2nd and 3rd fingers of the left hand.

No other abnormal physical signs in the central nervous system.

Radiography.—Wrists and cervical spine: no bony lesion seen.

Operation (June 11, 1946).—Both median nerves were exposed. The left nerve was swollen and pink for $^3/_4$ in. above the carpal ligament, and there was a depression on it corresponding to the upper level of the carpal ligament. The median nerve on the right side, which was also swollen, had divided into two parts about $1^1/_2$ in. above the upper end of the ligament.

Follow-up.—Two or three days after the operation pinprick was felt more sharply on the right hand, and there was a slight improvement in two-point discrimination. Subjectively there was considerable improvement, as the severe pain stopped and, though the fingers felt numb, the feeling of pins-and-needles diminished. Her nights were no longer disturbed.

Sept. 5: the feeling of numbness had shrunk to the distal half of the left index and middle fingers only. The wasting was less, and power had improved. Hypalgesia was present on the index and middle fingers and the terminal phalanx of the thumb. Hypæsthesia was present only over the terminal phalanges of the thumb, index and middle fingers, and tactile discrimination over the right index and left index and middle fingers only.

Nov. 6: she wrote that her hands felt much less numb, and that the movements of the thumbs were much stronger.

IV

A married housewife, aged 51.

History.—Twenty-one months ago she started to have a burning uncomfortable feeling in the index and middle fingers of both hands, which lasted for several months. After this she was free of all unpleasant sensation for five or six months.

Nine months ago she began to get a tingling feeling in the thumb and 2nd, 3rd, and 4th fingers of the left hand and the thumb of the right hand. This feeling gradually developed into a burning pain which affected the fingers but not the thumb.

Three or four months ago the same fingers began to feel numb, and the burning pain was brought on by using her hands. The tingling feeling was always worse in the mornings and more recently woke her up at night.

Past History.—In the past she has had several heavy falls on to her hands, but she has not broken any bones. In the last few months she has been doing an increased amount of housework.

Examination.—Wasting and weakness of both abductor brevis pollicis muscles. The short flexor of the thumb and the opponens pollicis were not affected.

Hypalgesia and hypæsthesia and slight loss of two-point discrimination in the distribution of the median nerve, the loss being more marked on the right than on the left. No other abnormal physical signs in the central nervous system.

Radiography.—Wrists and cervical spine: no bony lesion seen.

Operation (June 28, 1946).—Both median nerves were exposed at the wrist. On the right the nerve was pink and swollen for about $1^1/_2$ in. above the carpal ligament. The bundles of nerve-fibres could be seen distinctly. Below and more than $1^3/_4$ in. above the carpal ligament the nerve appeared normal. The left nerve was similar to the right and was even more swollen, being nearly as large as the sciatic.

Follow-up.—Two or three days after the operation there was a considerable subjective improvement. The tingling and burning pain went, but the affected fingers still felt numb.

After operation there was still impairment to pinprick and light touch, but this was less marked, and two-point discrimination was only very slightly impaired.

Feb. 3, 1947: no pain or paræsthesiæ. Fingers tend to go white in cold weather and puffy and shiny when very hot. Able to do housework, knitting and sewing normally. Just detectable wasting of abductor pollicis brevis on both sides: power in these muscles 90% of normal, and power in both opponens pollicis normal. No anæsthesia or analgesia; tactile discrimination perfect at 0·5 cm. separation.

V

A married housewife, aged 57.

History.—Two years' history of pain in front of right wrist spreading to thumb, index and middle fingers, like electricity, and associated with numbness in thumb, wasting of outer aspect of thenar eminence, and weakness of thumb. Four weeks' onset of pain and paræsthesiæ in left thumb, index and middle fingers. Left shoulder always higher than right. Occasional pain in neck on extension.

Examination.—Severe wasting and weakness of abductor brevis and opponens pollicis of right hand, and slight of left. Weakness of extension of right thumb at metacarpophalangeal and interphalangeal joints. Slight impairment of appreciation of light touch and pinprick over distal half of palmar surface of thumb, index and middle fingers, and radial half of ring finger of both hands and corresponding dorsal surfaces of terminal phalanges: no loss of tactile discrimination or postural sense. Sensory loss greater on right hand than left.

Electrical Reactions.—Faradic response lost in right abductor brevis and opponens pollicis, and sluggish in abductor longus and the extensors of the thumb on both sides.

Neck very short; extension somewhat limited; some pain on lateral flexion. Prominence of lower cervical spinous processes. Left scapula higher than right.

Radiography.—Dr. James Bull reports: "There are seven cervical vertebræ of which the atlas alone has a fairly normal appearance. C2 and C3 are fused and lack an intervertebral disk space between their bodies. C4 and C5 are fused and have a rudimentary intervertebral disk space. The same applies to C6 and C7. True intervertebral disk spaces are present between the pairs at C3–C4 and at C5–C6 level. The disk space between C7 and D1 is normal. Osteo-arthritic changes are present between C3–C4 and C5–C6. The body of C6 is rather rudimentary on the right side and causes a scoliosis. Bilateral cervical ribs are present at C7, the right being larger than the left. A very rudimentary cervical rib is present on the right side at C6.

"The right scapula is normal. The left scapula lies very high, the upper border being at the level of C7 (that on the right is at T3 level). The vertebral border of the left scapula, instead of having a normal straight edge, is angulated towards the spinal column in a V shape. At the apex of the V an abnormal bone articulates rather in the manner of the acromioclavicular joint. The abnormal bone has a spatulate appearance. It is triangular, with the apex directed cranially. The apex articulates with the spinous process of C5, the angle at the left base articulates with the left scapula as already mentioned, and the remaining angle of the bone is free. This triangular bone is about 8 cm. long and 7·5 cm. broad. It appears to be about as thick as a scapula and has a spinous process directed backwards at its upper end."

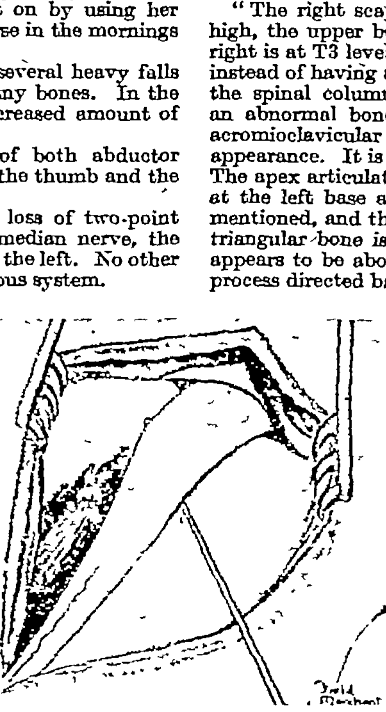

Fig. 2—Median nerve swollen and resembling a tendon.

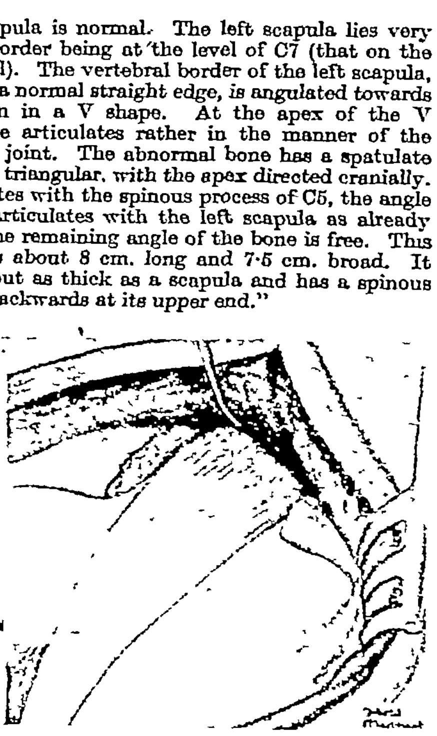

Fig. 3—Carpal ligament cut to expose median nerve.

Operation (Oct. 14, 1946).—The right median nerve was swollen for about $^1/_2$ in. above the carpal ligament and under the ligament. The carpal ligament was incised. The left median nerve was then exposed. This was also swollen but was pinker than the right. The left nerve divided into two parts about 1 in. above the upper end of the ligament, both parts running together under the ligament. The ligament was incised and the wound sutured.

Follow-up (Feb. 5, 1947).—No pain or paræsthesiæ. Power in thumbs stronger; can now darn for the first time for two years. Slight wasting of right abductor brevis pollicis, in which power is about half of normal. Muscular power otherwise normal in both hands. No substantial change in sensation.

Electrical reactions normal in thenar muscles of both hands except right abductor brevis pollicis which does not respond to faradism but responds normally to interrupted galvanism. Extensors of thumbs normal.

VI

A married housewife, aged 67.

History.—Three months ago while on holiday she did a great deal of unaccustomed heavy work. A few days later she developed a sharp shooting pain in her arms, which went down her hands. Every time she drew a deep breath she got a stabbing pain in the arm. The pain in the hand affected chiefly the 3rd finger and was always worse at night.

Six weeks ago she had some physiotherapy, which seemed to make the pain in her hands worse.

Five or six weeks ago both thumbs became weak and useless, the left being more affected than the right. She has noticed that the thumb and 2nd, 3rd, and half the 4th finger have felt numb, and she has a severe burning pain in her hands.

Right-handed.

Examination.—Hands: wasting and weakness of the opponens pollicis and abductor pollicis brevis, more marked on the left than on the right. Hypæsthesia and hypalgesia over the distribution of the median nerve. Joint sense and vibration sense normal. Two-point discrimination: no gross impairment. Reflexes present and equal. No other abnormal signs in the central nervous system.

Radiography.—Neck and wrists: no bony lesion seen.

Operation (Oct. 29, 1946).

Left hand: the median nerve was swollen and slightly pink. The surrounding tissues seemed more adherent than in a normal nerve. The carpal ligament was cut through.

Right hand: changes were similar to, but less marked than, those on the left. The carpal ligament was divided.

Follow-up (Feb. 5, 1947).—Feels much better. Free from pain except for occasional shoot in the fingers. Fingers still feel numb, but can knit and sew. Wasting of right thenar muscles less, but left unchanged. No change in voluntary power. Hypæsthesia of median distribution on both hands. Hypalgesia now limited to median supply to digits of right hand and on the left hand distal half of digits supplied by median nerve.

The clinical picture which emerges from these patients begins with burning and tingling sensations in the distribution of the median nerve of one hand. The discomfort may be severe and awaken the patient at night. Pari passu, weakness of the abductor brevis and opponens pollicis or, as in case IV, abductor brevis alone, develops, and these muscles waste fairly rapidly. Appreciation of pinprick, light touch, and tactile discrimination are impaired over the distal half of the fingers innervated by the median or even over the whole of the palmar aspect of these fingers. At this stage the pain diminishes, but sensory loss interferes with the manipulation of fine objects. Within an interval of weeks, months, or years the other hand is similarly affected. There is no weakness of the muscles innervated by the median nerve in the forearm, nor is the nerve usually tender at the wrist.

In all the patients operated on, the same lesion has been found: a compression of the median nerve where it passes beneath the transverse carpal ligament, and a swelling of the nerve for an inch or so immediately above this. When the history has been short, the swollen nerve has appeared pink; in more chronic cases it has seemed more fibrotic. It seems likely that the final condition in untreated cases is a neuroma, such as that examined histologically by Marie and Foix (1913).

PATHOGENESIS

The carpal tunnel (fig. 1) lies between the tough transverse carpal ligament anteriorly and the bones of the wrist-joint. It is divided into two compartments, the larger of which contains the tendons of the flexors of the digits and the median nerve, and the smaller the tendon of the flexor carpi radialis. Normally there is little spare room in the carpal tunnel, and it is easy to see how the median nerve may be compressed between the bones of the wrist-joint and the transverse carpal ligament when the tunnel is narrowed owing to fractures involving the lower end of the radius or proximal carpal bones, or to osteo-arthritis of the wrist. In our patients, however, no bony lesion was shown radiographically, and the source of the compression must be sought elsewhere. There can be little doubt that occupation is a causal factor. One of our patients, like four of Brouwer's, was employed in tailoring; four of the others said they had done much unaccustomed housework during the war; and in the last the onset occurred at a time when she had to carry buckets of water.

Abbott and Saunders (1933) state that, even in normal persons, acute flexion of the wrist pinches the median nerve between the proximal margin of the transverse carpal ligament and the anterior border of the distal end of the radius. They carried out injection experiments on the cadaver which showed that, if the wrist was in a position of acute flexion with some ulnar deviation, solutions injected proximally into the median nerve were arrested at a point opposite the proximal border of the transverse carpal ligament; whereas, if the wrist was held in moderate flexion or extension, the injections flowed easily into the palm of the hand and even along the terminal branches of the nerve.

Our own observations do not support the view that flexion of the wrist is the important factor. If the tip of the little finger is introduced into the carpal tunnel in the cadaver, it is easy to feel that there is much more room in it during flexion of the wrist than during extension. Moreover, on flexion of the wrist, as might be expected, the median nerve becomes slacker. To measure the pressure changes we constructed a simple tambour consisting of an elongated rubber-bulb, which was introduced into the carpal tunnel and was filled with water and connected to a manometer. The pressure was adjusted so as to register 0 when the wrist was straight. Flexion to a right angle raised the pressure to 100 mm. of water, but extension to a right angle raised it to well over 300 mm. of water. Measurement of the volume displaced showed that extension reduced the content of the bulb by 0·7 c.cm. as compared with flexion.

Acute flexion of the wrist is a rare movement, but extension is a common one, and repeated extension occurs in housework. In scrubbing and polishing, the hand holding the brush or the cloth is usually extended at the wrist, and the other hand often rests with the palm upon the flat surface and the wrist also extended. It seems that the rise of pressure in the carpal tunnel caused by repeated extension of the wrist is in some people sufficient to cause compression of the median nerve. Since most patients affected in this way are middle-aged or elderly, and since the pathogenic process in all pressure lesions of nerves appears to be ischæmia, it is probable that vascular degeneration in middle life increases the ischæmic effect of pressures which might be harmless in younger people. Moreover, the reaction of the nerve to pressure is œdema, which increases the pressure still further and so leads to a vicious circle.

The severity of the œdema above the constriction was surprising, but these observations in man confirm what has been found in the experimental animal. Weiss (1943a and b), in the course of experiments which involved the splicing of divided peripheral nerves by a cuff of live artery, noted that, when the splice was too tight, œdema developed in the nerve on the proximal side of the constriction, and thought that this indicated a centrifugal flow of lymph in the nerve which was obstructed by the constriction. Denny-Brown and Brenner (1944b) have observed a similar œdema after compression of a peripheral nerve with a spring clip. They reject Weiss's explanation on the ground that in his experiments the nerves were divided, and that the resulting interference with the circulation in the peripheral segment explains why the œdema was more severe proximal to the lesion. In their spring-clip experiments œdema was noted both above and below the site of compression. "Continued pressure on a segment of nerve," they write, "not only renders that region ischæmic but induces prolonged vascular stasis in neighbouring regions." After such lesions, as after tourniquet paralysis (Denny-Brown and Brenner 1944a), conduction in motor fibres is selectively damaged, and sensation, if impaired, recovers much more rapidly. The same authors (1944b) attribute this dissociation between motor and sensory function "to a functional property of the disorder of the axoplasm, and not to selective effect related to the size of the fibre."

Denny-Brown and Doherty (1945), in acute experiments on the effects of stretching peripheral nerves, found that after milder lesions a pseudoneuroma formed owing to the presence of fluid in the endoneural spaces, whereas when the lesion was more severe a true neuroma was present.

It is thus possible to give a fairly complete explanation of both the operative and clinical findings in our patients. The primary lesion appears to be a compression of the nerve as it passes through the carpal tunnel. The œdema proximal to the compression is comparable with that found experimentally above ischæmic lesions. This, if not relieved, tends to impair the function of the nerve and ends by becoming a true neuroma. The pathogenesis of this form of median neuritis is thus in some respects similar to that of the pressure neuritis arising in a "slipping" ulnar nerve, though the initial mode of compression is different. Meralgia paræsthetica, due to compression of the external cutaneous nerve beneath Poupart's ligament, is an even closer parallel. Since spontaneous recovery does not seem to occur, operation should be carried out as early as possible.

As Zachary (1945) points out, the selective damage to the motor functions, which led earlier workers to postulate an unverified lesion of the thenar branch of the nerve, is explained by our knowledge of the effects of trauma on a mixed nerve. Thus Stopford (1926) distinguishes three stages in the symptomatology of the compression of a mixed nerve: (1) increasing weakness and neuralgic pain; (2) objective sensory disturbance consisting of dissociated loss of appreciation of pain, heat, and cold before light touch, the neuralgia diminishing and disappearing as full analgesia develops; and (3) tactile anæsthesia within a smaller area than the remainder of the sensory loss. We have met with all three of these stages in our patients. Though weakness and wasting have on the whole been more severe than sensory disturbances, the latter have never been absent. Whereas it is possible that thenar atrophy may occur alone if the thenar branch of the median nerve is damaged in isolation, this hypothetical lesion has apparently never been proved to exist; and, in some cases regarded as examples of this lesion, sensory symptoms have been described by the patient—e.g., cases 1 and 2 of Hunt (1911). The frequent sparing of flexor brevis pollicis is no doubt due, as Zachary (1945) points out, to the fact that it is often innervated entirely by the ulnar nerve. When the palmar cutaneous branch of the median nerve lies superficial to the transverse carpal ligament it escapes; hence there is no sensory loss on the palm.

A feature which is difficult to explain is the presence, in two of our patients and in one of Zachary's, of weakness of some of the long extensors or flexors of the digits. Our case v showed weakness of extension of the right thumb and diminished response to faradism in the corresponding muscles on both sides. In one of our unverified cases both median nerves were compressed at the wrists as a result of osteo-arthritis secondary to fracture of both scaphoids. The patient had loss of flexion of the terminal phalanx of the left thumb, which he said had come on suddenly. Zachary's first patient had almost complete loss of extension of the left index and middle fingers. In our case v the extensors of the thumb recovered pari passu with the thenar muscles. We draw attention to this curious point so that others may look for it and perhaps discover the explanation.

DIAGNOSIS

When sensory symptoms are slight, the muscular wasting may suggest progressive muscular atrophy. The sharp limitation of the wasting to the outer half of the thenar eminence, and its severity there, in the absence of wasting elsewhere and of fibrillation, are characteristic, and the presence of paræsthesiæ and even slight sensory loss of median distribution exclude motor-neurone disease. Syringomyelia is not likely to lead to difficulty, for the characteristic dissociated sensory loss will usually be present and extend over an area wider than the distribution of the median nerve. Muscular wasting will not be limited to the thenar eminence, and the tendon reflexes will, as a rule, be diminished or lost in the upper limbs.

The diagnosis from the costoclavicular syndromes may be much more difficult; two of our cases had previously been diagnosed as such. Wilson (1913) first drew attention to thenar wasting as a symptom of cervical rib, and in particular to the occurrence of wasting of the abductor brevis and opponens pollicis with sparing of the flexor brevis. To explain this he assumed that "though their peripheral supply is from the same source, their root supply is from two sources, probably the seventh and eighth cervical. . . . It may fairly be concluded that the root supply of the abductor brevis and opponens pollicis is the seventh cervical, and of flexor brevis pollicis the eighth cervical." Wilson offered no proof of this, and there is an alternative and much more probable explanation, both of the wasting of the median muscles and of the sparing of the flexor brevis. Fibres from the C8 and D1 roots run to the median nerve through the inner cord of the plexus and the inner head of the median nerve. Compression of the inner head of the median nerve—e.g., by the third part of the subclavian artery—would involve the nerve-supply to the hand muscles carried by the median; and, as Highet (1943) has shown, in 80% of cases the flexor brevis is supplied by the ulnar nerve. Whatever the explanation, partial thenar wasting may be produced by a lesion of the median nerve in the carpal tunnel, or by a lesion of its thenar branch, or as part of a costoclavicular syndrome. Moreover, X-ray evidence of the presence of a cervical rib does not prove that this is the source of the wasting, since in our case v bilateral cervical ribs together with the Klippel-Feil syndrome and Sprengel shoulder coexisted with pressure neuritis of the median nerves.

Sensory abnormalities are therefore most important in diagnosis. They are relatively uncommon in the costoclavicular syndromes associated with structural abnormalities. In 60% of Sargent's (1921) 65 cases of cervical rib no objective sensory change was found, and in only 4 patients was sensation impaired on the radial side of the hand. The thenar type of wasting was present in 12 out of 32 cases. Thus it is clear that thenar wasting due to cervical rib is unlikely to be associated with sensory loss falling within the cutaneous distribution of the median nerve. When, as commonly happens, cervical rib involves either the C8 or D1 contribution to the plexus, or the inner cord, or the inner head of the median nerve, the segmental cutaneous area affected will be D1 or C8 or both. Even if the plexus be postfixed so that the C8 root carries sensation to what is normally the C7 cutaneous area, there will be no sensory change on the thumb or index finger. Objective sensory loss on the thumb or the index finger associated with thenar wasting is therefore most unlikely to be part of a costoclavicular syndrome and points to damage to the median nerve. Similarly, sensory impairment of full median distribution affecting the radial half of the ring finger and sparing the ulnar half can be caused only by a median-nerve lesion and not by a lesion involving the brachial plexus.

SURGICAL TREATMENT

The operation is carried out through an incision over the front of the wrist. The vertical incision is 2 in. long and precisely in the middle, and ends at the distal transverse crease, as it was felt that it was preferable not to make an incision over the flexor aspect of the wrist or to leave a scar on the palm. The nerve is practically subcutaneous and very easily found. Delay may be caused because of the altered appearance of the nerve, which resembles a tendon, as it is swollen to two or three times its normal size (fig. 2), resembling the friction neuromata seen in cases of cervical rib or attrition of the ulnar nerve at the elbow. In 2 of the 6 cases the nerve had divided about 2 in. above the carpal tunnel and passed through the tunnel in two thickened parts; this very common abnormality might also cause delay in recognising the nerve. It seems that there is an effort on the part of the perineural and endoneural connective tissues to protect the delicate nervous elements by thickening. The effect of this thickening is not helpful to the nerve, as it increases the friction and the compression even more so if this is a factor, as in the type of case we are now considering. It was demonstrated at operation that there is a considerable to-and-fro excursion of the median nerve in the carpal tunnel during wrist movements, but the thickening extended over much more of the nerve than the part chafed, the hyperplastic process extending some distance on each side of the irritated portion.

The anterior carpal ligament is cut through in the midline along its entire length (fig. 3) until the thenar muscles originating from its inferior border are seen and partly divided; the finger can then be passed through the tunnel with ease, to make sure that the nerve is free from constriction. The nerve is now lifted from its bed so as to demonstrate certain constant filmy adhesions, which are divided until the nerve is quite free, when it is returned to its bed and the wound sutured after securing hæmostasis following the removal of the tourniquet. No splinting is applied after the operation, and the wrist is only partly immobilised with a firmly bandaged wool dressing for seven days until the stitches are removed.

There is no reason to fear prolapse of the tendons, because all powerful movements of the hand are done with the wrist in extension. The physiotherapy appropriate to a peripheral-nerve lesion should be carried out.

RESULTS OF OPERATION

These patients have been observed for only a short time—from 3 to 7 months—since operation. Relief from pain and tingling was rapid and complete in all cases. No. iv has made an almost complete motor and sensory recovery in 7 months. No. v has made an almost complete motor recovery in $3^1/_2$ months without objective sensory improvement. The others have all improved to some extent, and improvement may be expected to continue until from 6 months to a year after operation.

SUMMARY

Six cases of bilateral compression of the median nerve in the carpal tunnel are reported. All occurred in middle-aged or elderly women without X-ray evidence of bony damage in the neighbourhood of the wrist-joints.

The symptoms were pain, parræsthesiæ, and cutaneous sensory loss within the distribution of the digital branches of the median nerves, and partial thenar atrophy, limited to the abductor brevis and opponens pollicis muscles or even the abductor brevis alone.

All were treated by surgical division of the transverse carpal ligament with immediate relief of pain and tingling and gradual improvement in power and diminution in sensory loss.

The lesion found at operation was compression of the nerves in the carpal tunnel, and œdema for about 1 in. proximally.

It has been shown that extension of the wrist raises the pressure in the carpal tunnel, and it is suggested that occupations involving this movement may in time lead to compression of the median nerves.

The symptoms and pathology are discussed in the light of recent experimental work.

Diagnosis, especially from costoclavicular syndromes, is considered.

We are indebted to Dr. Douglas McAlpine for allowing us to report case vi, and to Prof. J. D. Boyd, Prof. H. J. Seddon, and Mr. R. B. Zachary for helpful comments.

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PURIFIED PRECIPITATED DIPHTHERIA TOXOID OF CONSTANT COMPOSITION

(P.T.A.P.)

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Despite considerable advances extending over a long period, it has not hitherto been possible for the manufacturer to make any accurate prediction of potency, when assayed by in-vivo methods, of batches of diphtheria prophylactic, whether formol *toxoid* or alum-precipitated toxoid (A.P.T.). This lack of reproducible physiological activity has rendered unsatisfactory the assessment of immunising procedures, such as dosage, time intervals, &c.

The difficulties in the preparation of A.P.T. of uniform antigenicity arise principally from our limited knowledge of its exact composition, of the mechanism of the enhanced activity of the precipitated *toxoid* when administered as A.P.T., and of the influence of impurities on the induced antibody response. The position has recently been described by Glenny (quoted by Lewis 1941) as follows:

> "Any comparison between the efficiency of different prophylactics can only be made if many batches of the same type have been used, owing to the great variation in

the antigenic value between individual batches of the same type. The simplest type of prophylactic, formol toxoid, is subject to great variation. Glenny and Barr (unpublished) have found that the antigenic efficiency of two batches of diphtheria toxoid, of the same flocculating value and time, can vary at least a hundred-fold, as judged by antitoxin production in guineapigs. Large enough groups of animals were used to cut out individual animal variation. Methods of preparing A.P.T. introduce further variation: the type of medium used, the amount of potash alum added, and the subsequent separation and cleansing of the precipitate differ considerably in different laboratories."

This report is a summary of an inquiry into the nature of A.P.T. and of a method of preparing a new diphtheria prophylactic with an immunising activity at least equal to that of high quality A.P.T. and having a constancy of composition previously unattainable.

TECHNICAL

The first stage of the investigation was the preparation of the medium for the growth of the strain of *C. diphtheriæ* used. A slight modification of Mueller's (1939) semisynthetic medium was adopted which eliminated the variations inherent in digest media and gave toxins free from undesirable peptones and similar substances.

A study of the mineral composition of different samples of A.P.T. revealed that they were essentially a mixture of aluminium hydroxide and aluminium phosphate approximately in the ratio of bicarbonate to inorganic phosphate present in the formol toxoid.

It has been found, however, that both pure aluminium hydroxide and aluminium phosphate will precipitate the toxoid antigen; but whereas aluminium phosphate precipitates *only* protein, aluminium hydroxide also precipitates other nitrogenous matter. Finally, it was found that, if *purified* toxoid was added to a suspension of pure aluminium phosphate, the toxoid was precipitated in useful amounts.

Since this integrated preparation is a potent immunising agent (see below) it was important to be able to prepare the purified toxoid on a large scale. The refined toxoid used in this work was prepared by a method which will later be described in detail. It has a purity of 1200–1500 Lf/mg. nitrogen.

The purified and concentrated toxoid may be freeze-dried and stored for a long period. The dried material redissolves, apparently unaltered, on the simple addition of distilled water or saline.

PRELIMINARY POTENCY TESTS

When it was found that a suspension of pure aluminium phosphate would remove the toxoid from solution, it became clear that this could be the basis of an alternative method of preparing a diphtheria prophylactic without the disadvantages of alum precipitation, provided that the resultant product was a potent immunising agent.

A sample of pure aluminium phosphate was prepared with equimolar amounts of aluminium chloride and trisodium phosphate to give 3 mg./c.cm. of aluminium-phosphate suspension. To this was added sufficient concentrated and purified toxoid to give Lf 50, and the mixture was left standing for twenty-four hours. Examination of the preparation revealed that there was no detectable toxoid in the supernatant fluid, but that it was all in the centrifuged deposit.

A potency test was carried out with this preparation, using ten guineapigs (300 g. in weight) each receiving subcutaneously an injection of 1 Lf of the diluted preparation in 1 c.cm. of saline. The dose was repeated four weeks later, and the animals were bled six weeks after the first injection. A small quantity of blood was taken from each animal at the time of the second injection to observe the average antitoxin titre four weeks after one injection. The results were:

Titre after four weeks (one dose) ..	0·2 unit per c.cm. of serum (average value).
Titre after six weeks (two doses) ..	2·25 units per c.cm. of serum (geometric mean).

A duplicate test with another sample of purified and concentrated toxoid gave the following results:

Titre after four weeks (one dose) ..	0·2 unit per c.cm. of serum (average value).
Titre after six weeks (two doses) ..	2·05 units per c.cm. of serum (geometric mean).

Although not exceptionally good, these results were reasonably consistent and sufficiently satisfactory to warrant further investigation.

PROPERTIES OF PURIFIED TOXOID, ALUMINIUM-PHOSPHATE-PRECIPITATED

In the large-scale preparation of this new diphtheria prophylactic, with highly purified toxoid, and aluminium phosphate as precipitant and mineral carrier, several important points have to be borne in mind.

It is easy to add a measured volume of concentrated purified toxoid solution to a definite quantity of aluminium-phosphate suspension, and this operation may be regularly and readily reproduced. It is necessary, however, to ascertain what influence the following factors have on the potency of such preparations:

(1) Any damage inflicted on the toxoid during the processes of toxoiding and purification. For instance, an increase in the time required for flocculation with antitoxin (Kf) may indicate some damage inflicted on the toxoid.

(2) Purity of the toxoid solutions used. It is not yet practicable to produce the pure toxoid commercially. That used in the present method is about 66% pure. (The toxoid present in the initial solutions accounts for about 25% of the total protein or 2% of their total nitrogen contents.)

(3) Any influence of the amount of mineral carrier used per dose. Seal and Johnson (1941) have reported that an increased amount of alum precipitate does give rise to the production of more antitoxin in animals. These experiments were only roughly quantitative, and the observations were not further investigated.

The following information has been obtained on these points:

(1) *Prolonged Kf.*—Though the method of toxoiding used produces a toxoid with a Kf not exceeding three times that of the parent toxin, there is a *reduction* of Kf for the final purified solution compared with the initial formol toxoid.

(2) *Purity of Toxoid Solution.*—This important aspect of the problem in different samples of diphtheria prophylactic is being more closely examined. The new method of preparation makes it possible to investigate this point more accurately, as the amount of both toxoid and mineral carrier may be precisely controlled, leaving the purity of the toxoid preparation as the only variable factor.

(3) *Influence of Amount of Mineral Carrier.*—Briefly, the more aluminium phosphate injected per unit of toxoid, the greater is the antibody response in guineapigs, but there is an optimal amount, considerably in excess of that required merely to precipitate the toxoid, beyond which the response declines (see below).

STABILITY AND REACTIONS

It is also necessary to find out whether the new preparation is stable on storage, and whether it produces any untoward reactions in human prophylaxis against diphtheria.

Stability.—Samples of Lf 50, purified toxoid, aluminium-phosphate-precipitated, have been stored at room temperature for a year and have lost only 10% in flocculating power. A sample stored in the refrigerator for two years has shown no detectable loss.

In practice the new prophylactic can be made from purified and dried toxoid and freshly prepared aluminium-phosphate suspension as required.

Reactions.—Schick-positive children and adults have been immunised with the new prophylactic, and no untoward reactions were encountered.

Tests were also made on a few persons hypersensitive to diphtheria formol toxoid and to A.P.T. In these experiments a direct comparison was made between crude formol toxoid and purified toxoid, as well as between A.P.T. and purified toxoid, aluminium-phosphate-precipitated. The dose was 1 Lf each, in 0·2 c.cm. volume, injected subcutaneously. These injections were given simultaneously in strictly comparable skin areas. A reduced inflammatory reaction was definitely observed where the purified toxoid was injected, whether in solution or precipitated; therefore it cannot be claimed that no reactions developed at all. The aluminium-phosphate carrier without the toxoid gave rise to no untoward reactions.

POSSIBILITY OF A STANDARD DIPHTHERIA PROPHYLACTIC

For laboratory and statutory purposes it is desirable to have a standard or reference diphtheria prophylactic against which other preparations may be standardised, in much the same way as with some antitoxins, vitamins, and hormones.

The major difficulty in the use of A.P.T. as a standard has been its instability on long storage. Sir Percival Hartley (1945) has reported that freeze-dried A.P.T. has not proved satisfactory in this respect.

Though it cannot be claimed that the completed purified toxoid, aluminium-phosphate-precipitated, preparations remain stable indefinitely, this difficulty may possibly be overcome, as mentioned above, by using the two components separately: (1) the purified and dried toxoid, and (2) a suspension of freshly prepared pure aluminium phosphate. These could be integrated at the time of the potency test. The dried toxoid could be prepared in bulk and issued in bottles containing an exact number of units of toxoid; to this could be added a definite amount of a defined suspension of aluminium phosphate for the test.

Influence of Amount of Mineral Carrier on in-vivo Potency

When a sample of A.P.T. is to be tested for potency, the regulations of the Therapeutic Substances Act require that it be diluted to Lf 1 (one flocculating unit per c.cm.), and that two injections of 1 c.cm. each into normal guineapigs should be made four weeks apart. The guineapigs should be bled not later than three weeks after the second injection, and the sera assayed individually for their antitoxin values; from these the geometric mean is calculated.

The object of the test is to obtain a measure of the antigenicity of the prophylactic, the titre of which must be not less than Lf 50. To inject into guineapigs the same amounts of A.P.T. as are administered to a child would involve using excessive amounts owing to the difference in weight between test animal and child. A recent Government inquiry (see British Medical Journal, 194[illegible] [illegible] d that sam[illegible] which had been [illegible] SUMMARY [illegible] g high Schick-

Six cases of bilateral compression of the [illegible]ted in guinea- in the carpal tunnel are reported. All occur[illegible]ith a geometric mean value of at least two units of antit· per c.cm.

The dilution of the prophylactic reduces not only the toxoid content but also the mineral carrier, though it preserves their original proportions. Thus the amount of mineral carrier used in the test animal is never more than one twenty-fifth of that for human prophylaxis. Hitherto no animal experiments have been recorded on the potency of a diphtheria prophylactic which maintained the same concentration of carrier as in human prophylaxis and with a reasonably small quantity of toxoid.

It was observed that, when guineapigs were injected subcutaneously with 1 Lf doses of diluted A.P.T., nodules never developed, but they invariably appeared when a small dose (0·2 c.cm. or greater) of undiluted A.P.T. was used. Since the depot theory of Glenny et al. (1931), for the enhanced potency of A.P.T. over its parent formol toxoid, postulates a depot, or reservoir, of slowly liberated toxoid in the tissues, it follows that the diluted prophylactic should be antigenically inferior to the concentrated one.

It is therefore of practical importance, in human prophylaxis, to determine the optimal amount of carrier to use for both primary and secondary stimuli. With A.P.T. of varying mineral composition this is very difficult to ascertain. For example, it was found that A.P.T. derived from Mueller's (1939) *medium toxins* did not pass the animal potency test when prepared in the usual way, but did so easily with 1% sodium phosphate added to the formol toxoid used before the addition of alum. This produced a well-marked increase in the amount of precipitate per Lf.

The fact that a potent diphtheria prophylactic can be prepared simply by mixing purified toxoid with a suspension of aluminium phosphate facilitates the investigation of these important questions. By this means it is possible to determine quantitatively the influence of the amount of mineral carrier on the antitoxin response and to ascertain the optimal amount to be contained in diphtheria prophylactics of this type.

INVESTIGATION

For this investigation concentrated and purified toxoids and suspensions of pure aluminium phosphate were used; these were prepared as described above and were preserved with 1/10,000 sodium ethyl mercurithiosalicylate. Samples were made in which the ratio of toxoid to aluminium-phosphate carrier was varied. In all cases 1 Lf quantities of toxoid in 1 c.cm. amounts were injected into groups of at least 10 guineapigs. The dose was repeated four weeks later. A small quantity of blood (0·5 c.cm.) was collected from each animal at the end of the twenty-eight-day interval to obtain the average antitoxin titre four weeks after the first dose. Larger bleedings were made two weeks after the second dose, and each serum was individually assayed for its antitoxin content. From these results the geometric mean value was calculated for each group.

Results.—The results obtained are summarised in the table, with their statistical analysis, which reveals that in every case there was a chance of less than 1 in 100 of these being fortuitous. These results show that the amount of mineral carrier (aluminium phosphate) plays an important part in regulating the antigenic potency of such preparations. When a sample of diphtheria prophylactic is diluted to conform to the official method of assaying potency, the indicated efficiency of the prophylactic, measured by the numerical value of the antitoxin produced, is probably below that obtained from the undiluted preparation, owing to the reduction in the amount of mineral carrier used.

This is shown in series A (see table). The material used was composed initially of 3 mg./c.cm. of aluminium phosphate with a titre of Lf 50 and was diluted to Lf 1 for the test. The same sample of purified toxoid diluted to Lf 1 but mixed with 3 mg. of aluminium phosphate (corresponding to the preparation A as used for children with only its toxoid component reduced) would give (1) about ten times as much antitoxin for a primary stimulus (its value being taken as 2 units per c.cm. after one dose), and (2) about four times as much antitoxin with two doses (its value being taken as 8 units per c.cm. for two doses).

Particular importance should be attached to the very pronounced efficacy of the primary stimulus with preparations in which the amount of mineral carrier has been increased. Further, these results indicate that the optimal amount of mineral carrier required for maximal antitoxin production in guineapigs is approximately 2·75 mg. of aluminium phosphate for each injection.

INFLUENCE OF VARYING AMOUNT OF $AlPO_4$ ON POTENCY

(Antigen employed constant at 1 Lf per dose)

Series	$AlPO_4$ injected per dose (mg.)	Serum antitoxin titres u./ml.		Gain	Statistical analysis ‡						
		(I)*	(II)†	Ratio $\frac{II}{I}$	n	d.f.	Mean	Sd²	Sx²	s²	t
A	0·06	0·2	2·2	11·0	20	19	2·5	52·9	..	..	..
B	0·2	0·4	4·1	10·0	10	9	4·7	50·12	103 0	3·6	3 0
C	0·5	0·7	4·4	6 3	10	9	5·1	70·9	123·9	4·4	3·2
D	1·0	1·0	5·4	5·4	10	9	6·9	222·9	275·8	9·8	3·6
E	2·0	1·75	7·6	4·3	12	11	8·3	154·7	207·6	6·9	6·0
F	4·0	1·5	3·9	2·6	14	13	4·35	47·18	100·1	3·1	3·0

* 28 days after 1st dose (mean value).

† 14 days after 2nd dose (geometric mean).

‡ For this analysis the results from the 0·06 mg./ml. sample were compared with those from the others, using the formula :

$$t = \sqrt{\frac{\bar{x}}{s^2 \frac{(n_1+n_2)}{(n_1 . n_2)}}}.$$

It would be erroneous to assume that, because a child weighs at least thirty times as much as a guineapig, the best dose of mineral carrier to use in the diphtheria prophylactics for children should be thirty times the optimal amount for guineapigs.

For an accurate assessment of a sample of diphtheria prophylactic it would be more reasonable to use the same amount of carrier for both, but considerably less toxoid in the guineapigs. The figures in the table support this view, though the evidence is weakened by the high antitoxin levels which result from the need to conform to the official potency-test regulations, where 1 Lf of toxoid must be used. To obtain in the guineapig the level of circulating antitoxin which in the child is considered adequate for protection against diphtheria—i.e., about 1/50 unit per c.cm.—with the same amount of carrier, it is not unlikely that very much less than 1 unit of toxoid would be required, particularly when two doses are used.

The figures in the table also show that, as the amount of mineral carrier is increased, the "gain" resulting from the second inoculation is decreased. This aspect of the phenomenon of antitoxin production in the guineapig is being investigated and appears to be of considerable complexity.

The shape of the curve obtained when the "gain"—i.e., ratio of the second response to the primary—is plotted against the amount of aluminium phosphate injected suggested that it was a rectangular hyperbola. This was confirmed by the finding that the product of the "gain" and the number of mg. of aluminium phosphate plus 1 was a constant. The values obtained for each aluminium-phosphate level were :

$AlPO_4$ injected per dose (mg.)	*"Gain"*	*($AlPO_4$+1) × "gain"*
0·06	11·0	11·6
0·2	10·0	12·0
0·5	6·3	9·4
1·0	5·4	10·8
2·0	4·3	12·9
4·0	2·6	13·0

Here the constant is about 12.

Field trials with purified toxoid, aluminium-phosphate-precipitated, on several hundreds of children have been carried out by Dr. Guy Bousfield, who reports his findings separately.

DISCUSSION

It has been shown that it is possible to make a potent diphtheria prophylactic by first purifying the diphtheria toxoid and then incorporating it in a suspension of pure aluminium phosphate. Both the titre and the concentration of aluminium phosphate in the final product can be accurately regulated as required.

Though this new method permits of accurate reproduction from a chemical point of view, it does not necessarily follow that a similar degree of accuracy has been achieved in respect of physiological activity.

In some measure, however, this has been attained, as is shown by the fact that one of the most important variables—the amount of mineral carrier—can be controlled. Further, the removal of much foreign protein and other nitrogenous material initially present in the crude toxoid solutions must help to reduce variations.

From a strictly chemical point of view, if absolutely pure toxoid was used with the aluminium-phosphate carrier, there would appear to be no grounds for expecting variations in physiological activity in preparations of the same composition.

Data to hand have shown that the new prophylactic, when prepared as described, does yield products of unusually constant antigenicity ; but, before a complete report can be made on this point, more data are needed.

SUMMARY

A method is outlined for the preparation of a new diphtheria prophylactic, consisting of a purified toxoid precipitated by a suspension of a measured amount of pure aluminium phosphate.

The new prophylactic is antigenically potent, has good storage properties, and produces less reactions than does A.P.T. in sensitive persons.

A method is suggested for the production of a reference or standard diphtheria prophylactic.

In guineapigs the antitoxin response from the purified toxoid, aluminium-phosphate-precipitated, with a constant amount of toxoid is largely governed by the amount of mineral carrier it contains. This is particularly the case when the results of primary stimuli are examined.

For maximal antitoxin production in guineapigs the optimal amount of aluminium phosphate per dose is about 2·75 mg.

A simple mathematical equation has been found to express the relationship between the amount of aluminium phosphate injected and the ratio of the antitoxin obtained from two doses as against one of the same preparation.

My thanks are due to Dr. W. J. Martin, of the London School of Hygiene, for his expert advice on the statistical analysis. Important technical help was rendered me by W. C. Evans, PH.D.

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CLINICAL TRIALS OF DIPHTHERIA TOXOID ALUMINIUM-PHOSPHATE-PRECIPITATED

TO DETERMINE OPTIMAL ALUMINIUM-PHOSPHATE CONTENT

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AT the request of Mr. L. B. Holt I tried to find out if there were any differences in immunity production when persons were inoculated with batches of the same parent diphtheria toxoid made up so that they contained various amounts of aluminium phosphate.

Holt's method of preparing the antigen renders it possible for the pure phosphate to be used, with great advantage, in that the amount of Al PO_4 added can be controlled at will. Using only the phosphate in his preparations, Holt had found that they were physiologically active as immunising agents in guineapigs. It thus became necessary to determine whether his findings could be confirmed in man.

It was essential to make observations only on subjects of reasonably comparable body-weight, who were without substantial basal immunity. The investigation was therefore limited to Schick-positive children between their first and second birthdays. A suburban area, where herd immunity was low, was selected for the work.

The possibility of reaching conclusions based on serum-antitoxin titrations was excluded by the age of the children: a study of the Schick-conversion rate was the only available method of comparing various samples of prophylactic. Nevertheless, I have repeatedly observed in the past that the Schick test will yield results which are generally comparable with those obtained by the more precise method of antitoxin titration, provided that the test is intelligently applied. Thus no apology is made for presenting this work based on the Schick standard.

IMMUNITY RESPONSES

As so often happens when unknown territory is being explored, a preliminary experiment had to be staged. It was necessary to determine what Lf dosage should be used so that it should neither be so large as to mask any differences between samples containing varying Al PO_4 concentrations, nor so small that the antigen content was insufficient to produce a reasonable Schick conversion rate.

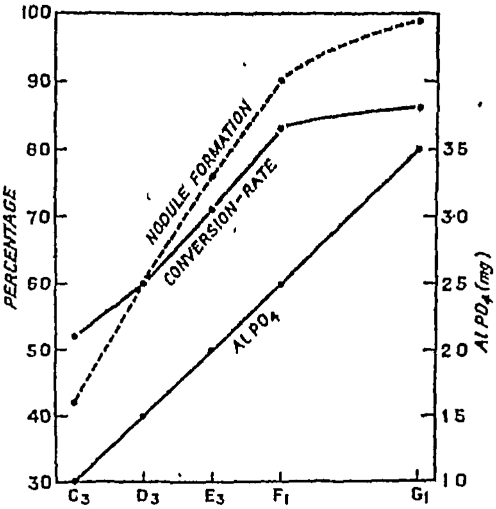

Fig. 1—Relation between amount of Al PO_4 injected, nodule formation, and Schick-conversion rate.

As a result of previous experiences with dilute antigens, the dosage adopted for the preliminary work was 0 3 c.cm. of a 10 Lf/c.cm. aluminium-phosphate toxoid, various samples supplied by Mr. Holt containing Al PO_4 in concentrations of 0·5, 1·0, 2·0, 3·0, and 4·0 mg. per c.cm. The actual quantities of Al PO_4 injected in the tests were thus three-tenths of the amounts described, as I was using the 0·3 c.cm. dose. Throughout the work described in this paper the injections were given subcutaneously, on the outer aspect of the upper arm, so that local reactions could be observed. Successive children were treated in rotation with the various samples of prophylactic, and post-Schick tests were performed twenty-eight days after the single injection of 0·3 c.cm. The batches yielded striking differences in the immunity response which they evoked; these are shown in table I. At this stage of the work it seemed possible that the findings in group E1 indicated that the optimum Al PO_4 dosage had been passed.

These results suggested the adoption of a larger Lf dosage and in consequence a slight corresponding increase in the total Al PO_4 injected. The next series thus received 0·5 c.cm. doses of 10 Lf/c.cm. preparations containing the same aluminium-phosphate concentrations as were used in the former investigation. The results appear in table II.

TABLE I—IMMUNITY RESPONSES IN 251 CHILDREN TO SINGLE INJECTIONS OF 0 3 C.CM. (3 LF UNITS OF TOXOID)

Group	Total Al PO_4 injected (mg.)	Schick results 28 days after injection		Conversion rate (%)
		Positive	Negative	
A1	0·15	41	5	*11*
B1	0·3	38	6	*13*
C1	0·6	35	15	*30*
D1	0·9	15	39	*72*
E1	1·2	19	39	*67*

When the investigation had gone this far it seemed that there was no reason to suppose that the findings in group E2 indicated that the optimal Al PO_4 concentration had yet been reached; so it was decided to extend the scope of the work without delay rather than to accumulate further evidence under the heading of table II. One thing that has to be appreciated in this kind of work is that no experiment can simply be extended to acquire further information. Each series must be complete in itself, so as to allow for minute differences in antigen composition, prevalence of traces of diphtheria infection in varying seasons, &c. These factors may explain the differences in conversion-rates which will be noted in table III, as compared with table II. Such variations render it impossible to present a composite table embodying all results. The trends of the curves are, however, sufficiently clear in the individual tables. For the above reasons I have always found it advisable *to provide for an overlap on the last experiment* when starting a new series.

Further samples of prophylactic had to be procured from Mr. Holt, and the Al PO_4 content of groups C2, D2, and E2 of table II were again used in the next stage of the investigation. The scope of this was extended by the inclusion of two further samples, F1 and G1, these containing 5 and 7 mg. of Al PO_4 per c.cm. respectively, the toxoid being maintained at 10 Lf/c.cm. These last five samples were prepared from a different parent toxoid. Table III shows the same upward trend in conversion-rates as the Al PO_4 dosage is increased.

The flattening of the curve when the 2·5 mg. dosage is reached is best shown in a graph, the rest of the rise being fairly steady. Fig. 1 illustrates the point and suggests that the optimum seems to be approached with the dose used in group G1. Clearly the work could not stop at this point, and a further sample of G1 strength, and two containing more Al PO_4, were prepared, H1 containing 10 mg. and I1 containing 15 mg. per c.cm. Results obtained with these three samples up to the time of publication are shown in table IV, which suggests that the optimal aluminium-phosphate dosage has been reached in sample H1 or thereabouts. At any rate, the

TABLE II—IMMUNITY RESPONSES IN 177 CHILDREN TO SINGLE INJECTIONS OF 0·5 C.CM. (5 LF UNITS OF TOXOID)

Group	Total Al PO_4 injected (mg.)	Schick results 28 days after injection		Conversion-rate (%)
		Positive	Negative	
A2	0·25	31	7	18
B2	0·5	26	11	30
C2	1·0	13	18	58
D2	1·5	10	28	74
E2	2·0	4	29	88

amount of the salt which can be added is governed by something more than theoretical considerations. Sample H1 contains about as much Al PO_4 as is convenient from the practical point of view, since prophylactics containing larger amounts leave copious white deposits wherever they fall and may, in vulgar parlance, be described as "messy."

Critics may say that this work is fragmentary. The answer is that one was exploring new territory and had to feel the way carefully so as not to produce unnecessarily severe local reactions as the Al PO_4 content of the prophylactics was increased. With the knowledge gained from the foregoing investigations it will be possible to stage one good experiment, and the next step will be to work out the range between 3 mg. and 15 mg. of Al PO_4 per c.cm. but allowing smaller differences between the various samples as regards their salt content. Thus the true curve and absolute theoretical optimum may be demonstrated in one large series. There is, however, no reason to delay publication of the present findings, which illustrate quite well the paramount importance of controlling carefully the amount of aluminium phosphate which must be added to the prophylactic if an optimal primary stimulus is required.

TABLE III—IMMUNITY RESPONSES IN 285 CHILDREN TO SINGLE INJECTIONS OF 0·5 C.CM. (5 LF UNITS OF TOXOID)

Group	Total Al PO_4 injected (mg.)	Schick results 28 days after injection		Conversion-rate (%)
		Positive	Negative	
C3	1·0	27	29	52
D3	1·5	22	33	60
E3	2·0	18	44	71
F1	2·5	9	45	83
G1	3·5	8	50	86

$\chi_4^2 = 22·7$. $P > 0·01$.

About half-way through the foregoing investigations the effect of increasing the aluminium salt on the immunity response was so pronounced that it was thought well to perform a small control experiment to meet possible criticism. Ten children therefore received a suspension of the Al PO_4 in 0·5 c.cm. doses of a 7·0 mg. per c.cm. preparation, but no antigen was included. On testing these ten children twenty-eight days later, all were as strongly Schick-positive as they had been originally.

NODULE FORMATION

The next endeavour was to determine to what extent nodule formation in the subcutaneous tissues was related to a satisfactory immunity response, and what bearing the Al PO_4 dosage had on the incidence and character of the nodules. Since all injections were deliberately given subcutaneously, it was easy to palpate for nodules at the time of the post-Schick test, twenty-eight days after the antigen had been administered. The findings are given in table V. They are so arranged that evidence in favour of the depot theory of stimulation appears in columns marked I and II, while arguments against it might be deduced from columns III and IV.

Taking the findings as a whole, columns I and II, favouring the depot theory, total 363 cases, while presumably contrary evidence in columns III and IV amounts to 144 cases. The evidence that satisfactory primary stimulation is bound up with some degree of local fibrosis and presumed depot action is thus about seven to three in favour of the depot theory.

In fig. 1, based on table III and on a portion of table V, it can readily be seen how striking is the resemblance between the conversion-rate curve and that of nodule formation and Al PO_4 content.

An interesting point arises in considering to what extent a true depot of any real permanency is likely to be established in the body after the injection of A.P.T. or similar prophylactics. It seems probable that the main deposit of antigen can only contribute to such a process for a relatively short time: encapsulation and occlusion from the circulatory or lymphatic systems must take place fairly rapidly, the enclosed prophylactic presumably serving no further useful purpose. So, if the depot theory is the true explanation of the success of A.P.T. and similar prophylactics, it seems probable that only that portion of precipitate near the periphery of the early inflammatory reaction is utilised, or is concerned with any sort of prolonged local depot action. That amount of A.P.T. must be very small, but I hold the view that the actual Lf dosage necessary to provide a stimulus is probably extremely small. We have to use relatively large doses to create those conditions which render it possible for a small proportion of the injection to be utilised optimally by the body.

TABLE IV—IMMUNITY RESPONSES IN 134 CHILDREN TO SINGLE INJECTIONS OF 0·5 C.CM. (5 LF UNITS OF TOXOID)

Group	Total Al PO_4 injected (mg.)	Schick results 28 days after injection		Conversion rate (%)
		Positive	Negative	
G2	3·5	7	35	83
H1	5·0	3	42	93
I1	7·5	4	43	91

Whatever the explanation is, the fact emerges clearly from the foregoing observations that the characteristic of nodule formation is most closely bound up with the use of an antigen with a reasonably high Al PO_4 content; and that the Schick-conversion rate improves with the incidence of a high percentage of nodules obtained as a result of using increasing quantities of aluminium phosphate. Generally speaking, as more Al PO_4 was

TABLE V—NODULE FORMATION WITH HOLT'S ALUMINIUM-PHOSPHATE TOXOID IN NINE DIFFERENT PHOSPHATE CONCENTRATIONS

Group	Al PO_4 dosage (mg.)	No. of cases	Developing nodules (%)	I	II	III	IV
				With nod. Schick-−	No nod. Schick-+	With nod. Schick-+	No nod. Schick-−
A	0·25	34	29	2	20	8	4
B	0·5	36	36	6	18	7	5
C	1·0	85	42	23	29	13	20
D	1·5	89	60	37	13	16	23
E	2·0	86	76	58	7	7	14
F	2·5	60	90	46	0	8	6
G	3·5	37	100	30	0	7	0
H	5·0	38	100	35	0	3	0
I	7·5	42	100	39	0	3	0

ATELECTASIS AFTER PARTIAL GASTRECTOMY

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ATELECTASIS, or collapse, has been recognised as probably the commonest postoperative chest complication. Most writers consider that bronchial occlusion, due to inspiration of a mucous plug or resulting from inflammatory œdema of the lining epithelium, is the usual cause; but there is little reference in the literature to the time of onset of postoperative atelectasis.

Thomas (1938) pointed out that, though bronchial occlusion was probably the mechanical factor responsible, collapse did not supervene immediately, citing Brooks's (1938) use of a balloon to produce temporary occlusion of the bronchial lumen as a form of collapse therapy in pulmonary tuberculosis. Collapse did not take place usually until 4–6 hours after inflation of the balloon. Consideration of the time-incidence of occlusion is obviously of importance in the use of bronchial aspiration. Haight (1938) showed the value of such treatment in the early stages of atelectasis to prevent its further development.

It was therefore decided to radiograph the chests of patients who had undergone partial gastrectomy at Charing Cross Hospital and Ashridge E.M.S. Hospital *to determine with more accuracy the time of onset of atelectasis.* Radiography was done immediately after, four hours after, and twenty-four hours after operation. In certain cases, in which the previous radiological findings and the clinical condition indicated, radiography was done later also. Radiological interpretation was not always easy, and an additional handicap was that the first film was taken with the patient supine, the later ones with the patient erect. During the investigation the frequency of atelectasis and certain possible causal factors, such as age and a previous history of chest disease, were also considered.

TABLE I—AGE-INCIDENCE OF ABNORMAL POSTOPERATIVE RADIOLOGICAL SIGNS

Age-group (years)	Number of cases			
	With radiological signs		Without radiological signs	
	Males	Females	Males	Females
Under 30 ..	..	1	..	..
30–40 ..	7	2	11	2
40–50 ..	8	..	12	1
50–60 ..	5	1	3	..
60 and over ..	2	..	..	..

The preoperative preparation was standard in almost all cases. The patient received sulphathiazole gr. 2 to start and then gr. 1 four-hourly. Breathing exercises, starting on the day before operation, were a routine. The immediate preoperative medication was 'Omnopon' gr. $^1/_3$, scopolamine gr. $^1/_{150}$ half an hour before operation. The patients numbered 55 (48 males and 7 females), and 26 of them (22 males and 4 females) developed postoperatively abnormal radiological signs including those of various stages of atelectasis and increased hilar striation or vascular markings of a lobe, which may precede atelectasis.

Table I shows that the preponderance of patients operated on fell into the groups 30–40 years and 40–50. Similarly, the highest incidence of those with radiological signs fell into these particular groups. No particular age-group appears especially liable to show such signs, though a higher incidence is to be noted among the older ones, as would be expected.

Previous respiratory infection has long been recognised as predisposing to postoperative atelectasis. The chronic bronchitic, or the patient with slight bronchiectasis producing a little mucopurulent sputum every morning, is especially liable.

Table II shows that the great majority of the patients gave no history of previous chest disease. Almost the same number of patients with chronic bronchitis and emphysema showed radiological signs after operation as those which did not, although not in all cases was the diagnosis of chronic bronchitis and emphysema confirmed radiologically. From this small series, therefore, it does not appear that previous chest disease necessarily predisposes to postoperative atelectasis.

Anæsthesia.—Much of the recent literature on the subject of postoperative chest complications has considered the influence of forms of anæsthesia on their causation. Such a comparison is hardly possible in the present series, since the anæsthesia in practically all cases was the same. High spinal anæsthesia with light 'Nupercaine' 1 in 1500 or 1 in 1000 by Lake's modification of Howard Jones's method was used almost exclusively. Of the patients who showed radiological evidence of chest complications, 3 received supplementary gas and oxygen; in 4 cases anæsthesia other than spinal was used, 3 of them receiving gas-oxygen and cyclopropane, and the other regional and splanchnic block. Only 3 patients received general anæsthesia alone; all showed abnormal postoperative radiological signs.

TABLE II—RELATION OF ABNORMAL POSTOPERATIVE RADIOLOGICAL SIGNS TO HISTORY OF CHEST DISEASE

Previous condition of chest	Number of cases	
	With radiological signs	Without radiological signs
No previous chest disease	18	21
Chronic bronchitis and emphysema	6	5
Previous chest disease	1 (old pleural effusion) 1 (bronchopneumonia)	2 (bronchopneumonia) 1 (rheumatic carditis)

Time of Operation.—Brock (1936) has emphasised that in the drier seasons a higher incidence of collapse might be expected owing to greater fluid loss from sweating, with consequent increased viscidity of sputum and possible retention in the terminal bronchioles. The seasonal incidence of radiological complications was therefore noted.

Table III shows that the cases with radiological evidence of pulmonary complication occurred far more frequently in the period March 31–Oct. 1. This suggests that the time of year, possibly for the reasons already suggested, may contribute to the incidence of postoperative chest complications; but many other factors, such as the temperature on the day of operation and the humidity of operating-theatre and wards, would also have to be considered.

TABLE III—SEASONAL INCIDENCE OF ABNORMAL POSTOPERATIVE RADIOLOGICAL SIGNS

Time of year	Number of cases	
	With radiological signs	Without radiological signs
Oct. 31–March 1 ..	8	17
March 31–Oct. 1 ..	18	12

POSTOPERATIVE CHEST COMPLICATIONS

Collapse.—This includes patchy or lobular atelectasis, partial collapse (atelectasis affecting part of a lobe), and total or massive collapse (collapse of one or more lobes). The first postoperative film was taken on the operating-table immediately after operation, and in all those cases which later showed abnormal radiological signs none were noted in this film (see table IV). The first signs were noted in the film taken four hours after operation. Altogether there were 13 cases of collapse, of which 5 were first manifest in the four-hour film, showing patchy atelectasis

TABLE IV—TIME OF ONSET OF POSTOPERATIVE ATELECTASIS

Time of radiography after operation	Number of cases of atelectasis
Immediate	None
4 hours	5
24 hours	6
Later	2
Total ..	13

In the film taken at twenty-four hours 11 cases were confirmed radiologically. The 5 cases noted in the four-hour film all showed development of the original patchy atelectasis, and in some a definite partial collapse of a lobe was evident. The other 6 showed signs of commencing patchy atelectasis. In 2 of the 11 cases observed in the film taken at twenty-four hours atelectasis affected both bases; in 5 it affected the right side alone, and in 4 cases the left side alone. In the 2 other cases in the series radiological evidence of collapse was not manifest until three and five days after operation (see table IV). Usually the lung fields on the affected side began to clear four or five days after operation, although in 4 cases the other side showed signs of atelectasis before this event.

In all cases of collapse there were clinical signs and symptoms, though, as Gius (1940) says, "the physical signs in the early stages are notoriously inconstant and variable. Transient physical signs are found in the chest after nearly all upper abdominal operations, and a diagnosis of atelectasis is normally not warranted on the basis of physical signs alone." The temperature rose to 100–101° F; the pulse-rate correspondingly to 100–120. A patchy distribution of râles and high-pitched rhonchi developed in some cases, and occasionally areas of bronchial breathing with increased vocal resonance and diminished percussion note. Gross mediastinal shift was not observed in any case. Sputum, at first scanty, tenacious, and viscid, became more copious and mucopurulent in a few cases. In the 2 cases occurring rather later than the others the associated rise of temperature and pulse-rate without other obvious cause suggested atelectasis, which was confirmed by radiography.

Appearances Resembling Collapse.—In 10 of the 26 cases increase in the vascular markings either in the lower lobes or hilar regions was noted radiologically. None were noted in the immediate postoperative film, 7 appeared in the four-hour film, and others at twenty-four hours. Some noted in the four-hour film had cleared at twenty-four hours. Mention is made of these because, where atelectasis was first noted radiologically at twenty-four hours, increase in the vascular markings of the affected areas was noted in the four-hour film (see below).

Other Types.—In 3 cases pulmonary complications other than collapse occurred. In 1 of them increased density in the right hilar region was noted radiologically at twenty-four hours. Three days later the patient developed bronchopneumonia. The second case showed the clinical picture of bronchitis, developing nearly a week after operation. Radiography revealed increased markings in the left hilar region. In the third case no abnormal signs were noted in the usual postoperative films, but five days later the patient developed signs and symptoms of collapse at his right base. The film then taken showed collapse of right lower lobe, with a small pleural effusion.

In another case (not included in the series) the patient developed bronchopneumonia secondary to a subphrenic abscess. Eventually death took place from toxæmia and paralytic ileus. This was the only death from a chest or other complication and was secondary to a subphrenic abscess. No radiological signs were visible until the fifth day, when they consisted of raising of the left diaphragm, with distension of the splenic flexure, and partial collapse. Bronchopneumonic changes supervened later.

TIME OF RADIOLOGICAL APPEARANCE OF ATELECTASIS

Signs of commencing patchy atelectasis were seen in the four-hour film in 5 cases (table IV), none being noted in the immediate postoperative films. Four hours after operation clinical features are of little value in the diagnosis of postoperative atelectasis, as already emphasised. At this stage, therefore, only radiography can establish the diagnosis. In the films taken at this time, however, 7 cases were reported as having increased vascular markings of the hilar region or lower lobes. This appearance is not easy to distinguish from atelectasis. In some cases the signs of patchy atelectasis developed in the film taken at twenty-four hours. In the others at twenty-four hours the radiological signs were similar to those of the four-hour film or had disappeared. In no case in which hyperæmia alone was noted in the film at twenty-four hours did atelectasis develop subsequently. The cases of atelectasis observed in the four-hour film, however, were all more marked at twenty-four hours. At that stage 6 more cases had developed—i.e., by twenty-four hours 11 out of the 13 cases had shown themselves radiologically. Neither of the 2 cases arising subsequent to this time showed signs of hyperæmia or atelectasis in the postoperative film. It was the clinical condition that suggested the development of atelectasis, which was confirmed by radiography.

Thus, in the observation and diagnosis of postoperative atelectasis, it seems that radiography twenty-four hours after operation is most valuable. Collapse previously noted in the four-hour film will be definitely confirmed, and most of the cases of collapse will have appeared by then (11 out of 13 in this series). Further, the changes, interpreted as increased vascular markings of hilar or basal regions, have either regressed or have developed into early patchy atelectasis by this time. Twenty-four hours after operation the clinical signs and symptoms of collapse are slight and often misleading. Radiography alone can establish the diagnosis.

It is therefore suggested that, to show whether or not atelectasis has occurred, a routine film should be taken twenty-four hours after operation. If the hypothesis is accepted that bronchial occlusion by a mucous plug is the chief ætiological factor, and that early bronchial aspiration is the correct treatment, its use at this stage is indicated if a film taken at this time shows atelectasis. Immediate postoperative bronchoscopy, in cases where spinal anæsthesia has been used, necessitates local anæsthesia of the pharynx, larynx, and trachea; but bronchoscopy may be performed under local anæsthesia twenty-four hours after operation, and the difficulties associated with its use immediately after operation would not then arise.

SUMMARY

The incidence of atelectasis after partial gastrectomy has been investigated by radiography of the chest immediately after, four hours after, and twenty-four hours after operation.

Of 55 cases investigated 26 showed abnormal post-operative radiological signs, and out of these 26 cases 13 showed signs of lobular, partial, or total atelectasis.

No signs were noted in the immediate postoperative film; signs first appeared radiologically at four hours in

5 cases, and at twenty-four hours in a further 6 cases. The other 2 cases of atelectasis did not develop until later.

Besides signs of atelectasis there were increased vascular markings in some cases, and 3 other cases showed bronchopneumonia, bronchitis, and collapse with effusion.

The findings suggest that the film taken twenty-four hours after operation is the most valuable in determining whether or not atelectasis has occurred.

If the cause of atelectasis is bronchial occlusion by a mucous plug, bronchoscopy should then be considered.

I should like to thank Mr. Norman Lake, at whose suggestion this investigation was carried out, for his continued advice and encouragement in the preparation of this article.

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PAIN AND THE HEALING OF PEPTIC ULCERS

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It has been known for many years that at a certain stage peptic ulcers may be present without associated symptoms, of which the chief is pain.

This curious feature is seen in all grades of peptic ulcer, from the acute to the very chronic. Most clinicians can remember patients who suddenly had violent, profuse, and dangerous hæmatemesis, without any prodromal dyspepsia, and in some of whom gastroscopy, performed within a few days of the hæmorrhage, revealed an acute ulcer healing rapidly and spontaneously, without pain at any time. At the other extreme is the callous ulcer, of which the following is an example:

A man, aged 82, had severe epigastric pain, loss of appetite, and rapid emaciation. A barium meal showed a huge ulcer involving most of the lesser curve of the pars media. Its size alone suggested malignancy, yet within forty-eight hours of being put to bed on hourly milk feeds the patient lost his pains. Within a fortnight his appetite had returned, and within a month the ulcer crater had diminished to half its former size. Nevertheless, the crater never disappeared, and at the patient's death, of arteriosclerotic cardiovascular disease two years later, it was still present, though there had never been any recurrence of pain or indigestion.

On the other hand, the ulcer may heal and the pain continue, as it does in a phantom limb.

A woman, aged 42, had a small stubborn gastric ulcer, for which she was fed on milk by continuous intragastric drip for six weeks. At the end of this time, as her pains were no better, it was decided to perform a partial gastrectomy. The surgeon asked that she should be gastroscoped first, and at gastroscopy the ulcer was found to be completely healed, a small depressed epithelised scar being seen. Some students, present at the examination, were shown the puckered folds produced by the healing of the ulcer. The patient, overhearing this demonstration, realised that at last her ulcer had gone, and from that moment she lost her pain.

Not so fortunate was a woman, aged 38, whose duodenal ulcer was treated by continuous milk drip and whose pain remained unrelieved. As a result a partial gastrectomy was advised; but, owing to some mischance, a barium meal was not given before operation. At laparotomy no ulceration was present, a small scar only being found in the duodenum.

It seems therefore clear that one of the main clinical criteria of ulcer activity—i.e., pain—is unreliable, since ulcers can be present for a long time without producing any discomfort; and, on the other hand, though an ulcer may be healed, the patient may continue to feel the pain usually associated with an active ulcer.

HEALING FACTORS

The factors that cause an ulcer to heal are no easier to understand.

A man, aged 50, was given a long rest in bed, with careful diet, for his gastric ulcer; and, though he soon lost all his pain and felt very well, the ulcer, viewed at intervals through the gastroscope, showed no signs of healing.

The patient accepted the decision to operate, and a week later, the day before that fixed for the operation, a final gastroscopy was performed. The ulcer was healing rapidly, operation was postponed, and in another week no crater could be seen, a white scar marking the site of a hitherto peculiarly intractable lesion.

Of the various measures used to encourage ulcers to heal, some authorities emphasise the value of rest in bed, others forbid tobacco, others pay strict attention to diet, others favour various antacids, acid neutralisers, acid buffers, acid inhibitors. It is perhaps heresy to doubt whether any of these are necessary; yet the following experience is suggestive:

A consecutive series of 20 patients, each with a chronic gastric ulcer, were given a daily hypodermic injection of 1 c.cm. of distilled water. They were ambulant, their diet was unrestricted and even disregarded, they were given no medicines, and those who enjoyed smoking were encouraged to continue.

With one exception all lost their pains as quickly—i.e., within a few days—as a control series treated along orthodox lines. Healing of the ulcers was observed gastroscopically and took place in the usual time—i.e., in 4–8 weeks from the start of treatment.

The exception was a man who was worried about his wife's illness. His pain continued, and his ulcer showed no sign of healing. After his third gastroscopy, some four weeks from the beginning of treatment, he was told that his ulcer had almost healed. Thereupon his pain went, within a fortnight his ulcer really was healing, and within a month it was completely healed.

DISCUSSION

No doubt in a larger series there would have been some failures, and no-one would wish to use distilled-water injections as routine ulcer therapy. Nevertheless, the fact remains that ulcers may heal after a series of injections of a completely inert fluid such as distilled water.

Hubacher [1] records favourable results following the injection of extracts of stomach and small intestine; and Morrison [2] has obtained equally good results by the oral administration of normal gastric juice.

It is clear that any one of several different treatments, having apparently nothing in common, may be associated with the healing of peptic ulcers. From this it seems fair to argue that the essential factor is the patient's belief that his treatment is going to be successful. Whether he agrees or not with the treatment matters not at all in the case of a man with pernicious anæmia—a few injections of liver extract, and he is well. Not so the man with a gastric ulcer—not only must he be satisfied that his treatment is proceeding along the correct lines, but also he must find himself in a sympathetic environment and be protected from protracted anxieties.

Ulcers are not healed by diet alone, nor by injections, nor by medicines, but because the man with the ulcer comes under the care of a physician who is able to transmit some of his own confidence to his patient. Because it is common sense to rest a diseased organ and to give rest to a man suffering from disease, so we continue to treat ulcers by advising rest, a dietetic holiday, and a temporary escape from the worry and strain of the daily round. If the habits of these patients could be altered permanently, they might have no relapses.

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1. Hubacher, O. *Lancet*, 1946, ii, 272.
2. Morrison, L. M. *Amer. J. digest. Dis.* 1945, 12, 323.

and total or massive collapse (collapse of one or more lobes). The first postoperative film was taken on the operating-table immediately after operation, and in all those cases which later showed abnormal radiological signs none were noted in this film (see table IV). The first signs were noted in the film taken four hours after operation. Altogether there were 13 cases of collapse, of which 5 were first manifest in the four-hour film, showing patchy atelectasis

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Appearances Resembling Collapse.—In 10 of the 26 cases increase in the vascular markings either in the lower lobes or hilar regions was noted radiologically. None were noted in the immediate postoperative film, 7 appeared in the four-hour film, and others at twenty-four hours. Some noted in the four-hour film had cleared at twenty-four hours. Mention is made of these because, where atelectasis was first noted radiologically at twenty-four hours, increase in the vascular markings of the affected areas was noted in the four-hour film (see below).

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TIME OF RADIOLOGICAL APPEARANCE OF ATELECTASIS

Signs of commencing patchy atelectasis were seen in the four-hour film in 5 cases (table IV), none being noted in the immediate postoperative films. Four hours after operation clinical features are of little value in the diagnosis of postoperative atelectasis, as already emphasised. At this stage, therefore, only radiography can establish the diagnosis. In the films taken at this time, however, 7 cases were reported as having increased vascular markings of the hilar region or lower lobes. This appearance is not easy to distinguish from atelectasis. In some cases the signs of patchy atelectasis developed in the film taken at twenty-four hours. In the others at twenty-four hours the radiological signs were similar to those of the four-hour film or had disappeared. In no case in which hyperæmia alone was noted in the film at twenty-four hours did atelectasis develop subsequently. The cases of atelectasis observed in the four-hour film, however, were all more marked at twenty-four hours. At that stage 6 more cases had developed—i.e., by twenty-four hours 11 out of the 13 cases had shown themselves radiologically. Neither of the 2 cases arising subsequent to this time showed signs of hyperæmia or atelectasis in the postoperative film. It was the clinical condition that suggested the development of atelectasis, which was confirmed by radiography.

Thus, in the observation and diagnosis of postoperative atelectasis, it seems that radiography twenty-four hours after operation is most valuable. Collapse previously noted in the four-hour film will be definitely confirmed, and most of the cases of collapse will have appeared by then (11 out of 13 in this series). Further, the changes, interpreted as increased vascular markings of hilar or basal regions, have either regressed or have developed into early patchy atelectasis by this time. Twenty-four hours after operation the clinical signs and symptoms of collapse are slight and often misleading. Radiography alone can establish the diagnosis.

It is therefore suggested that, to show whether or not atelectasis has occurred, a routine film should be taken *twenty-four hours after operation.* If the hypothesis is accepted that bronchial occlusion by a mucous plug is the chief ætiological factor, and that early bronchial aspiration is the correct treatment, its use at this stage is indicated if a film taken at this time shows atelectasis. Immediate postoperative bronchoscopy, in cases where spinal anæsthesia has been used, necessitates local anæsthesia of the pharynx, larynx, and trachea; but bronchoscopy may be performed under local anæsthesia twenty-four hours after operation, and the difficulties associated with its use immediately after operation would not then arise.

SUMMARY

The incidence of atelectasis after partial gastrectomy has been investigated by radiography of the chest immediately after, four hours after, and twenty-four hours after operation.

Of 55 cases investigated 26 showed abnormal postoperative radiological signs, and out of these 26 cases 13 showed signs of lobular, partial, or total atelectasis.

No signs were noted in the immediate postoperative film; signs first appeared radiologically at four hours in

5 cases, and at twenty-four hours in a further 6 cases. The other 2 cases of atelectasis did not develop until later.

Besides signs of atelectasis there were increased vascular markings in some cases, and 3 other cases showed bronchopneumonia, bronchitis, and collapse with effusion.

The findings suggest that the film taken twenty-four hours after operation is the most valuable in determining whether or not atelectasis has occurred.

If the cause of atelectasis is bronchial occlusion by a mucous plug, bronchoscopy should then be considered.

I should like to thank Mr. Norman Lake, at whose suggestion this investigation was carried out, for his continued advice and encouragement in the preparation of this article.

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PAIN AND THE HEALING OF PEPTIC ULCERS

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IT has been known for many years that at a certain stage peptic ulcers may be present without associated symptoms, of which the chief is pain.

This curious feature is seen in all grades of peptic ulcer, from the acute to the very chronic. Most clinicians can remember patients who suddenly had violent, profuse, and dangerous hæmatemesis, without any prodromal dyspepsia, and in some of whom gastroscopy, performed within a few days of the hæmorrhage, revealed an acute ulcer healing rapidly and spontaneously, without pain at any time. At the other extreme is the callous ulcer, of which the following is an example:

> A man, aged 82, had severe epigastric pain, loss of appetite, and rapid emaciation. A barium meal showed a huge ulcer involving most of the lesser curve of the pars media. Its size alone suggested malignancy, yet within forty-eight hours of being put to bed on hourly milk feeds the patient lost his pains. Within a fortnight his appetite had returned, and within a month the ulcer crater had diminished to half its former size. Nevertheless, the crater never disappeared, and at the patient's death, of arteriosclerotic cardiovascular disease two years later, it was still present, though there had never been any recurrence of pain or indigestion.

On the other hand, the ulcer may heal and the pain continue, as it does in a phantom limb.

> A woman, aged 42, had a small stubborn gastric ulcer, for which she was fed on milk by continuous intragastric drip for six weeks. At the end of this time, as her pains were no better, it was decided to perform a partial gastrectomy. The surgeon asked that she should be gastroscoped first, and at gastroscopy the ulcer was found to be completely healed, a small depressed epithelised scar being seen. Some students, present at the examination, were shown the puckered folds produced by the healing of the ulcer. The patient, overhearing this demonstration, realised that at last her ulcer had gone, and from that moment she lost her pain.

Not so fortunate was a woman, aged 38, whose duodenal ulcer was treated by continuous milk drip and whose pain remained unrelieved. As a result a partial gastrectomy was advised; but, owing to some mischance, a barium meal was not given before operation. At laparotomy no ulceration was present, a small scar only being found in the duodenum.

It seems therefore clear that one of the main clinical criteria of ulcer activity—i.e., pain—is unreliable, since ulcers can be present for a long time without producing any discomfort; and, on the other hand, though an ulcer may be healed, the patient may continue to feel the pain usually associated with an active ulcer.

HEALING FACTORS

The factors that cause an ulcer to heal are no easier to understand.

> A man, aged 50, was given a long rest in bed, with careful diet, for his gastric ulcer; and, though he soon lost all his pain and felt very well, the ulcer, viewed at intervals through the gastroscope, showed no signs of healing.
>
> The patient accepted the decision to operate, and a week later, the day before that fixed for the operation, a final gastroscopy was performed. The ulcer was healing rapidly, operation was postponed, and in another week no crater could be seen, a white scar marking the site of a hitherto peculiarly intractable lesion.

Of the various measures used to encourage ulcers to heal, some authorities emphasise the value of rest in bed, others forbid tobacco, others pay strict attention to diet, others favour various antacids, acid neutralisers, acid buffers, acid inhibitors. It is perhaps heresy to doubt whether any of these are necessary; yet the following experience is suggestive:

> A consecutive series of 20 patients, each with a chronic gastric ulcer, were given a daily hypodermic injection of 1 c.cm. of distilled water. They were ambulant, their diet was unrestricted and even disregarded, they were given no medicines, and those who enjoyed smoking were encouraged to continue.
>
> With one exception all lost their pains as quickly—i.e., within a few days—as a control series treated along orthodox lines. Healing of the ulcers was observed gastroscopically and took place in the usual time—i.e., in 4–8 weeks from the start of treatment.
>
> The exception was a man who was worried about his wife's illness. His pain continued, and his ulcer showed no sign of healing. After his third gastroscopy, some four weeks from the beginning of treatment, he was told that his ulcer had almost healed. Thereupon his pain went, within a fortnight his ulcer really was healing, and within a month it was completely healed.

DISCUSSION

No doubt in a larger series there would have been some failures, and no-one would wish to use distilled-water injections as routine ulcer therapy. Nevertheless, the fact remains that ulcers may heal after a series of injections of a completely inert fluid such as distilled water.

Hubacher[1] records favourable results following the injection of extracts of stomach and small intestine; and Morrison[2] has obtained equally good results by the oral administration of normal gastric juice.

It is clear that any one of several different treatments, having apparently nothing in common, may be associated with the healing of peptic ulcers. From this it seems fair to argue that the essential factor is the patient's belief that his treatment is going to be successful. Whether he agrees or not with the treatment matters not at all in the case of a man with pernicious anæmia—a few injections of liver extract and he is well. Not so the man with a gastric ulcer—not only must he be satisfied that his treatment is proceeding along the correct lines, but also he must find himself in a sympathetic environment and be protected from protracted anxieties.

Ulcers are not healed by diet alone, nor by injections, nor by medicines, but because the man with the ulcer comes under the care of a physician who is able to transmit some of his own confidence to his patient. Because it is common sense to rest a diseased organ and to give rest to a man suffering from disease, so we continue to treat ulcers by advising rest, a dietetic holiday, and a temporary escape from the worry and strain of the daily round. If the habits of these patients could be altered permanently, they might have no relapses.

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THE LANCET

LONDON: SATURDAY, MARCH 8, 1947

Enough to Eat?

DISCUSSION of the national diet, now a favourite pastime, is often silenced by a reminder that it is determined less by appetite than by world supplies and the requirements of other countries. When famine threatens Eastern Europe, it may seem indecent to grumble about dull food or minor deficiencies. Nevertheless both our allocation of existing supplies and our policy for the future depend partly on knowing how far we are in fact now being properly fed. A single theme runs through the Government's economic white-paper[1]—the need for greater production—and elsewhere in this issue Dr. McMENEMEY argues cogently that for full physical and mental health, and thus for full production, the national diet must be increased and varied.

The nutritionists tell us that the average consumption of the people of this country falls little short of what it was before the war; and that this consumption, though near the borderline, is still above internationally accepted minimal standards.[2] On the other hand, the margin is so small that inability to draw on the floating 10% of rationed foods at canteens or restaurants undoubtedly causes some to go short, and there is uneven distribution within the family.[3] The ration is not large enough to meet personal idiosyncrasies in favour of a particular food, and it takes little account of personal taste. Despite improvements, our fare remains monotonous, and whatever its other virtues it often fails to give the sense of satisfaction and repletion by which we tend to gauge the sufficiency of meals. Has this any adverse effect on personal efficiency? Surveys, we are informed, "suggest that the nutritional state of the nation was not worse at the end than at the beginning of the war, and, as regards children, was somewhat better." [4] But, as E. P. CATHCART [5] has put it, a person's state involves something more than physical attributes: "there are also intangible psychic factors which may be summarised in terms like 'alertness,' 'fitness,' 'aliveness,'" and these are not readily measured. The surveys have been few in number and restricted in scope, and wide differences in the conclusions of competent observers studying the same groups show how high personal judgment ranks in the reckoning.[6] Until a base-line has been found, the nutritionist can give no firm answer to those who ask whether there is particular virtue in good red meat, or to those others who suggest that we are getting a suboptimal diet whose defects are evident only in our daily work.

By all accounts, many of the peoples of Europe, on inferior rations, are showing remarkable vigour in reconstruction: the strength of their incentives seems to overcome the deficiencies of their food. Obviously, then, the nutritionist cannot expect to see the whole picture. To the psychologist many of the features which are physically baffling seem clearer. The prevalent hunger is, he argues, one manifestation of our gradual recovery from post-war inertia: it is related to a larger hunger for a sense of purpose and a sense of security; and the common syndrome of lassitude, irritability, and deficient mental concentration, tentatively ascribed by others to early vitamin-B deficiency, he claims to be at least partly psychogenic. He has satisfied himself of a relationship between food-fussiness and uncertainty or insecurity; and these are uncertain times. He reasons that the worker, particularly in industry, seeks to offset the lack of colour in his daily employment by variety and excitement in his relaxations; the present diet underlines, instead of interrupting, the general monotony. He points to examples in industry where, with low morale and reciprocal hostility between management and workers, the canteen is made a scapegoat. The current irritation could, he believes, be partly overcome by giving people more say in their feeding; he would promote open discussions, and he would ensure that workers were given evidence of attention to their diet and to the pattern and difficulties of their lives, for Service experience showed that a man's opinion of his food varies less with its quality at the table than with the interest known to be taken in its preparation and in his own general welfare. Finally, the psychologist would favour, as a form of mental release, any changes which brought greater variety, satiety, or acknowledgment of pet luxuries. How far advantages of this kind can properly be used as an incentive to enter particular industries, or as a reward for good output, is another matter. It depends perhaps on whether they would be offered at the expense of a satisfactory diet for the rest of the community; for in Lord BEVERIDGE's phrase, nobody should eat cake till everyone has bread, and hitherto it has been an acknowledged principle that in the distribution of food there should be no privileged class.

The control of food is not, of course, the concern simply of the dietitian, the nutritionist, or the psychologist. It concerns also employer and employed, those who grow or buy food, those who process or cook it, and those who distribute it; and each can make his own contribution. Five years ago the *Times* suggested that representatives of these various interests should be brought together in a Nutrition Council; but despite influential support, particularly from leaders of the medical profession, the council was never formed. This time of economic adversity might be the occasion to reverse the decision. One of the council's first tasks would be to undertake the continuous surveys recommended at the Hot Springs Conference, and such surveys might help, among other things, to answer the question whether the diet adequate to prevent any signs of malnutrition or disease is ipso facto adequate for full endeavour. To a country spending £725 million this year on imported food and agricultural equipment, and

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THE LANCET

LONDON: SATURDAY, MARCH 8, 1947

Enough to Eat?

DISCUSSION of the national diet, now a favourite pastime, is often silenced by a reminder that it is determined less by appetite than by world supplies and the requirements of other countries. When famine threatens Eastern Europe, it may seem indecent to grumble about dull food or minor deficiencies Nevertheless both our allocation of existing supplies and our policy for the future depend partly on knowing how far we are in fact now being properly fed. A single theme runs through the Government's economic white-paper [1]—the need for greater production—and elsewhere in this issue Dr. MCMENEMEY argues cogently that for full physical and mental health, and thus for full production, the national diet must be increased and varied.

The nutritionists tell us that the average consumption of the people of this country falls little short of what it was before the war, and that this consumption, though near the borderline, is still above internationally accepted minimal standards [2] On the other hand, the margin is so small that inability to draw on the floating 10% of rationed foods at canteens or restaurants undoubtedly causes some to go short, and there is uneven distribution within the family.[3] The ration is not large enough to meet personal idiosyncrasies in favour of a particular food, and it takes little account of personal taste. Despite improvements, our fare remains monotonous, and whatever its other virtues it often fails to give the sense of satisfaction and repletion by which we tend to gauge the sufficiency of meals. Has this any adverse effect on personal efficiency? Surveys, we are informed, "suggest that the nutritional state of the nation was not worse at the end than at the beginning of the war, and, as regards children, was somewhat better." [4] But, as E. P. CATHCART [5] has put it, a person's state involves something more than physical attributes: "there are also intangible psychic factors which may be summarised in terms like 'alertness,' 'fitness,' 'aliveness,'" and these are not readily measured The surveys have been few in number and restricted in scope, and wide differences in the conclusions of competent observers studying the same groups show how high personal judgment ranks in the reckoning.[6] Until a base-line has been found, the nutritionist can give no firm answer to those who ask whether there is particular virtue in good red meat, or to those others who suggest that we are getting a suboptimal diet whose defects are evident only in our daily work

By all accounts, many of the peoples of Europe, on inferior rations, are showing remarkable vigour in reconstruction: the strength of their incentives seems to overcome the deficiencies of their food. Obviously, then, the nutritionist cannot expect to see the whole picture. To the psychologist many of the features which are physically baffling seem clearer. The prevalent hunger is, he argues, one manifestation of our gradual recovery from post-war inertia: it is related to a larger hunger for a sense of purpose and a sense of security; and the common syndrome of lassitude, irritability, and deficient mental concentration, tentatively ascribed by others to early vitamin-B deficiency, he claims to be at least partly psychogenic. He has satisfied himself of a relationship between food-fussiness and uncertainty or insecurity; and these are uncertain times. He reasons that the worker, particularly in industry, seeks to offset the lack of colour in his daily employment by variety and excitement in his relaxations; the present diet underlines, instead of interrupting, the general monotony. He points to examples in industry where, with low morale and reciprocal hostility between management and workers, the canteen is made a scapegoat. The current irritation could, he believes, be partly overcome by giving people more say in their feeding; he would promote open discussions, and he would ensure that workers were given evidence of attention to their diet and to the pattern and difficulties of their lives, for Service experience showed that a man's opinion of his food varies less with its quality at the table than with the interest known to be taken in its preparation and in his own general welfare. Finally, the psychologist would favour, as a form of mental release, any changes which brought greater variety, satiety, or acknowledgment of pet luxuries. How far advantages of this kind can properly be used as an incentive to enter particular industries, or as a reward for good output, is another matter. It depends perhaps on whether they would be offered at the expense of a satisfactory diet for the rest of the community; for in Lord BEVERIDGE's phrase, nobody should eat cake till everyone has bread, and hitherto it has been an acknowledged principle that in the distribution of food there should be no privileged class.

The control of food is not, of course, the concern simply of the dietitian, the nutritionist, or the psychologist. It concerns also employer and employed, those who grow or buy food, those who process or cook it, and those who distribute it; and each can make his own contribution. Five years ago the *Times* suggested that representatives of these various interests should be brought together in a Nutrition Council; but despite influential support, particularly from leaders of the medical profession, the council was never formed. This time of economic adversity might be the occasion to reverse the decision. One of the council's first tasks would be to undertake the continuous surveys recommended at the Hot Springs Conference, and such surveys might help, among other things, to answer the question whether the diet adequate to prevent any signs of malnutrition or disease is ipso facto adequate for full endeavour. To a country spending £725 million this year on imported food and agricultural equipment, and urgently needing greater output, this question is highly important; but if nutrition continues to be regarded as a matter for guidance exclusively by nutritionists, and for purely interdepartmental discussion, we shall not be making full use of our opportunities to get the facts.

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[1] Economic Survey for 1947. Cmd. 7046. H.M. Stationery Office.

[2] Food Consumption Levels in the United States, Canada, and the United Kingdom: Third Report of a Special Joint Committee set up by the Combined Food Board. United States Department of Agriculture Production and Marketing Administration 1946.

[3] Schultz, T. *Bull. Oxfd Univ. Inst. Statist.* 1946, 8, 375.

[4] On the State of the Public Health During Six Years of War. H.M. Stationery Office 1946.

[5] Cathcart, E P. *Brit. med. J.* 1937, i, 435.

[6] See *Lancet*, 1944, ii, 825.

Part-time Nursing and its Future

DURING the war it was often said that part-time nursing had been tried but had failed. Gloucestershire has made it clear that the failure lay not with the part-time workers but with those seeking to use them. Those who attended the Cheltenham conference (reported elsewhere in this issue) saw hospitals, staffed almost entirely by part-timers, running smoothly and giving to chronic-sick patients a standard of care not exceeded in first-class acute hospitals.

In his full account of an experiment for which he has been largely responsible, Mr. W. A. SHEE could not help revealing how much careful and human deliberation had gone to make it succeed. The essence of the scheme has been *that part-time workers*, whether State-registered nurses or raw recruits with no previous experience, have been regarded from the beginning as members of the hospital team, and given responsibility appropriate to their sense and experience. The result has been to attract a new type of woman into nursing, or rather to attract good nurses who have been compelled to resign their career, and *other able women who can give some but not all of* their time to the care of the sick. There seems little doubt that we now have in our hands a complete answer to the staffing difficulties of the infirmaries and institutions for the old and ailing, and the Ministries of Health and Labour are warmly encouraging local authorities to follow Gloucestershire's lead. The many visitors to the conference went back convinced, to carry the principles to their own areas. Medical officers of health were not perhaps as numerous as could have been wished, but possibly the Society of Medical Officers of Health would contemplate inviting Dr. KENNETH COWAN and Mr. SHEE to open a discussion on part-time nursing at one of their meetings. The success of such schemes, experience has shown, depends on overcoming in advance the prejudice of those who will have to work it, and especially the prejudices of matrons; and nobody is better placed for this persuasive task than the medical officer of health. The prejudices of authorities can be diminished by showing the Gloucestershire balance-sheet, where expenditure of £10,000 a year on transport is entirely compensated in other ways.

Londoners will have noticed that a part-time scheme was launched on Feb. 15 for the Greater London area, where the L.C.C. hospitals are in greatest need. The daily press has published lists of hospitals to which volunteers can apply; the Ministry of Labour resettlement advice offices are also taking particulars from volunteers and forwarding them to the nearest hospital wanting part-time workers; and specially difficult cases are being put through the London Appointments Office, at 23, Portman Square, W.1, which is acting as a clearing-house for the whole area. The appeal unfortunately coincided with the fuel crisis, and this no doubt *partly* explains why the number of volunteers of all kinds in a fortnight was only 930—a total which must seem meagre to those familiar with the Cockney tradition of lending a friendly hand to neighbours in difficulties. But *criticisms at the conference suggest that backwardness* in volunteering is also partly attributable to the Rushcliffe rates of pay which have been adopted. On this scale intermediate assistant nurses are paid 1*s*. 5*d*. an hour, which is less than the rate recommended by the National Joint Council for ward orderlies doing domestic work; and State-registered staff nurses are offered 2*s*. 1*d*., which is less than the average pay of a metropolitan charwoman. There was a strong feeling at the conference that these rates should be reconsidered.

May not the part-time principle have much wider applications than at present appear? Speakers at Cheltenham felt it opened great possibilities for *mental hospitals and sanatoria, and perhaps also* for special hospitals and acute general hospitals. There were doubts whether it could be applied in training schools, but further experiment may disperse even these: it is possible to conceive of a training hospital in which part-time workers, jointly with full-time trained staff, ensure the staffing of the ward, and thus release the sister for bedside teaching and the students for learning. The long-standing complaint that students bear the double burden of study and hospital service could thus be relieved. We must not be faint-hearted if the implications of the part-time system turn out to be much greater than we originally supposed.

Neonatal Infection

IT is probably fair to say that about a fifth of all deaths in the first four weeks of life are the result of infection. Rather more than half of the total infant mortality occurs in this first month, which in England and Wales means some 18,000 deaths; so each year 3000–4000 babies die of infection, much of it preventable, in the first few weeks of life. The report[1] of a subcommittee of the Scottish Scientific Advisory Committee, under the chairmanship of Sir ALEXANDER MACGREGOR, which has been studying the causes, predisposing factors, and control of neonatal infection, shows that the neonatal mortality for Scotland during 1941–43 was 35·91 per thousand live births. The rates for maternity units ranged from 10·1 per thousand in emergency hospitals taking only normal cases to 52·2 per thousand in teaching institutions which admit a high proportion of abnormal cases and have a premature-birth rate of 12·7% compared with 2·8% in the emergency hospitals. The proportion of these deaths attributed to infection ranged around 10%, but where clinical diagnosis was checked by careful post-mortem examination this proportion was doubled.

The principal form of fatal neonatal infection was pneumonia, of which Dr. AGNES MACGREGOR has described four main varieties. The first is chiefly associated with birth asphyxia, and deaths usually occur in the first three days of life; its prevention lies chiefly with the obstetrician. The second, septic aspiration pneumonia, also most common in the first few days of life, is due to inhalation of milk or regurgitated stomach contents; its prevention is dependent on care in the feeding and nursing of the infant. The third, staphylococcal pneumonia, is commoner in the neonatal period than at any other time of life and frequently arises in small outbreaks: while the fourth, bronchopneumonia similar to that in older infants, may be due to organisms, such as *Bact. coli.* which are not usually associated with pneumonic infection. Many of these pneumonias, which are most common in premature infants and are often related to faults in lung function, are undetected clinically because of the absence of cough, fever, and dyspnœa; while cyanosis, when present, may suggest asphyxia or cerebral hæmorrhage. In Scotland, in the three years covered by the report, neonatal diarrhœa was responsible for much fewer deaths than respiratory infections, and outbreaks of neonatal diarrhœa were rare, but the committee cite Prof. CHARLES MCNEIL's figures showing an incidence of diarrhœa ten times higher in premature than in full-time babies. The committee also comment on the much greater resistance to intestinal infection among breast-fed than among artificially fed infants, a point well illustrated by the figures from Cincinnati,[2] where of 221 infants admitted to hospital for diarrhœa all but 3 had been bottle-fed.

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[1] Neonatal Deaths Due to Infection. Edinburgh: H.M. Stationery Office. 1947. Pp. 43. 9*d*.

The committee give sound advice on prevention. Emphasis is rightly laid on the adequacy and quality of the nursery nursing staff. They should be sufficient in number for the work to be careful and unhurried; there should be a nucleus of permanent trained staff to ensure continuity of treatment; and a basic nursing technique should be fully understood and practised. The nursery nurse or "auxiliary worker" (who may range in age from 17 to 45 years), being a permanent member of the nursing staff, is more useful than the pupil-midwife who spends only 4–6 weeks in the nursery. The nursery should be under the charge of a pædiatrician skilled in the care of young babies, and records should be kept of the day-to-day progress of each infant so that any minor infection or loss of weight is noted and attended to early. Mothers need more instruction in the care of the infant and in breast-feeding, WALLER's[3] studies on lactation being borne in mind; this may mean a larger staff and a longer stay in hospital, and, before the mother leaves hospital, coöperation between the health visitors and the hospital midwives. The committee were divided in their views about keeping infant and mother together or having a separate nursery for the healthy babies. If separate nurseries are provided they should be small, containing only 4–6 cots and allowing 40 sq. ft. per cot; the cots should be properly spaced and not crowded cheek by jowl along one side of the room as they often are. A separate nursery with a number of single rooms should be provided for sick and premature infants and for infected cases requiring isolation. For premature infants the committee favour a ward unit of 4 cots kept at a temperature of 75–80° F and a relative humidity of 70%, and they recommend the nursing technique evolved by Dr. MARY CROSSE in Birmingham.

Prematurity is clearly the most important predisposing factor in fatal infections. Thus in the two largest Scottish teaching hospitals the death-rates from infection were 5·4 and 5·7 per thousand among mature babies but 79 and 75 per thousand among premature infants. In the four Glasgow corporation hospitals, where the proportion of abnormal cases is much smaller, death-rates from infection among full-time and premature babies were 3·4 and 29 per thousand. Of the neonatal deaths from all causes, 70% were in premature infants. The causes of prematurity require further elucidation, but the studies of BAIRD[4] and SUTHERLAND[5] indicate that poverty and poor nutrition of the mother are important factors, and the remarkable reduction in the stillbirth-rate and neonatal mortality during the war years is probably a reflection of better nutrition in the lowest social classes, among whom premature births are most common. A reduction in the prematurity-rate, now around 7%, must be the long-term policy in the control of neonatal mortality. Meanwhile, this report points the way to the preventive measures that should be practised in every maternity unit.

Annotations

DIVORCE

THE great argument against divorce is the bad effect of a broken home on children. In their final report,[6] the Committee on Procedure in Matrimonial Causes, whose chairman is Mr. Justice Denning, pay special attention to the child, and consider in detail possible means of reconciling the parents. Reconciliation work has so far been mostly done by voluntary bodies, some of them religious. Court missionaries and probation officers have also helped estranged couples to understand each other better, and so have the Family Welfare Association, and the Sailors', Soldiers' and Airmen's Families Association. Since 1937 magistrates have been officially permitted to ask a probation officer or other person to try to reconcile parties seeking separation or divorce. Under the Army and R.A.F. Legal Aid Scheme some 27,000 applicants for divorce (a quarter of all those applying) have been reconciled; and in civilian life the Marriage Guidance Council, founded in 1938 and reconstituted in 1943, has done successful work. At its centres selected people act as "counsellors," interviewing those who apply and often referring them, according to their needs, to a consultant, who may be a doctor or psychologist, an ethical or spiritual adviser, a social worker, or a lawyer.

The Denning Committee find that the prospects of reconciliation are most favourable in the early stages of disharmony, and in families where there are children. For success, one of the couple must seek help of his or her own free will; and each must be sure that nothing told to the adviser will be repeated to the other partner without permission. The personal relationship with the adviser is so important that churches, voluntary societies, and individuals have a much better chance than a State institution would. Unfortunately the law relating to collusion and condonation hampers attempts at reconciliation: fear that the divorce may be quashed makes each partner reluctant to offer or accept advances. Actually, the law about collusion does not forbid discussions with a view to reconciliation, or about the future of the children, the house and furniture, maintenance, or costs. Condonation, on the other hand, presents a more serious bar to reconciliation, because one act of sexual intercourse cancels out an injured husband's grounds for divorce (though it does not affect those of an injured wife unless she has really forgiven and reinstated her husband).

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[2] Weihl, C., Rapoport, S., Dodd, K. *J. Pediat.* 1947, 30, 45.

[3] Waller, H. *Lancet*, 1943, i, 69; *Arch. Dis. Childh.* 1946, 21, 105.

[4] Baird, D. *J. Obstet. Gynæc.* 1945, 52, 339.

[5] Sutherland, I. *Lancet*, 1946, ii, 953.

[6] Cmd. 7024. H.M. Stationery Office. Pp. 36. 9d.

The committee want to see a Marriage Welfare Service, sponsored by the State, established to ensure that enough suitable advisers are available, to encourage people to seek competent advice—engaged couples in preparation for marriage, and married couples as soon as serious conflicts arise—and to attempt reconciliation when necessary. This service would be developed from existing services and societies, which would be grant-aided, and would have opportunities for broadcasting, and for giving information at registrars' offices. Court welfare officers would be appointed to help those applying for divorce, or thinking about it; and solicitors approached about divorce would be asked to recommend the couple to consult a welfare officer or one of the voluntary societies. The welfare officer should have access to every petition, and in suitable cases should write offering his services.

The committee think that the present administration of divorce is poorly fitted to safeguard children.

> If no application is made for custody, the court has no opportunity to consider their welfare; if an application for custody is unopposed, the court usually grants it; though the lack of opposition may be due to misunderstanding. Thus a wife who is guilty of adultery may think she has forfeited the children and may reluctantly hand them over to her husband, though this may not be the best thing for them. Where an application is opposed, the subsequent conflict between the parents often becomes so bitter that the welfare of the children fades out of sight.

The report recommends that in every divorce case, whether there is an application for custody of the children or not, the court welfare officer should report on the welfare of the children and should represent their interests before the court. The divorce judge should deal with the future of the children on the same day as he deals with the divorce, but afterwards. The hearing about custody should be in private, and the parents and their advisers would have the chance to be present, and to bring witnesses: their evidence should be given orally on oath, and not by affidavit as at present. The judge would also be able to see the parents and children separately and in private.

The rest of the committee's recommendations deal with alimony and maintenance, and with procedural reforms to meet certain difficult cases. These have no direct bearing on social medicine.

CONTROL OF SCRUB-TYPHUS

In the Far East campaign scrub-typhus was a major medical problem whose dimensions had not been anticipated from the limited peace-time experience. Only when the jungle was invaded by an army was it realised how widespread was the infestation. This mysterious disease had a profound effect on the fighting soldier and it acquired some of the properties of a secret weapon. The overall case-mortality of about 10% was equally impressive to the medical authorities. Owing to the painstaking work of Australian investigators and the U.S. Typhus Commission the disease came ultimately under complete control.

In attacking this problem McCulloch[1] assumed that the disease was mite-borne—a view widely held at the outbreak of war and one which has since been further substantiated. The success of new mosquito repellents such as dimethyl phthalate suggested their use against the trombiculids which carry the rickettsia responsible for scrub-typhus. The field work began with the exposure of volunteers to the mite producing "scrub itch," *Trombicula minor*, a mite which does not carry the rickettsia but produces the same reaction as the "harvester" mite in England. The protection afforded by dimethyl phthalate was striking, and dibutyl phthalate (D.B.P.)—more readily obtainable in Australia—proved even superior and withstood washing without losing its repellent action. With this initial success the detailed treatment of clothing was worked out on sample pieces of cloth subjected to various forms of impregnation and various types of washing, using mites easily obtained from the jungle. The method eventually adopted by Australian troops was to rub an ounce of D.B.P. into socks, trousers, and shirt once a fortnight, a treatment which was shown to be effective even with unrestricted washing. Rubbing in by hand was much better than spraying.

One of the most important and difficult stages in the introduction of new hygiene measures to a field force is the necessary education of the soldier, who is sceptical and suspicious of innovations. This "sales-resistance" disappears directly a unit encounters scrub-typhus in the field, and unit commanders then become anxious to take advantage of any method of protection. In New Guinea the instruction of troops formed one of the most important elements of success. Anti-mite fluid was first issued to the Australian forces in November, 1943, and by June, 1944, all troops in forward areas—those most exposed to infection—were protected. The scrub-typhus rates fell sharply. For the last year of the war the incidence was about 9% of that for 1943, though this fall cannot wholly be ascribed to the use of the miticide, since distribution of scrub-typhus is essentially patchy and troops may have been fighting in less infested country. However the unmistakable conclusion of the New Guinea campaign was that D.B.P., applied fortnightly, could completely control scrub-typhus and that where failure occurred it was ascribable to lack of supplies.

A NEW DIPHTHERIA PROPHYLACTIC

ALUM-PRECIPITATED toxoid (A.P.T.), the diphtheria prophylactic used in this country for mass immunisation, is doing much to prevent this preventable disease, as the Ministry of Health figures and the depleted diphtheria wards in fever hospitals combine to show. Yet though A.P.T. is potent and generally reliable, it has some drawbacks. Thus, as Mr. Holt points out on another page, it is difficult to prepare batches of uniform antigenicity because its exact composition is uncertain, and we still do not know how precipitation enhances the activity of the toxoid, and what influence impurities have on the antibody-response. These defects have, in his opinion, made the assessment of dosage and spacing unsatisfactory. He has therefore devised a new prophylactic believed to be antigenically potent and stable and productive of fewer reactions than A.P.T. in sensitive persons. It consists of purified toxoid precipitated by a suspension of a measured amount of purified aluminium phosphate ($Al PO_4$) and is called P.T.A.P. The great advantage claimed for it is that the antigenicity of each batch can be accurately predicted.

The new product has been submitted to field trials on a pilot scale by Dr. Guy Bousfield, who reports on his results in this issue. The subjects were Schick-positive children between their first and second birthdays, living in a suburban area where herd-immunity was low; thus the children were of reasonably comparable body-weight and without substantial basal immunity. Serum antitoxin titrations were thought to be impracticable in these young children, so Dr. Bousfield assessed the immunity responses to a single subcutaneous injection of the prophylactic by post-Schick tests carried out 28 days later. Breaking new ground, and seeking to avoid undesirable reactions, the trials were made in stages, in an attempt to determine the optimum concentration of $Al PO_4$ and Lf dosage of toxoid. The highest Schick-conversion rate (93%) was obtained with 5 Lf units of toxoid in conjunction with 5 mg. of Al PO$_4$. Small though the series were, the results seem to demonstrate the favourable effect on the Schick-conversion rate of increasing the amount of Al PO$_4$ up to this level, and the importance of controlling the amount so as to obtain an optimal primary stimulus. Further tests are to be made to determine more exactly the dosage of Al PO$_4$ which produces the best results.

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[1] McCulloch, R. N. *Med. J. Aust.* 1946, i, 717.

When A.P.T. is injected intramuscularly nodules sometimes form at the site of injection, unless it is made deeply. Dr. Bousfield found at the time of the post-Schick tests that nodules could often be felt where P.T.A.P. had been injected subcutaneously, and that their incidence rose almost in strict proportion to the increase of the Al PO$_4$ content. His findings support the view that satisfactory primary stimulation depends on some degree of local fibrosis and depot-action—that is, the slow release of toxoid into the tissues generally. Thus the nodule which some workers have sought to avoid by a suitable technique of injection may be an important factor in the production of immunity. General reactions after the subcutaneous injections of P.T.A.P. were few; and after a subsequent intramuscular dose to complete the immunising course there were none at all.

Since the choice of a new prophylactic for mass-immunisation is of national concern, these observations will doubtless be repeated by other workers on a bigger scale. In such trials the results—with due respect to Schick's test—should be additionally checked by antitoxin titrations.

JANET

Pierre Janet's great contribution to psychopathology showed two dominant trends, happily fused. On the one hand he was a collector and systematist, in the Linnæan tradition: all his life he went on adding to the fine herbarium which he began in childhood, and the patient amassing of exact data about mental abnormality was only another activity of the born collector-classifier. The other side of him—mystical and philosophical—was equally strong, though less in evidence; to it he attributed his first interest in psychology and especially in clairvoyance and hypnotism, the study of which brought him, when he was 23, to the notice of Charcot and Richet in Paris, and incidentally of Sidgwick and F. W. H. Myers in the Society of Psychical Research in London. His appointment in 1889 to the charge of the psychological laboratory which Charcot established at the Salpêtrière set his feet firmly on the path which he followed for the next half century with endless zest and exactitude. He used to say that his was a "psychology of the fountain pen" so careful was he to record immediately and with minute fidelity what the patient and he had said, and to abstain from using any recollections that were not precisely in accord with what he had set down in his voluminous notes. His medical training made him reluctant to generalise from particular observations, or to stress dynamic psychological influences at the expense of the hereditary and organic causes of mental illness. Consequently, although he had observed the significance of traumatic experiences and the occurrence of unconscious mental processes earlier than Breuer and Freud, he stopped short at this observation; writing of it much later, he said he could not expand a clinical observation into a metaphysical system. The notions of psychological tension and mental level which he introduced served him well in describing the functional hierarchy and the play of symptoms in the neuroses. In England his concept of dissociation and his descriptions of "psychasthenia" are more widely known than his far-reaching studies into the psychology of conduct, which have become part of orthodox French psychiatry. The essence of his later work lay in the effort to classify all psychological facts under action and conduct, in accordance with his notions of hierarchical organisation. The economic problems of action, the sources and expenditure of energy, seemed to him the paramount issue in psychology and psychiatry. Whereas the methods and the theories of the other great psychopathologist who was his fellow-student at the Salpêtrière were revolutionary, Janet had a classical preference for precision and order: he subordinated hypothesis to exact observation, and his teachings aroused neither the antagonism nor the productive stir that made Freud the greater force.

TONICS VINDICATED?

THE vegetable "tonics" have long been out of fashion in our medical schools—at most they have achieved passing mention in historical introductions to pharmacology—yet the family doctor has continued to prescribe some of them for their appetising properties or merely as flavouring agents. Now it seems that there may be a rational basis for these traditional remedies. Chaikelis[1] has investigated the thiamine content of 41 genera of herbs and medical plants belonging to 20 distinct and separate botanical families, and has found that this ranges from 125 to 2880 microgrammes per 100 grammes of dried substance. No less than 12 of the dried plants examined contained more than 1000 µg. per 100 g. and only 5 contained less than 300 µg. The list includes buchu (1965 µg. per 100 g.), caraway (722), camomile (1154), dandelion (1577), gentian (477), quassia (1839), thyme (502), and white cinnamon (427). The two richest known sources of thiamine, wheat-germ and yeast, contain 2000 µg. per 100 g., so some of these herbs run them close. It would be interesting to know how much of the thiamine content of herbs is extracted in making infusions. Chaikelis points out that the symptoms of thiamine deficiency include loss of appetite, fatigue, gastro-intestinal disturbances, muscular weakness, and lowering of the blood-pressure, and these are the very symptoms for which tonics are often prescribed.

NEGOTIATIONS BEGIN

ON Friday of last week the Negotiating Committee, representing medical organisations, met the Minister of Health for discussions on the National Health Service Act. The members now are:

British Medical Association.—Nominated by the council: Dr. J. A. Brown, Dr. R. W. Cockshut, Dr. Guy Dain, Dr. W. E. Dornan, Dr. F. Gray, Dr. E. A. Gregg, Mr. R. L. Newell, Dr. S. Wand, and a Scottish member. Elected by the representative body: Mr. A. Lawrence Abel, Dr. J. C. Arthur, Dr. O. C. Carter, Lord Horder, Dr. J. A. L. Vaughan Jones, Dr. J. F. Lambie, Dr. J. B. Miller, Dr. J. A. Pridham, and Dr. S. A. Winstanley.

Royal College of Physicians.—Lord Moran, Dr. H. E. A. Boldero, and Prof. Henry Cohen.

Royal College of Surgeons.—Sir Alfred Webb-Johnson, Mr. Zachary Cope, and Prof. Ernest Finch.

Royal College of Obstetricians and Gynæcologists.—Mr. William Gilliatt and Mr. A. A. Gemmell.

Royal Scottish Medical Corporations.—Prof. Charles McNeil, Mr. Henry Wade, and Dr. J. H. Macdonald.

Society of Medical Officers of Health.—Dr. G. F. Buchan and Dr. R. H. H. Jolly.

Medical Women's Federation.—Dr. Mary Esslemont.

Society of Apothecaries.—Dr. H. Seaward Morley.

The committee has set up six subcommittees dealing severally with general practice, hospital and specialist services, public health, mental-health services, eye services, and superannuation.

Sir WILL SPENS is to preside over a committee to consider the remuneration appropriate for consultants and specialists in a publicly organised service.

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1. Chaikelis, A. S. *J. Amer. pharm. Ass.* 1946, 35, 343.

Special Articles

RECRUITMENT OF DOCTORS TO THE FORCES

REPORT FROM THE CENTRAL MEDICAL WAR COMMITTEE

THE Central Medical War Committee (C.M.W.C.) has issued an account of the work of its Services Committee during 1946. The report, signed by Mr. H. S. SOUTTAR, chairman of the C.M.W.C., and by Dr. PETER MACDONALD, chairman of the Services Committee, begins by describing the constitution and function of these bodies.

The C.M.W.C. is reappointed annually by the Minister of Health. Its members are nominated by various professional organisations and other bodies. The Services Committee, which is concerned with the recruitment of individual practitioners and acts generally as the executive of the C.M.W.C., is reappointed annually by the parent committee, chiefly from its own membership; it includes four ex-Service doctors, three of them specially appointed as such. The members of both committees give their services voluntarily. Officers of the three Service departments and of the Ministries of Health, Labour, Education, and Pensions attend all meetings as observers and advisers.

The functions which the Services Committee undertakes on behalf of the C.M.W.C. are advisory. The decisions of the committee are recommendations to the Minister of Health, who acts as the agent of the Minister of Labour and National Service so far as the recruitment of doctors is concerned. As a general rule, however, these decisions receive the tacit consent of the Minister's representatives who attend the meetings, and are put into effect without first being submitted formally to Whitehall for approval. In practice, therefore, the committee acts as if it had executive powers; but the last word always rests with the Minister of Health; in matters of general policy the committee can only recommend. The answer to those critics who blame the committee for not raising the limit of age for compulsory recruitment of specialists, or for not calling up men rejected during the war as medically unfit for service, or for not forecasting the release of age-service groups of serving officers for at least six months ahead is that the committee is not in a position to do any of these things. Although the release arrangements depend partly on the success of its efforts to obtain new recruits, the committee does not determine these arrangements and is never able to announce them until they have been promulgated by the Service departments.

RECRUITMENT OF GENERAL-DUTY OFFICERS

During the second half of 1945 the committee had recruited specialists up to the age of 40 and general-duty officers up to the age of 35. Early in 1946 the Government decided to retain the age-limit for specialists at 40 but to reduce that for general-duty officers to 30. Any man born on or after July 1, 1915, was to be regarded as within the latter age-limit. Within the last year the date of birth used in deciding liability for service has twice been advanced by six months for the purpose of maintaining the age-limit at 30. At the present time the date is July 1, 1916, the corresponding date for specialists being July 1, 1906.

During 1946 the committee had no difficulty in supplying the quotas of general-duty medical officers allotted to the three Services on the recommendation of the Medical Personnel (Priority) Committee, now known as the Medical Priority Committee. On the contrary, the number of practitioners, not of specialist status, who became available for recruitment during the year exceeded the estimates on which the quotas were based, with the result that the quotas had to be adjusted to take in the surplus. The total number of medical officers recruited for general duty was 1123. This figure is considerably higher than the corresponding figure (968) for the previous year, and is not much below the figure (1185) for the year 1944, when the limit of age for compulsory recruitment was much higher than in 1946 and when women doctors were still liable to such recruitment and were in fact recruited to the number of 200. The increased yield of recruits in 1946 is to be attributed to the fact that large numbers of ex-Service doctors became available during the year for civilian employment. The result of this was that recently qualified practitioners had greater difficulty in obtaining B2 and B1 hospital posts and thus securing deferment of call-up, and those already holding B1 posts could more easily be released for military service.

The only difficulty encountered by the committee in connexion with recruitment of general-duty officers was in regard to the proportions in which the available recruits should be allotted to the three Services to enable them to release serving officers at approximately the same rate.

At the beginning of the year medical officers in the Royal Air Force were complaining bitterly about the arrangements for their release. Although the Army had announced its intention of releasing in February general-duty medical officers in group 38, and the Navy had already released some medical officers in group 40, the R.A.F. programme provided only for the release of group 28 by the end of March. The committee, although in no way responsible for this state of affairs, was being blamed for having failed to prevent what was alleged to be a departure from the Government's release plan. It was known that no medical recruits had been sent to the R.A.F. during the last four months of 1945, and this was being attributed to lack of foresight on the part of the committee, which had had no alternative but to allocate all the recruits available during these months to the Navy and the Army in accordance with Government instructions.

The Ministry of Health was asked to explain the situation, and replied that the inequality in the rates of release was an inevitable consequence of a decision of the Government, which had been announced in the House of Commons in December, 1945, to reduce the ratio of medical officers to Service personnel to 2 per 1000 in each of the three Services as an emergency measure. It was because the ratio of doctors in the R.A.F. had been relatively low that the numbers to be released from that Service were less than in the other Services. The Ministry added that there was no question of a departure from the white-paper plan, which was elastic enough to permit the release of different groups as between the three Services or indeed as between branches of each Service.

The white-paper had indeed stated that there would be necessary differences in the rates of release; but the committee was not satisfied that this particular case was one of necessity. It thought that equality could be achieved, although not immediately, by an adjustment of the quotas of recruits allocated to the three Services. It had been estimated that 450 recruits would be available during the first half of the year, and the number provisionally allocated to the R.A.F. on the advice of the Medical Priority Committee was only 110. The Services Committee recommended that this allocation should be increased materially, and was later informed that it had been increased to 210. When it became evident that the number of recruits in the first half-year would considerably exceed the estimate, the committee decided to allocate the greater part of the surplus to the R.A.F., which received 298 out of the total of 585.

The figures for the whole year are: Royal Navy, 145; Army, 410; Royal Air Force, 568. The quotas recommended by the Medical Priority Committee for the second half of the year were designed to bring R.A.F. releases into line with those of the Army by the end of the year. This result has been achieved, both Services having released group 53 in December.

RECRUITMENT OF SPECIALISTS

At the end of 1945 the release of specialists had already fallen behind the release of general-duty officers, and the difficulty of finding substitutes for those Service specialists who could not be released without replacement was causing the committee grave concern. The recruitment of specialists and graded specialists continued to be the most difficult problem confronting the committee during 1946. The ways in which it attempted to solve the problem are described briefly as follows:

In the first place, the committee examined a complete list of those specialists who had been granted deferment by the local medical war committees. Holders of B1 posts were excluded from the list as arrangements had been made for their recruitment to be initiated centrally and not by the local committees. Hygiene specialists, psychiatrists employed in the mental-hospitals service, and pathologists were excluded also, the nomination of recruits in these categories being in the hands of the Ministry of Health, the Board of Control, and the Medical Research Council respectively. Of the 135 specialists included in this list, some had been found medically unfit for military service; others were engaged exclusively in specialties in which recruits were not required; a few were found on further inquiry to have no liability under the National Service Act; and one was registered as a conscientious objector. There remained 80 possible recruits. These were mainly men between the ages of 35 and 40 who were performing highly important work, many of them being on the staffs of teaching hospitals. In rather more than one-half of these cases the committee resolved to initiate recruitment, but there were some cases in which it later decided, after examining the representations received, that it was necessary to grant further deferment; and a few of the men nominated eventually to the Service departments were rejected as medically unfit. The number of fit men whom the committee finally decided to recruit was 33. The scrutiny of these difficult cases entailed much labour, but enabled the committee to satisfy itself completely as to the very formidable problems with which the local medical war committees had been confronted in their efforts to find additional recruits among the few senior specialists of military age who had not already served in the Forces.

Holders of B1 posts have recently formed, and must continue to form, the great bulk of the new recruits of specialist and graded specialist status. In their review the committee re-examined also the position of those senior B1 officers who had previously been granted indefinite deferment because of the extreme difficulty of securing sufficiently experienced substitutes to take over their work. There were 25 such practitioners, of whom the committee decided to recruit 14. The other cases of specialists in B1 posts which were considered during the year—on the completion of twelve months or two years in the posts, or on the expiry of an extended period of deferment previously granted—numbered approximately 110; and in all but 16 of these cases the decision was to recruit the practitioners concerned, either immediately or after a short interval. In a further effort to increase the yield of specialist recruits the committee examined its register of general practitioners below the age of 40 and selected those practitioners who, because they held higher diplomas or for other reasons, possibly might be regarded as eligible for specialist or graded specialist status in the Forces; but in only 10 of these cases did the committee find it possible to initiate recruitment.

STANDARDS OF GRADING

During the past year the committee has modified greatly the standards used in classifying prospective recruits as specialists and graded specialists. Every recruit who has held a B1 post for not less than twelve months is now considered by the subcommittee concerned with grading. A candidate for grading is no longer expected to hold a higher diploma or to have been qualified for a specified number of years; the only question considered is whether he has acquired sufficient experience in a specialty to enable him to hold a responsible post in that specialty, under supervision in the case of a graded specialist. The supply of graded specialists has thus been appreciably increased. As there is now no shortage of general-duty recruits, the present policy of the committee is to allow a B1 officer to retain his post after he has held it for twelve months if he is not then considered eligible for graded specialist status but seems likely to qualify for such status after a further period of deferment.

The committee has repeated its request that the War Office should consider employing specialists of a lower physical standard. The War Office has been furnished with a list of the specialists rejected as medically unfit and has been asked to indicate which of these it is prepared to re-examine. Another recommendation made by the committee was that the Service departments should encourage voluntary recruitment by offering specialists a higher rank, but this proposal has been rejected as impracticable. Towards the end of the year the committee published an appeal to suitably qualified women doctors to offer their services as gynæcologists, anæsthetists, pathologists, and radiologists. Finally the committee has urged, not for the first time, the importance of scrutinising the use made by the Services of their specialist officers; and the Medical Priority Committee has recently sent investigators to conduct such a scrutiny in the main overseas commands with a view to economies in the employment of specialists.

The total number of specialists and graded specialists supplied to the Services during 1946 was 293, the corresponding figures for 1944 and 1945 being 46 and 80 respectively. Of the 1946 recruits, 17 were nominated by the Scottish Central Medical War Committee and 86 by the Committee of Reference, which initiates the recruitment of specialists in London. Despite all the efforts made to increase the yield of specialist recruits, the release of specialists from the Army was 12 groups behind the release of general-duty officers at the end of the year. Unfortunately, specialists of military age who are medically fit for service and have not already served do not exist in the numbers that would be required to bring the release of Army specialists into line with that of general-duty medical officers.

SHORT-SERVICE EMERGENCY COMMISSIONS

At its first meeting in 1946 the committee was informed that approval had been given to a recommendation of the Medical Priority Committee that specialists should be employed in the Forces on a short-term basis. It had been decided that suitable specialists would be accepted for employment for eighteen months, the commission held being known as a "specialist short-service emergency commission."

It was intended that these commissions should be given to any specialists liable to compulsory recruitment between the ages of 30 and 40, as well as to those above the age of 40 who joined the Forces voluntarily. It was hoped that the offer of employment limited to eighteen months would attract specialists above the age of 40 who might hesitate to volunteer for an indefinite period; and at the time it seemed reasonable to make the short-service commissions available also to specialists recruited compulsorily, if above the limit of age for recruitment of the male population generally, especially as many of these recruits had been retained against their own wishes in E.M.S. and other civilian appointments during the war years and had shared some of the disadvantages of the Service doctors, particularly the disadvantage of being unable to establish themselves in permanent positions.

Before many months had passed, however, the committee began to have doubts about the wisdom of this part of the plan. There was practically no response to the appeal for volunteers, and the continued difficulty experienced by the committee in obtaining sufficient recruits of specialist status made it appear that the men accepted for short-service commissions in 1946 might complete their service at a time when some of the specialists recruited in 1945, although due for release, would have to be retained for a further period.

In July the committee asked the Medical Priority Committee to reconsider the plan; and it was informed in November that it had been decided to suspend forthwith the offer of short-service emergency commissions to specialists liable to compulsory recruitment.

MISCELLANEOUS

In November the committee decided to discontinue, for an experimental period of six months from Jan. 1, 1947, its control of the establishments of resident medical officers in hospitals. This decision was thought unlikely to result in a serious reduction of the number of recruits available for general duty in the Services. As many of the senior hospital posts are now held by ex-Service doctors the committee considered it desirable, in the interests of future recruitment of specialists, that hospitals should be free to create additional posts as circumstances might require. It has asked the hospitals to restrict new B1 posts to men known to be liable and medically fit for military service.

The committee received nearly 1200 applications for release of medical officers out of turn during 1945. As was to be expected, the number greatly diminished in 1946. Among the 120 cases considered during the year there were 47 in which the committee decided to recommend release in class B. In 38 cases—16 of specialists and 22 of general-duty officers—the recommendations were approved by the Service departments. In view of the serious shortage of specialists in the Services, the committee has continued to exercise great discrimination in regard to release of specialists in class B.

The committee has again asked the Service departments to consider granting leave, whenever possible, to medical officers stationed overseas who have applied for permanent appointments and have been selected for interview. The departments continue to regard this proposal as impracticable. The War Office pointed out to the committee that such a concession could not be restricted to doctors and that, if it were made available generally, a large part of the Army would be continually on the move to and from the United Kingdom.

In the interests of ex-Service practitioners, the committee decided in February, 1946, that it would not in future recommend the issue of entry permits to doctors from Eire, even if satisfied as to the necessity of filling the appointments for which such doctors might be selected, except where the hospital concerned (or the local medical war committee in the case of an assistantship in general practice) was able to assure the committee that every effort had been made without success to secure a candidate normally resident in this country. In July the committee was informed that women entering this country from Eire would no longer be subject to any restriction relating to employment; and in December the information was received that the Home Office was anxious to remove all "conditional landing" controls at the end of the year as it considered that the imposition of landing conditions could no longer be justified in the case of a citizen of Eire. The committee, in view of the reported unemployment among ex-Service doctors, felt bound to resist this proposal, and requested reconsideration of the advisability of retaining for the time being the restrictions on employment in this country of male doctors from Eire who have not served in the Forces.

RELEASES FROM THE ARMY

The committee has received the following statistics relating to releases of medical officers from the Army since June 1, 1945, when the reallocation of man-power scheme came into operation:

	Total	*Percentage of strength* (11,876) *at June* 1, 1945
Releases to Dec. 30, 1946:		
Class A	8846	74 48
Class B	222	1·86
Class C	42	0·35
Relinquishments	123	1·20
Invalidings	295	2·50
	9528	80·39
Intake, June 18, 1945, to Dec. 30, 1946	1007	8·48
Net release to civil life	8521	71·91

MENTAL HEALTH

AT the inaugural meeting of the National Association for Mental Health, held in London on Feb. 12, Mr. R. A. Butler, M.P., was elected president, Lord Feversham chairman, Lady Norman vice-chairman, and Sir Otto Niemeyer treasurer. The association has been formed by the amalgamation of the Central Association for Mental Welfare, the Child Guidance Council, and the National Council for Mental Hygiene—as recommended by the Feversham committee on voluntary mental health services.

Dr. Kenneth Soddy, medical director of the association, said he was particularly anxious that the aftercare scheme for ex-Service psychiatric casualties should be continued. The voluntary case-work service would still be valuable as an outrider to official services. Occupation centres for defectives, the care of delinquents, and surveys were among the other tasks now in hand. In child guidance the era of indoctrination had ended; now the problem was to catch up with the opportunities which were offered. There was need for more child-guidance clinics and more workers; and it was hoped that the universities would take their share in the training of these workers. An important international congress, organised at the request of international bodies, was to be held in London next year.

PART-TIME NURSING

CONFERENCE AT CHELTENHAM

BY using part-time nurses Gloucestershire has solved the staffing difficulties of its institutions for the old and ailing[1]; and on Feb. 18 and 19 a conference, arranged jointly by the county council and the Ministries of Health and Labour, was held at Cheltenham to discuss the scheme and demonstrate it in action.

At the opening session on Feb. 18, with Lieut.-Colonel JOHN GODMAN presiding, Sir ARTHUR RUCKER (Ministry of Health) spoke of the great and growing scarcity of nursing and domestic staff which is likely to endanger the working of the National Health Service. This service is suspected in some quarters of all the dangers of bureaucracy; but part-time nursing should help to counteract this danger by stimulating local interest in the care of the sick and the old. The Ministry of Health have sent to the regions suggestions for part-time schemes, some of which have already been started. A part-time scheme for London was launched on Feb. 15.

Mr. A. F. ROUSE (Ministry of Labour) mentioned over 30,000 nursing vacancies notified to his Ministry, and he thought there might be 15,000 others. The war, he said, could hardly have been won so soon without the help of part-time women workers. The Gloucestershire County Council have handled their people well, with full regard to their family commitments.

VIEWS OF THE ORGANISER

Mr. WILLIAM SHEE (public-assistance officer, Gloucestershire) said that he launched the scheme on Jan. 29, 1946, as a last resource. At that time the county services were about to break down. In less than a year the whole picture had changed; not a ward has had to be closed, and the hospitals for the chronic sick are now fully staffed. The Civil Nursing Reserve, who during the war should have saved the situation for the country at large, were lost to nursing by the dozen, he said, because they were regarded as supernumeraries. Part-time workers must be regarded as "staff," and given full responsibility while they are on duty, even if they only come in for a few hours a week. Part-time nursing staff includes regulars, reserves, and casuals, the last being particularly useful at the weekends, when they are often willing to relieve full-time staff. They are classified, according to their experience, as trained nurses, enrolled assistant nurses, nursing attendants (with some previous nursing experience), and nursing orderlies (with no previous nursing experience). They are all engaged in nursing duties, and do no domestic work.

Pay scales had to be worked out. The National Joint Council has fixed rates for domestic workers at 1s. 4d. an hour for cleaners, 1s. 5d. for housemaids, and 1s. 5½d. for ward orderlies doing domestic work. It seemed common sense, Mr. Shee said, that a woman doing nursing should not be paid less than a cleaner; the rate for nursing orderlies was therefore fixed at 1s. 6d.

Attendants were offered 1s. 9d., and trained nurses 2s. 6d.—an average based on the Rushcliffe rates, which range from 2s. 0½d. to 3s. Enrolled assistant nurses were offered 2s. The latest Rushcliffe scales for part-time nurses offer 2s. 10d. to sisters, only 2s. 1d. to trained staff nurses, 2s. to enrolled assistant nurses, and only 1s. 5d. to "intermediate assistant nurses."

This last figure, in Mr. Shee's opinion, may be right for women who can complete their training and become enrolled; but part-time workers have not this opportunity.

The Gloucestershire workers are collected from approved centres and sent in taxis to their work. Seven of the nine county hospitals for the chronic sick are in isolated country places, and the workers travel 7200 miles a week, at a cost of £10,000 a year, or 5s. per bed per week. They are allowed travelling time from the centre and a meal on duty; if they want it, they can buy another meal at canteen prices when they come off duty. The full-time staff, thanks to the newcomers, now do a straight 8-hour span of duty daily, instead of a 13-hour span with some hours off; since they, too, are now given their meals in duty time, their weekly hours of work are actually below 48—about 42, in fact. Uniforms of pleasant style are provided and laundered for part-time workers. After six months' service they get holidays with pay; if it happens that a husband's holiday falls due before the six months is up, the worker is allowed to take hers at the same time, but must come back and complete her six months before she receives her holiday pay.

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[1] See *Lancet*, 1946, ii, 873.

The council has advertised in the press, and by posters and cinema slides, and by addresses to women's organisations; but the best advertisement has come from the women who do the work. A fine type has been attracted from the start; of the 301 engaged, 72 are trained nurses, 32 enrolled assistant nurses, 92 nursing attendants, and 105 nursing orderlies. Only 4 had to be refused as unsuitable, and only 31 left during the first year; 10 of these left during the first month, but between the sixth and the twelfth month only 6 left. Some 86% are married, their husbands' occupations ranging from unskilled or skilled labouring to professional work.

The cost of a 66% part-time service, Mr. Shee reckons, is no greater than the cost of a whole-time nursing service, supposing you could get it; for much must be spent on up-to-date nurses' homes, and large sums go on expensive labour engaged from nurses' coöperative agencies. It seems that a hitherto unused source of labour is being tapped. When a hospital in a neighbouring county lost its entire staff, the Gloucestershire County Council were able to staff it completely at 36 hours' notice, from among their reserve part-time workers. There is no age-limit for candidates, and the average age of those recruited is 38½. Most of them have children, with an average of 1·8 children per worker. The shifts run from 8 A.M. to 12 NOON, NOON to 4 P.M., 4 P.M. to 8 P.M., or (on night duty) from 8 P.M. to 8 A.M. The patients are left to sleep until 7 A.M., and are washed by the day staff.

Some 56% of part-time workers have had previous nursing experience, and the inexperienced are taught at the bedside by the trained staff. Nursing orderlies in due course gain promotion to the grade of nursing attendant. While believing that the State-registered nurse should have a high standard of training, Mr. Shee feels that the aim of such a standard must always be the good of the community, not merely the status of the nurse: training standards should never be allowed to create hardship for the sick. The success of the Gloucestershire scheme has been due, he considers, to the interest and coöperation of the matrons; and it is important to cultivate the right orientation of mind in matrons who are to work such schemes. He holds that no hospital should now close a ward unless everyone concerned is satisfied there is nothing for it but defeat.

EFFECTS OF THE SYSTEM

Dr. H. **KENNETH COWAN** (M.O.H. for Gloucestershire) finds that patients like the part-time system, not only because it provides enough nurses to look after them properly but because they enjoy news from outside the hospital, and the sight of fresh faces. He suggested that part-time nursing will have a permanent value in the care of the chronic sick, and may well apply in sanatoria, and possibly in acute general and special hospitals, where part-time workers could be used to supplement full-time staff.

Mrs. B. A. **BENNETT** (Ministry of Labour) told how her critical nurse's eye had been satisfied on a tour of the Gloucestershire infirmaries. She saw there, she said, well-nursed patients, happy nurses, splendid bedside teaching—in fact, the loving care of old people. Mrs. F. W. **REYNOLDS** (matron of Cheltenham County Infirmary) remarked that she now has a staff waiting-list. The part-time nurses are treated, and work, as part of the team. On public holidays they have volunteered to relieve the full-time staff by making up rotas among themselves.

On Feb. 19 Dr. B. H. **HASLETT** (consulting physician to the county infirmaries) described the types of patients nursed. Most of them are over 70, many are senile, some have rheumatic disorders, others need reablement after a stroke, a few are late cancer cases, some are incontinent. It is slightly demoralising work, he said, to change the same incontinent patient several times a day; but a part-time nurse usually has to do this only once in her span of duty, and may therefore suit the patient better than the full-time nurse. It is important to get patients out of bed if they are well enough, and to dress them in their own clothes. This means more work for nurses, and may be neglected where staff is scarce. In 1945 in some of the infirmaries the matron was the only trained nurse on duty, and it was becoming necessary to reduce and simplify treatment, especially surgical treatment, instead of expanding it. Now it has become possible to undertake more surgery in the infirmaries and even to reduce the waiting-list in the general hospitals by using spare infirmary beds for people needing urgent operations. He considers that each large ward should have a full-time sister, if possible, though in emergency part-time workers alone can run a small hospital. The women attracted, being more mature and experienced than most recruits to nursing training, are also more considerate to the old. If acute and chronic patients could share the same hospitals, nurses in training would get experience of both, and some would choose to specialise in the care of the chronic sick. It is true that part-time workers usually have divided loyalties, and may have to give up work for a time to meet demands at home, but this must be accepted and allowed for. They seem to like the work and to want to come back to it; and this is the only system which allows the married trained nurse to carry on with nursing.

In reply to a question, Dr. **COWAN** said that the council hoped to extend the system into maternity hospitals. Miss D. E. **WESTMACOTT** asked whether the danger of introducing infection into maternity wards in this way had been considered. Dr. **COWAN** replied that in wards designed to take 40 they have had as many as 70 patients in labour, while the staff consisted of only 10 midwives instead of the full complement of 18. It is better, he thinks, to have a staff adequately supplemented by picked part-timers than to try to deliver patients with insufficient staff.

OPINIONS AND CONCLUSIONS

Mr. **SHEE** asked whether the meeting would care to consider a resolution criticising the Rushcliffe scales for part-time nurses, but on the assurance of three members of the Rushcliffe Committee that all that had been said would be reported and considered, he did not press the suggestion.

In further discussions, and during the course of a brains trust held on the evening of Feb. 18, the case of the trained nurse who has been away from nursing for many years was raised. A sister who has returned to part-time work after a 13-year interval remarked competently "I took hold of a swot-book and got the new stuff up." Asked whether she felt that, as matron, she could give a part-time nurse the full responsibility of ward administration, Mrs. **REYNOLDS** replied: "Of course. I don't look on them as 'part-time workers'; they are my nurses."

This attitude to part-time workers was emphasised by several Gloucestershire speakers; and it is evident, as Mr. Shee claims, that the hospitals regard themselves as being staffed by part-time workers, supplemented by what full-time nurses are available. Mr. C. A. W. **ROBERTS** (Rushcliffe Committee) pointed out the possible application of part-time nursing to mental hospitals; and Mrs. E. O. **JACKSON** (matron of University College Hospital) considered that it was the answer to the problems of hospitals for the chronic sick and of small hospitals. She thought it might even be applied in some departments of training schools. At the same time she pointed out that the assistant nurse's qualification was established to regularise the position of untrained women in nursing; since part-time nurses cannot at present train for any qualification, the old situation may to some extent be re-created.

Mr. W. E. **LEOPOLD** (Ministry of Labour) emphasised the careful way in which the Gloucestershire scheme was launched—the steady build-up, and the care taken to overcome prejudice before the campaign began. He asked those starting schemes to keep this in mind, yet to remember the urgency of our need; and he begged them to let the Ministry know of their successes and failures. "Where people will not coöperate," he said, "tell us, so that we can back you up."

VISIT TO THE HOSPITALS

A visit to some county infirmaries during the afternoon of Feb. 18 confirmed what had been reported of the scheme. There were ample nurses on duty, doing their work peacefully, at a rate which permitted them to be thorough and careful. All the patients questioned were pleased with their treatment, and those who had been in long enough to see the change-over spoke enthusiastically of the part-time scheme. The standard of comfort was clearly high, and the matrons did not look harassed. The part-time nurses were keen and satisfied, enjoying the rewards of nursing without the fatigues and frustrations sometimes associated with full duty, and bringing to their task freshness and the judgment and initiative which family life fosters. They were on pleasant terms with the full-time staff, who spoke of them appreciatively.

ROYAL COLLEGE OF SURGEONS

HUNTERIAN FESTIVAL

THE Hunterian oration of the Royal College of Surgeons of England was delivered on Feb. 14 by Sir JAMES WALTON, consulting surgeon to the London Hospital, whose subject was Hunterian Ideals Today. It was, he said, by the study of John Hunter's specimens and his series that the importance of his work could be best appreciated. Though his collection had been grievously damaged during the war, much would be gained from the council's decision that, instead of being kept separate as a historical group, the remaining specimens should form a living centre of growth in each section of the museum.

At the Hunterian dinner held in the college that evening, H.R.H. the Duke of GLOUCESTER, himself an honorary fellow, reported that in Australia he had fulfilled the council's commission to bestow the honorary fellowship on Sir Hugh Devine. The PRIME MINISTER, speaking of the National Health Service Act, said that in his experience very few Acts of Parliament came up to the hopes of their authors, but still fewer fulfilled the fears of their opponents. The main object of this Act was to make available to all the benefits formerly confined to a few. The acceptance of this "very great aim" marked a big revolution in ideas—a revolution due not only to politicians but also to doctors. "I am quite sure," added Mr. Attlee, "that as we are united in aim we shall in our British common-sense way find a method by which we can all work together." Sir ALFRED WEBB-JOHNSON, the president, said that the profession was deeply conscious of its responsibility. No health service could be a success without its cordial coöperation, and if flaws were found in the plan he had sufficient confidence in the common sense of the British people and of Parliament to feel sure that those flaws would be removed. Turning to domestic affairs, he mentioned that £144,000 has now been subscribed towards the £250,000 needed for restoration of the college. At present 200 graduates are attending classes, and the London colleges are still foci on which men from other countries concentrate.

Sir HENEAGE OGILVIE's toast of the Guests drew replies from the Lord CHANCELLOR (Viscount Jowitt) and Prof. LOUIS BAZY, past president of the Académie de Chirurgie de Paris, who had just been admitted an honorary fellow. Speaking of the proposed treaty of alliance between France and Britain, Professor Bazy said that it was already signed in the hearts of all Frenchmen. Sir CECIL WAKELEY proposed The Hunterian Orator, and in an eloquent reply Sir JAMES WALTON pleaded for a return of kindliness, courtesy, honesty, and charity—between men and between nations.

Those present included the SOVIET AMBASSADOR, the Earl of ATHLONE, Viscount ADDISON, K.G., F.R.C.S., and Mr. ANEURIN BEVAN.

GENERAL MEDICAL COUNCIL

SESSION FOR PENAL CASES, FEB. 25

AT an extra session, held on Feb. 25, Mr. John James Robertson, M.P., introduced by Dr. R. W. Craig, joined the council as a Crown nominee for five years. Three penal cases were considered.

Alexander Lawrie, registered as of 113, Manchester Road, Accrington, Lancs, M.B. Edin. (1932), had been twice convicted in 1944 of being drunk in charge of a motor-car; in February, 1945, the council had postponed judgment for two years. Being satisfied with his conduct in the interval, it now decided not to erase his name.

Christopher Whitehead, registered as of 62, Hockley Hill, Birmingham, L.R.C.P.I. (1926), had been convicted of drunkenness in charge of a motor-car in May, 1944. In February, 1945, judgment was postponed for two years. In April, 1946, he was convicted again of being drunk in an omnibus. He was summoned to appear before the council in November of that year, but was prevented by illness from attending. He now appeared accompanied by Mr. G. E. Evans, of counsel, instructed by Messrs. Donald, Darlington, and Nice. The President (Sir Herbert Eason) reminded him that he had been warned at his last appearance that if he should be convicted again during his period of probation the council might forthwith direct the erasure of his name.

Mr. Evans said that the respondent's conduct had been unblemished before the convictions. He deeply regretted his recent lapse. To relieve an attack of giddiness he had taken three double whiskies at 11 A.M. After his conviction he had entered a hospital and had been discharged on June 1, having responded well to physical and psychological treatment. The medical superintendent reported that his blood-sugar balance was unstable and that he was accordingly highly sensitive to alcohol when fasting. Now that he understood the cause of his trouble he promised to abstain in future. He had arranged to purchase a practice, and to see the vendor on the next day. He produced several testimonials to his professional excellence.

Dr. Whitehead gave evidence on his own behalf and said that he had been practically a total abstainer since his conviction, and had not been on duty at the time he had been drunk. The council postponed judgment again until February, 1949.

Donald Gordon Coutts, registered as of 23, Jordangate, Macclesfield, Cheshire, L.R.C.P.E. (1923), had been sentenced to three years' penal servitude in September, 1946, for the theft of a pound note from a hotel bedroom and of a number of toilet articles the property of a hotel landlord; he had pleaded guilty and admitted 28 other offences. He had previously been cashiered from the Army for cashing several worthless cheques in India and for remaining absent without leave for a month. He did not appear in answer to his notice, but wrote to the council saying that he was in prison and could not afford the expense of the journey. Mr. F. P. Winterbotham said that the Lord Chief Justice, in dismissing his appeal against sentence, had said that he had been a satisfactory doctor but this had given him the less reason for plunging into crime; he had preyed on hotel-keepers for seven or eight months, and it was useless to say that his nerves were wrong. Mr. Winterbotham read a statement from Dr. Coutts, and other evidence, tending to show that he had been treated over several years for severe psychoneurosis. The council found the charges proved and ordered the erasure of his name.

The council considered in private its draft recommendations for the medical curriculum, and the report of a committee which held conferences with the medical defence societies and the British Medical Association on penal procedure under the council's draft Medical Bill.

"... the main differences between the good doctor and the bad are history-taking and planning. Both need time. The good doctor takes a careful history, which is the most important part of his examination. He does not leave the case until he has a plan of action. He may not have made a diagnosis, but he has made a decision. The bad doctor has made neither. Without a decision, reassurance and explanation are impossible."—Prof. ROBERT PLATT, addressing the north-western branch of the Society of Medical Officers of Health (*Publ. Hlth, Lond.*, February, 1947, p. 99).

In England Now

A Running Commentary by Peripatetic Correspondents

A LIGHT flurry of new snowflakes has filled the animals' footmarks, which are now picked out in white on the grey sheet covering our fields. Why snow should go grey down here in the country was a mystery to me till I realised that all this dirt is just a ten days' deposit from the cloud of smoke that always hangs over England.

Much preferring the traditional coal fire to anything that comes out of a wire or a pipe, I've always looked askance at the activities of the National Smoke Abatement Society; but I was shaken last autumn by their Sir George Elliston's remark that 10,000 of our miners spend all their days in producing the smoke that interrupts our sunshine. Almost more disturbing was Mr. E. Minshall in the *Manchester Guardian* of Feb. 17, who showed that burning raw coal is about as wasteful as buying milk and pouring away the cream. It seems that 1,000,000 tons of this stuff, treated scientifically, will yield 390,000,000 cubic yards of coal-gas (which I calculate would grill 97,500,000 underdone fillet steaks), 420,000 gallons of motor fuel, 250 tons of phenol, 1000 tons of cresol, 4000 tons of naphthaline (which would at last drive the carrot-fly right out of our garden), 22,000 tons of pitch, 800,000 gallons of Diesel oil, and 640,000 tons of coke (of which 2 cwt. was, thank goodness, delivered to us last week).

> "When it is considered," said Mr. Minshall, "what proportion of coal mined is burnt without any regard to the collection of these raw materials it is at once realised that the people are sacrificing untold wealth in order that they may enjoy the doubtful privilege of a very inefficient mode of heating and that industry should enjoy the obnoxious privilege of dispatching into the atmosphere each year many thousands of tons of soot, tar, acid vapours (sulphur dioxide and hydrochloric acid), and other substances injurious to public health."

Regardless of the public health I shall continue to defend the burning of coal in the domestic grate—as a deliberate luxury. But hasn't the time come when stokers at our power-stations and throughout industry might be denied this atavistic pleasure?

Excuse me while I cut up some wood.

* * *

One vivid memory of my schooldays is the joyous abandon with which we at Dulwich welcomed a real good epidemic of German measles in 1895 or thereabouts. I can still recall our delight at feeling the enlarged glands under our ears, and the hectic holiday in the "san." with twenty other high-spirited young devils—three weeks with no more hardship than a dose of purgative; if you were lucky only the gentle and refreshing Eno's. So it comes as a shock to find there is a viper in the bunch of bananas.

* * *

Dressed warmly in our ordinary clothes, despite the presence of a Royal Duke, we were all very comfortable at the Hunterian dinner. Surgeons, said the President, are naturally on familiar ground when it comes to making drastic cuts, maintaining gas pressure, avoiding inflation, and keeping open arterial channels and channels of evacuation. Even Mr. Attlee, displaying the detachment expected of our Prime Ministers at moments of peril, seemed less anxious about the industrial crisis than about the possibility that his hosts, if annoyed by the Health Act, might put him in their famous museum. It remained for the Hunterian Orator, replying to what its proposer called the real toast of the evening, to touch at the last moment on the fundamentals of our national situation. It had always seemed to him, he said, that the best means of attaining happiness is to be occupied with work: "Has anyone ever known a really busy man who was unhappy?" People should not, as now, be laying themselves out to obtain more leisure, but should be seeking absorbing occupation, both for their working years and afterwards.

But Sir James Walton would have to admit that, since the Industrial Revolution, the face worn by Honest Labour has often been deplorably dull; and most people can't begin their "absorbing occupation" till they've secured their leisure. Moreover it isn't always dogs or football: nobody should under-estimate the proportion of its free time which the British public devotes to mildly productive activities such as the upkeep of homes, gardens, and allotments. I have a friend who (it is true) wastes his own weekend in bicycling and thinking: but one of his thoughts is that, if we had another campaign for more home-grown food, any loss to the nation through working a 40-hour week could be largely offset by the value of the vegetables grown in busy hours of idleness at home. Sir James (and anyone fond of vegetables) would like that.

* * *

Shivering in the consulting-room for two hours morning and afternoon may be a change from home, where the water main has frozen again, but the prospect doesn't attract other people, and the consequent dearth of patients would be a source of grave anxiety if one's colleagues weren't in the same boat (or on the same ice-floe). "No-one to see me this afternoon," says the E.N.T. man. "Ditto," says the ophthalmologist, while the gynæcologist complains that his patients, having braved the rigours of the Arctic to get to him, resolutely refuse to prepare themselves for his examination, so the visit degenerates into a social call, or an abortive attempt to break the ice.

Meanwhile one listens to the weather reports over the restricted broadcasting service, in the vain hope of a gleam breaking through; one goes home early to fill the coal bucket from the pathetic little dump in the garden, de-snowing it as best one may; one sends for chilblain ointment (samples), sweeps the snow from the garage approach, fails to buy an ounce of paraffin or anti-freeze, swaps burst-pipe yarns (the modern equivalent of blitz stories) with neighbours, wonders what the next Spens committee will produce, sympathises with the builder's labourer who says if he had money he'd follow the sun, and decides tomorrow to stay a little longer at the hospital to cadge a hot bath in the residents' college. Finally, when one's digital circulation has packed up and one is frozen almost into aphasia, one wonders whether that whole-time salaried job would not have cut a little more ice after all.

* * *

Notorious money-grubbers, we G.P.S. The other day I went 12 miles, got my car stuck, and walked across three ice-covered fields in an east wind to see an octogenarian (N.H.I.) patient whose sole complaint was that he felt cold.

* * *

Leaning back in the comfort of what was once a first-class carriage on our suburban line I opened my *Lancet* of Feb. 8, and idly turning to page 231 seemed to read as follows:

> "Learning physiology as a second-year medical student has its tragic side in our college. I have never understood what pH stands for, and having a brain-wave the other day thought it might be a ferment and asked him who is supposed to teach me whether it was. The poor fellow tumbled against the bench, and burst out into a spate of words that told me nothing. However I led him to think he had made it clear to me, and thanked him. Some days later he introduced another of those combinations of letters in connexion with the blood. This time Rh. . . . He asked me if I understood it and I had to say it came next but one to pH, and was going on to ask why the capital letter had been inserted when . . ."

The train stopped with a jerk at our local terminus and I saved my specs, threw my *Lancet* in my case, and ran up the ramp to miss the bus that is timed just not to meet the train. When I had regained my breath I began to have sympathy for this poor boy. Having a form-visual brain and a sound-hearing mind, I have always had great difficulty in grasping the physiologist's airy somethings without a local habitation. It is not so bad when they have a name—I can at least struggle with a dictionary or a lexicon—but when they are represented by letters that are not even algebraic symbols I am stumped. I believe the Rh factor has something to do with a monkey, though why it should carry a capital "R" while the lion and the lizard keep to a small "l" they do not tell me; but pH is quite meaningless and must remain so till English is no longer English.

Letters to the Editor

THE NATION'S FOOD

SIR,—Mr. Strachey's unsatisfactory answer to Mr. Reid in the House of Commons on Feb. 6 deserves further attention.

> "I believe," said Mr. Reid, "that this nation has now to face greater trials, possibly, than it has ever had to face in its history . . . and unless the diet of this country can be improved, and improved quickly, there is the greatest risk that this country will not pull through the trials which face it in the immediate future. . . . Let us not blink the fact that there is a widespread feeling at the moment that this country has not got the food from outside sources of supply which it ought to have got. . . . We have got to get the materials somehow, and if, by reason of ideological considerations, he [the Minister of Food] refrains from returning to ordinary means of buying and thereby loses food for the people of this country, he and his Government are incurring a very heavy liability indeed, and a very heavy responsibility."

In reply, the Minister said that the country as a whole *was consuming about 7% less food than before the war.* The upper third of the community had found their diet reduced by much more than 7%; the middle third consumed about the same; and the poorest third was consuming far more than before the war.

It is true that there was some improvement in the *national dietary* during the war: the free issue of meals and milk in the schools has done much to benefit the children's health, and everyone is full of praise for the way in which the food situation was handled in the war years. But can the Minister possibly be right in thinking that the middle third consumes about the same, and the poorest third far more, than before the war? This would mean that the reduction in consumption by the upper third was sufficient not only to offset the increase in consumption of the poorest third but also to reduce the country's total consumption by 7%. Either the Minister is wrong in his analysis, or the "upper classes" must have been engaged before the war in almost continuous assimilation.

As members of the medical profession we are favourably placed for hearing the comments of our patients. Is not the story always the same—workmen complaining that they can't do a morning's work on a breakfast of tea, bread, and margarine; housewives at their wits' (and points') end, and going without themselves, in order to find solid food or even sandwich filling for the men-folk; and school-children raiding the larder and devouring the "mousetrap" ration as a snack? The women's wish is always the same—for meat, bacon, butter, palatable cheese, and eggs. Workers on the land, in the factories, mines, and shipyards all tell of the same dearth.

The Government in defence invariably pin their faith to calories. Would that this unfortunate thermic unit had never been invented, for it takes no account of the hosts of other factors, only some of which are understood, which go towards the satisfying and appetising dietary which is necessary for full physical and mental health.

Our national salvation depends on increased production, which so *far is not forthcoming.* If, as Mr. Strachey implies, the workmen are now better fed than before the war, then the outlook for industrial recovery is poor; if, however, as some of us feel, the men and their wives are hampered by food-rationing, now more severe and irksome than in the darkest days of the war, then everything is to be gained by improving the food situation. This is not as impossible as the Government suppose, especially if they heed Mr. Reid's suggestions. The importation of food and feeding-stuffs could be considerably increased at the expense of tobacco, films, and cosmetics. Dutch cheese could be imported more to our advantage than Dutch bulbs.

The American loan was largely approved by the Americans, despite mistrust of our post-war Government's policy, because it was felt that our people were in need of food and machinery; but what can the Americans think of a country whose Government do not avail themselves of the opportunity? Admittedly dollar resources must be carefully nursed, and imports must in part be chosen in relation to exports. Nor are we the only, or by any means the most, ill-nourished nation; but, excepting Germany, we have been engaged longer than any.

The British workman is still a proud craftsman, and if he is properly fed, and can see his wife, children, and parents properly fed, he will not fail to work all out. If well nourished we could again lead and point the way to European recovery; but at present our people have little to work for.

The time has come when the leaders of the profession should, in the nation's interest, review the food situation and assess the present state of our subnutrition, so offering speedy advice to our harassed and maybe well-meaning but insufficiently experienced Government.

Malvern. ROBINA McMENEMEY.

TREATMENT OF TUBERCULOSIS

SIR,—*It is regrettable that a report by Dr. Corrigan and myself* (Dec. 14) on a small group of patients with pulmonary tuberculosis who were benefited by minimal doses of amphetamine should have evoked from at least one correspondent a denunciation of modern methods of treatment. One cannot attempt seriously to reason with Dr. Brailsford when he suggests (Dec. 28) that the lethal condition of phthisis should remain undiagnosed and untreated because he sometimes sees healed lesions in X-ray films. On the other hand, we do not dispute Dr. Simmonds's contention (Jan. 11) that many patients have a very proper faith in surgical treatment, although some are not as phlegmatic as others. Dr. Clive's axe has, we think, been slightly twisted in his hand. We believe that he did not intend his blow to be struck against the use of collapse therapy, but in defence of the fundamental principles of sanatorium treatment (Jan. 25). Surely both are indispensable; but it has become apparent that the active and passive phases of treatment cannot be happily synchronised.

We thought we had made it clear in our article that we used amphetamine only in exceptional circumstances, in order to alleviate undue mental distress. We suggested, moreover, that the drug might have a value not only in the treatment of difficult cases of phthisis but also in general surgery. *It is interesting to recall that a good* deal of disapproval was expressed when anæsthetics were introduced for the alleviation of the physical pain of surgical operations.

Harefield County Hospital, Middlesex. L. E. HOUGHTON.

GERMANY

SIR,—As one who has been in contact with German medicine for about a year, I fully endorse the pleas of Flight-Lieutenant Saunders and Flying Officer Levy (Feb. 8). The inadequacy of medical supplies is serious: paper bandages are still being used even in the larger and better-equipped hospitals.

Penicillin became generally available for the first time in Schleswig-Holstein (and, I believe, the British zone) last October, when, through the agency of the British Red Cross and COBSRA, penicillin banks were established. One such bank was at the Save the Children Fund Hospital, Lübeck. Unfortunately the limited supply *soon ran low.* We have been reluctantly forced to confine the use of the remainder to children until such time as supplies are replenished. So far the situation remains unrelieved.

The employment of penicillin was heartening, and the appreciation of patient and doctor quite inestimable. A group of relief workers in Brunswick, whose salaries are but nominal, sent a relatively considerable sum to London for the purchase of further supplies. It was disheartening and acutely embarrassing to refuse treatment with the excuse that no penicillin was available, while supplies were lying idle, in Military Government stores, waiting for venereal cases.

I would make two suggestions: (1) that the Control Commission should be urged to change the ruling that penicillin be used for *cases of V.D. only*; and (2) that, in view of the low price of penicillin, immediate financial support be given to such organisations as the British Red Cross and the Save the Children Fund for the purchase of penicillin. In these ways we should be counteracting the present deterioration in British prestige and implementing the principles about which the Germans have heard so much.

Save the Children Fund Hospital, Lübeck. DAVID MORRIS.

SIR,—I entirely support the appeal of the two R.A.F. medical officers for penicillin for the Germans. It is utterly humiliating to watch a man die for lack of it, as I have done, while knowing that it is being used for face-cream at home and in America. Helpful though the contribution of the Ecumenical Refugee Commission will be it can only touch the fringe of the problem. The solution is:

(1) To allocate penicillin from British and American production for urgent German needs (which can easily be assessed, if this has not already been done) *before* allowing it to be used at home for trivial complaints. (2) To produce penicillin in Germany.

Nearly two years after the end of the war the huge majority of hospitals in the British zone of Germany have received no penicillin and German doctors have not been trained in its use. I am told that factories in Göttingen and Berlin have been, or will be, started—though I wonder whether two factories will be enough. The resources necessary, unlike those required for other industrial activities, are trifling; the results would be, as they have been in England, tremendous.

This is a matter of public morality, in which we are, therefore, all involved. It is the duty of the profession to insist on the necessary action.

B.A.O.R. DAVID PYKE.

⁂ A statement on penicillin by the Minister in charge of the British zone is reported on p. 309.—ED. L.

THYROID AND COLD SENSITIVITY

SIR,—I have observed—it is but a rough clinical impression—that patients taking thyroid gland for a variety of conditions, both rationally and empirically, have not noticed the extreme cold of recent weeks to the same extent as the majority. This is certainly true of patients suffering from thyrotoxicosis, and of course is as well recognised as is the hypersensitivity to cold of hypothyroid patients.

The thyroid gland of rabbits undergoes hyperplasia within half an hour of exposure to cold; and normal mice given thyroid gland stand exposure to cold without loss of temperature to the degree shown by control mice.[1] This is apparently due not only to the raising of metabolism but to induced greater activity. Whether or not this has any large-scale applicability to normally healthy man is debatable, and raises the question of the significance of reported ill effects of large doses over long periods. Nevertheless, it might be worth investigating the effect of controlled moderate dosage over short periods in groups of healthy volunteers. Certainly, inadequately compensated exposure to cold appears to lower resistance to respiratory infection, apart from its more obvious irksomeness. On the other hand, if we raise metabolism and appetite without being able to provide enough food our final state may be worse than the first.

London, W.1. S. L. SIMPSON.

WHAT CONSTITUTES LIVE BIRTH ?

SIR,—May I be permitted to comment on the article under this title in your issue of Jan. 18, in so far as it affects the provisions of the Births and Deaths Registration Acts?

These Acts prescribe that the birth of every child born alive shall be registered; and in the absence of a legal definition of live birth no arbitrary dividing line has been drawn in relation to duration of pregnancy as has been done in the case of stillbirths.

Accordingly successive Registrars-General have taken the view that it is a statutory requirement resting upon birth informants to register as live-born any child which after being completely expelled from its mother breathed or showed any other signs of life, regardless of the period of pregnancy. The question of viability or non-viability does not affect the requirements of registration. On this interpretation the only births which are not registrable either as a live birth or a stillbirth are the births of children which issue forth from the mother before the completion of 28 weeks of pregnancy, but which in other respects fall within the statutory definition of "stillbirths."

General Register Office, Somerset House,
London, W.C.2. J. M. ROSS.

HEALTH CENTRES OF TOMORROW

SIR,—May I offer my whole-hearted congratulations on the series of articles on Health Centres of Tomorrow, concluded in your issue of Feb. 8? You have given us a complete review of the whole problem and have succeeded in resolving many of the points of controversy that at present divide us.

One of your most important proposals is that there should be two main varieties of health centre: (1) an ideal type, to be put up on a limited scale in relation to a teaching school or some research organisation; and (2) a more utilitarian variety which could be universally applied to the whole country without undue delay. Clearly, the first type would be experimental and would give a valuable guide for the future, while the second type, though based upon the plans for the first, would only contain those elements which were immediately practicable.

Within the scope of this definition, the problem of X-ray apparatus at the health centre is immediately soluble. The ideal health centre would naturally have an X-ray plant; its more utilitarian brother could only hope to have one when we have produced "standardised and simplified apparatus which will not be costly." Meanwhile arrangements should be made for practitioners to have their patients X-rayed at a central department from which films would be forwarded.

Dr. Hoffstaedt's suggestion (Jan. 18) that miniature mass-radiography units should be available for X-raying general practitioners' cases deserves further consideration. Many of us who are interested in the problem of pulmonary tuberculosis have been wondering for some time whether it might not be possible to put this apparatus to a better use. Dr. Hoffstaedt's brilliant solution could go a long way towards solving the immediate problem of chest radiology for patients under the care of a general practitioner.

The question of having a clinical laboratory has also proved to be controversial. I cannot agree with Dr. Stark Murray (Jan. 18) when he opposes such an arrangement. The methods of routine clinical observation have gone beyond the stages of palpation and auscultation to include blood-counts, full urine examinations, and radiography of the chest. Any qualified doctor can do the blood and urine examinations himself, so why not let a group of ten doctors share a small laboratory with a centrifuge? We should not let lack of technicians prevent us from having a clinical laboratory in *every* health centre. It will not be of much value to bring doctors together in a health centre if the old isolated methods of work are to persist. The opportunity for sharing facilities inaccessible to the individual but feasible for the group is the main justification for health centres at the present time.

I believe that your articles may well become the point of departure for plans under the National Health Service Act, and I hope they will be carefully studied. Would it be possible to reprint the series, and the leader of Jan. 4, as a small booklet, and to send a copy to every general practitioner?

Grove Park Hospital, London, S.E.12. P. W. ROE.

SIR,—The ideal which inspired your excellent articles on the health centre is to secure the best possible service for every patient; and I reply to the letter of Dr. H. B. Porteous (Feb. 1) only because that ideal cannot be reached unless every detail is fully discussed. The difference between us is, however, entirely one of words. My use of the words "central laboratory" appears to have given him the idea of a great institution serving a very large unit of population, and of practitioners waiting days for a result. I agree that such a service would be entirely wrong. What I want to see is a central laboratory that provides every general practitioner within the normal health-centre unit with the most rapid and complete service that can be given.

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[1] Tanner, M. L. *Endocrinology*, 1946, 38, 263.

May I give an example from my own laboratory? Contrary to the ideas of most people, I spend a large proportion of my time in consultation with general practitioners either in the laboratory or in the homes of their patients. A few days ago—and this is the everyday routine of this laboratory—I was asked to see a patient whom the general practitioner thought might be suffering from agranulocytosis. The patient lived eight miles from the laboratory, which is the extreme limit of the radius we cover; nevertheless he was visited, swabs of the throat were taken, blood-counts were made, and the general practitioner was discussing the result and the best method of treatment in less than three hours.

Dr. Porteous repeats the assertion to which I took exception in your original article—namely, that "if five doctors were working as a group and using regularly the ordinary routine laboratory tests they could fully employ one technician." What I asked for, and have been seeking for years but have never been able to find, are actual figures to substantiate this assertion. Until they are produced I shall still believe that the best clinical pathological service is one in which *the pathologists are mobile*; the laboratory should serve a unit of *population not exceeding 100,000, and should be capable* of carrying out the whole of clinical bacteriology, hæmatology, and other associated sciences, at the request of *the family doctor and in the closest contact with him* and his patients.

Richmond, Surrey. D. STARK MURRAY.

DOSAGE OF NEPENTHE

SIR,—In your recent report (Jan. 25) of a death following an excessive dose of this drug you say that "nepenthe is a proprietary preparation of opium, containing about gr. 1 in 130 minims." Surely this should read: "Nepenthe is a proprietary preparation of opium, containing about gr. 1 of anhydrous morphine in 130 minims."

London, S.W.1 GEORGE E. SPEAR.

*** We are glad to have this error corrected. 'Nepenthe' *contains 0·84 % of anhydrous morphine.*—ED. L.

WOMEN DOCTORS AND SERVICE SPECIALIST APPOINTMENTS

SIR,—The Medical Women's Federation has been informed of the extreme difficulty which is being experienced in finding replacements from civilian life for the specialists (men and women) in the Services whose release is behind all other medical personnel—in the Army, for instance, it is 12 groups behind.

There is at present no conscription of women. As many women doctors know, in June, 1945, the Ministry of Labour, by a Cabinet decision, abandoned the call-up of women, and the doctors were included in the general ruling. The Medical Women's Federation wrote a letter at the time to the Ministry of Labour, which was afterwards reported in the medical press, pointing out that this exemption was contrary to the wish of medical women; it deplored the position and said that in professional matters women doctors wished to be treated as doctors, and not to have special privileges as women. Similar representations were made by the Services themselves and by the Central Medical War Committee. The Ministry of Labour, however, was not willing to rescind the order as applying to women doctors, but pointed out that they were at liberty to volunteer.

It must be admitted that recently the Service intake of volunteer women doctors has been very small. This has had the unfortunate consequence of delaying the release of serving specialists, both men and women, and of necessitating the call-up of an unfair proportion of men doctors, many approaching forty, on whom it may inflict serious hardship.

Young women of the graded or full specialist class must realise, furthermore, that their immunity from conscription is certainly not entirely to their advantage. B1 posts and higher hospital appointments are being reserved to a great extent for returning Service doctors or for those who are "recruitable," in order that, in the latter case, there shall be some specialists trained, in due course, to replace those who are now going into the Services.

The Medical Women's Federation wishes to draw the attention of all young women specialists to this urgent need, recognising however that this is only a short-term measure. Long-term policy involves the consideration of the conscription of women doctors equally with men, but this is bound up with the rectification of certain anomalies in the status of medical women serving with the Army and R.A.F. In spite of this, however, the federation urges eligible women specialists to offer their services *now*, chiefly for the sake of those who are being retained unwillingly or called up; and perhaps also for their own sakes, as on leaving the Services they will be in a strong position in applying for further appointments.

MARY F. LUCAS KEENE

Hayes, Kent. *President, Medical Women's Federation.*

NIGHT WORK

SIR,—I wonder whether the advisers of the Government have considered the consequences carefully before recommending night work for millions of people, including a great number of women.

As one who supervised several thousand women during the war years I know that they did magnificent work when their social problems were understood. The single young women were keen on doing night work with its close companionship and the chance of being out in the daytime. They needed little sleep at their age, and food was provided for them. In most cases they also had a certain amount of service because they lived at their parents' homes, or in hostels or lodgings. Incidentally, hospital nurses on night duty fall into this group, and show a very low rate of sick absenteeism; they are also the women on night work who have been observed for the longest period.

The young childless married woman, without a home of her own, and with her husband in the Forces, was in very much the same position except when her husband came on leave. The position of the married woman with obligations was, however, entirely different. Even the childless married woman, whose husband was away had more worries if she had a home of her own and was proud of it. Experience showed that women with young children worked most satisfactorily when they were employed on part-time work only, preferably between 10 A.M. and 5 P.M., provided they had Saturday off to do the week's shopping and the main cleaning.

These problems have increased since the return of the men from the Services. Care of the home and family life are of paramount importance, particularly as both men and women have often had to make a great effort to readjust themselves. Happily, this process of resettlement has usually proved successful, but it must not be endangered again. Physical and mental exhaustion and renewed disturbance of their hard-won married and family life will constitute a real danger. Unless the lessons of the war-years are remembered, and married women are exempt from night work and are given sufficient time off to run their homes, the result may be an increase of absences through sickness and a net loss of woman-power.

MEDICUS.

SUPRASPINATUS SYNDROME

SIR,—I read with interest Mr. Armstrong's article (Jan. 18), and I was pleased to note that Mr. Mayer (Feb. 1) advocates deep X-ray therapy as an alternative to surgery.

I cannot entirely agree with Mr. Armstrong's view that surgery alone will cure a third of the cases which do not cure themselves. Mr. Armstrong has dismissed physiotherapy for the supraspinatus lesion with a wave of the hand, as being useless. Whilst agreeing that radiant heat is a waste of time, long-wave diathermy, with one pad applied over the supraspinatus muscle belly and the other over the acromial bursa, will produce great relief from pain. However, a treatment with even more dramatic effects is the production of three Kromayer burns in the line of the tendon, repeated after some weeks if the first application has not cured. This treatment has cured most of my cases of supraspinatus tendinitis. In my experience, operation on the tendon sheath, with scraping or excising of the calcified area, produces intractable stiffness. With arthritis of the acromioclavicular joint, which I never can cure by any physiotherapy, excision of an inch of the acromion appears a very suitable procedure.

London, W.1. G. O. TIPPETT.

ACUTE PORPHYRIA

SIR,—In connexion with the observations of Dr. Gray and Professor Rimington (Feb. 1) we would remark that the paper by Watson and Schwartz came into our hands only after we had read the proof of our article. We knew then that certain of our views must be considered wrong. We thought it unnecessary, nevertheless, to send a correction, since the main purpose of the article was to draw the attention to the disease and its connexion with the barbiturates.

We still feel that the benzaldehyde test performed on the urine after extraction with ether is a simple and adequate test for porphobilinogen. If this test is negative after the urine has been made alkaline by giving the patient sodium bicarbonate the diagnosis of acute porphyria is wrong. This method of excluding the diagnosis is simple and can be carried out under primitive conditions.

We may further add that we have recently observed a third case of acute porphyria in which the excretion of porphobilinogen in the urine was provoked by the ingestion of barbiturates.

JORGEN JORGENSEN
Copenhagen. TORBEN K. WITH.

ADRENAL APOPLEXY

SIR,—I was interested in the report by Dr. MacMillan (Feb. 1). But his suggestions as to ætiology raise considerable difficulties.

If the hæmorrhage came from a vessel weakened by hyalinisation, it seems an extraordinary coincidence that the bursting-point was reached at the same time in both adrenals. Severe hyalinisation of adrenal arterioles is a fairly common post-mortem finding in deaths from hypertension, whereas adrenal hæmorrhage must be very rare as a termination of this disease. It seems that the hypertension can have played, if any, only a very small part; and some more important factor must surely have been present. It is hard to guess what that factor may have been; but, despite the initial absence of pyrexia, do the clinical and pathological findings totally eliminate an undiagnosed fulminating septicæmia (perhaps meningococcal)? A blood-culture and examination of the cerebrospinal fluid might have been instructive.

Pathological Department, King's College Hospital, London. G. F. M. HALL.

LESSER CIRCULATION OF THE KIDNEY

SIR,—We feel that some comments are necessary on the communication by Trueta and his co-workers which appeared in your issue of August 17 and on the leading article which appeared in the same issue. The techniques of these workers leave no doubt as to the existence of an anastomotic vessel, probably the Isaacs-Ludwig arteriole, which enables the cortical circulation to be short-circuited. We must say that we are far from happy about the experiments in which dye was used as an indicator of the patency of vessels, and we feel that the results would have carried more weight had some of the precise clearance techniques, advanced by Prof. Homer Smith, been used. This point is of particular significance in view of the remark appearing in the communication "the interpretation of renal function tests must be reconsidered." So long as urine is being formed by the kidney, filtration must be occurring at the glomerulus; and its extent is of importance, for unless this is known diuresis may equally well be explained by exclusion of the tubular circulation.

The theory of Cushny, published in 1917, made it apparent that the factor deciding the extent of filtration at the glomerulus was the blood-pressure and not, as Heidenhain had postulated in 1874, the blood-flow. If the blood-flow through the glomerulus is completely cut off then obviously filtration will cease: but it is impossible to draw any further conclusions from this limiting case, since the maintenance of a normal glomerular filtration rate may be associated with a profound reduction of renal plasma flow and urine volume.[1] While it may be valid to draw conclusions as to the extent of the glomerular filtration from urine flow in the rabbit, the animal presumably used in these experiments, such a correlation has never been demonstrated in other mammals, including man.

In the absence of exact information as to the extent of glomerular filtration and renal blood-flow there appears to be no evidence for the remark in your leader—"during active diuresis, the cortical circulation is fully open, while in anuria the medullary circulation is in action and the cortical circulation is thus bypassed"—if intended to apply to any animal other than the rabbit. From quantitative data,[1] however, it is clear that changes in the cortical circulation are of relatively minor importance in the determination of urine volume in man.

J. A. BARCLAY
W. T. COOKE
Birmingham. R. A. KENNEY.

PENICILLIN IN LUNG ABSCESS

SIR,—We were glad to see your annotation of Jan. 11; but, in saying that in pulmonary suppuration "the effects of . . . penicillin were uncertain, possibly because of inadequate trial," it misses what we consider the most important point of our paper.[1] It is our opinion that penicillin is a life-saving drug in acute putrid lung abscess, and re-reading of this paper will, we hope, dispel any doubt. Since it was published last July, we have had many more cases of this disease cured completely and saved from unnecessary and difficult surgery by the simultaneous administration of penicillin and sulphadiazine. The cures have now reached over 90%.

B. P. STIVELMAN
New York. J. KAVEE.

Public Health

Setting the Ball Rolling

ON the passing of the National Health Service Act county and county-borough councils became "local health authorities." Till the appointed day they will have no executive functions, but they will have much to do in preparing for their new rôle. They should begin, the Minister of Health suggests, by setting up a health committee, which should in turn appoint subcommittees to plan the various services. In his circular (22/47) the Minister gives the following as the latest dates for receiving their proposals: June 30, vaccination and immunisation, and ambulance services; August 31, midwifery, health visiting, home nursing, prevention of illness, care and aftercare, domestic help, and duties under Lunacy and Mental Treatment Acts and Mental Deficiency Acts: Sept. 30, care of mothers and young children: Nov. 30, health centres.

The Minister urges that the committee and subcommittees should include an adequate proportion of women, and that coördination with related services should be secured by appointing members from, for example, the education committee and the existing maternity and child-welfare committee. Under the Act an authority is free to go outside its own membership in making appointments to the committee, and this power will allow it to obtain the collaboration of doctors and other experts, and of representatives of such bodies as the local hospital management committee.

The Minister does not intend to initiate action to form joint boards, though where authorities themselves wish to combine he will be prepared to consider making an order accordingly. The advantages of arrangements made jointly—as distinct from joint boards—are, he adds, obvious.

The immediate aim of the authorities should be to provide as efficient and comprehensive a service as possible on April 1, 1948. But it would be neither possible nor desirable for their first proposals to be too cut and dried. Before health centres, for example, can be set up much detailed consultation with the medical, dental, and other professions will be needed. The proposals to be submitted by Nov. 30 could, the Minister suggests, suitably deal with such topics as the reservation of sites, especially on housing estates.

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[1] Barclay, J. A., Cooke, W. T., Kenney, R. A., Nutt, M. E. *Amer. J. Physiol.* (in the press).

[1] Stivelman, B. P., Kavee, J. *Ann. intern. Med.* 1946, 25, 66.

Infectious Disease in England and Wales

THREE WEEKS ENDED FEB. 8, 15, AND 22

Notifications

	Week ended Feb. 8	Week ended Feb. 15	Week ended Feb. 22
Smallpox	—	—	2
Relapsing fever	—	—	1
Scarlet fever	1130	1051	1081
Whooping-cough	1842	1964	2227
Diphtheria	233	211	217
Paratyphoid	3	1	—
Typhoid	7	5	3
Measles (excluding rubella)	17,258	16,719	15,765
Pneumonia (primary or influenzal)	1583	1404	1139
Cerebrospinal fever	94	78	90
Poliomyelitis	10	8	14
Polioencephalitis	1	—	1
Encephalitis lethargica	1	5	3
Dysentery	49	41	92
Puerperal pyrexia	115	100	142
Ophthalmia neonatorum	59	59	59

No case of cholera, plague, or typhus was notified.

In the 2 cases of smallpox at Grimsby illness began on Feb. 13–14; both patients, who have since died, were unvaccinated. There were 10 further cases up to March 4, with 2 more deaths. Infection, the source of which is unknown, occurred in a lodging-house used by seamen and farm labourers. Of the contacts there 10 cannot be identified, having moved on either by land or sea—most probably on trawlers or coastal vessels.

The case of relapsing fever was notified at Haltemprice, East Yorks.

Deaths in 126 great towns

Enteric fever	—	1 (0)	—
Measles	20 (1)	15 (2)	13 (0)
Scarlet fever	1 (0)	1 (0)	1 (0)
Whooping-cough	16 (4)	14 (1)	9 (2)
Diphtheria	4 (1)	3 (0)	2 (1)
Influenza	211 (30)	163 (19)	135 (21)
Diarrhœa and enteritis under 2 years	106 (13)	80 (4)	69 (5)

The figures in parentheses are those for London itself.

Stillbirths

Total no. notified	308	288	260
No. notified in London	38	41	33
Rate per thousand total births	31	27	25

Parliament

ON THE FLOOR OF THE HOUSE

PARLIAMENT last week grew heated over fuel, heard Mr. Ernest Bevin's reasons for referring the Palestine question to the United Nations, and discussed foreign affairs in the light of the forthcoming conference in Moscow. On the whole, the international prospect lightens. The Anglo-French treaty, now being signed, has an importance not yet fully appreciated. We approach the time when the peace treaties—all of them—will be made, and when nations can disagree about details without feeling that the fabric of international understanding is in jeopardy. The difficulties in Germany are very great indeed; but we are seeing such difficulties more vividly and more clearly now because there begins to be a light in the sky, which more and more of us believe will break into the full sunlight of agreement between the nations. If the United Nations can give the world peace and stability at the centre of its affairs, this peace and stability will be reflected in the individual countries.

British policy must be framed so as to allow for two alternatives: (1) that the United Nations comes into being strong, supported by a great majority of all peoples and armed with an international police force central organisation will be less strong, leaving each capable of making its authority respected; or (2) that the nation to depend on its own navy, army, and air force. Like the U.S.A., the U.S.S.R., and every other country, we are having to budget politically for both of these alternatives. But the world is tired of navies, armies, and air forces, and it is very improbable that it can continue to employ so much scientific research power, so much organising power, and so much plain honest-to-goodness man-power for military purposes, and yet remain solvent and reasonably comfortable—let alone guarantee to all men freedom and the pursuit of happiness.

As part of this lesser policy of self-defence there will soon be coming before the House a National Service Bill which will define the conditions of service in the Armed Forces which will be laid on all of us in Britain at an early date. This will certainly impose a strain on the medical profession, which by then will be carrying the responsibilities of the National Health Service. How far medical service in the Armed Forces and medical service in the N.H.S. can run together still remains to be worked out in detail. But if we become involved in a future war the civil and the Service sides of the medical profession will certainly have to be more intimately coördinated than during the recent one, and perhaps their members will be interchangeable This would only be carrying the idea of the E.M.S. organisation of the civil medical profession in the late war a stage further.

The medical group in the House of Commons will very soon be considering its policy on these questions, and a statement of the medical viewpoint will be made in Parliament when the Bill comes up for discussion. Meanwhile the Secretary of State for War has told us that the strength of the Army on Dec. 31, 1946, was 896,757 and that its strength on Dec. 31, 1947, is estimated at 660,000. But, he added, the strength "clearly depends on a number of factors." In other words, is the world going on the road to union in the United Nations or to division in strife between the powers? Each nation has to ask itself, where am I going?

MEDICUS, M.P.

FROM THE PRESS GALLERY

Conditions in Germany

In the House of Commons on Feb. 5 Mr. RICHARD LAW called attention to the appalling gravity of the situation in the British zone in Germany. There 20 to 30 million human beings were rotting to death and we deceived ourselves if we imagined that corruption could go on in Germany and not spread far beyond its confines. If we wanted to save Europe we must call a halt. By our mismanagement and good intentions he believed we were sowing the seeds of a third German war. He had been to the homes of the German people and seen the little children listless and puffy, with no shoes and in a terrible state of health, and from his own experience he knew that the food conditions in Germany had not been exaggerated. Our proper policy now, Mr. Law affirmed, was to abandon all this idea of trying to run the Germans for their good and to revert to the conception of control. We should help the Germans, but leave it to them to organise their industries.

Mr. J. B. HYND, Chancellor of the Duchy of Lancaster, replying for the Government, said that the key criticism of the Government was that they must send more food. They had sent more food and given the Germans more than the 1500 calories ration. This criticism ignored the desperate efforts which the Government had been making for the last eighteen months to get even those quantities of food into Germany. He admitted there had been local breakdowns but overall the ration had been maintained at 80 to 85%, and where it had fallen in one period it had been made up as far as possible later. There was a misunderstanding over the rations. The basic ration for the non-working adults was 1550 calories. But they represented only 30% of the population. The remainder were categorised according to the work they did, and their rations ranged from 2500 to 3000 calories which, in the opinion of the tripartite nutrition committee, was sufficient. In addition, 1,700,000 children in German schools were receiving free meals as well as their ordinary rations. Already the American and British authorities under the fusion agreement had fixed a target of 1800 calories for the normal consumer as a first step. But they recognised that nothing less than 2000 calories could be regarded as approaching a satisfactory condition.

Medical Supplies

On Feb. 6, replying to Mr. A. F. SKEFFINGTON on the question of an increased demand for medical supplies under the National Health Service Act, Mr. C. W. KEY, then parliamentary secretary to the Ministry of Health, said that through the Emergency Hospitals Scheme substantial quantities of medical supplies and apparatus were issued to the hospitals to enlarge the scope of their work. These were additional to the ordinary supplies maintained by the hospitals themselves for their current needs. Arrangements had also been made to acquire surpluses from our own, the Canadian, and the American Forces for the use of our hospitals. The hospitals would not be asked to pay for such supplies, which would remain Government property. In these ways hospital supplies were being gradually built up. Looking forward to the future the Minister had set up expert working parties, with which were associated representatives of the Ministry of Supply and of the Service departments, to assess the requirements of the new health service, beginning with radiological and laboratory apparatus. The working parties would later consider theatre and ward equipment, dental apparatus and ambulances, and the needs of special departments of hospitals, such as ear, nose and throat, and physiotherapy departments. Care would be taken not to go too far in the way of standardisation.

Control of Penicillin

On the motion for the adjournment on Feb. 25, Sir **John Mellor** submitted that Order 731 which made it a criminal offence to supply penicillin except against a medical prescription was no longer necessary. The medical profession did not contend that direct harm could come from the use of penicillin but that the reaction of the body to it tended to diminish with frequent use. But that was true of many drugs and did not mean that their sale was limited by legislation. Even assuming that some control over the distribution of penicillin should be retained, this order was the wrong way of doing it. There was nothing to justify the use of an order made under the Supplies and Services Transitional Powers Act for 1945 to enforce the medical opinion of the Ministry of Health. He agreed that it was wise to hearken to medical opinion. But it was one thing to say medical opinion should be respected and another to enforce it by law. People should be free to follow medical opinion or to disregard it.

Mr. **John Lewis** suggested that penicillin should not be used here indiscriminately while it was needed in other parts of the world. Penicillin tablets of 500 units, which could be bought without a doctor's certificate in any chemist's shop, were an utter waste of penicillin, for the tablets had not the slightest effect. Again, penicillin creams were being used indiscriminately in dermatology, though they were not a panacea. Wing-Commander **Roland Robinson** feared we were using penicillin as a pawn in the export drive. The Ministry of Supply and the Board of Trade were using it to get hard currency, when it might well be employed at home to improve the health of the people. Dr. S. **Jeger** pointed out that whenever a new drug achieved a fair proportion of cures the public got the idea that it was a cure-all and wanted it for all sorts of things for which it was no use. Again, when a doctor issued a prescription he did not just order a supply of a drug; he also gave instructions for the method of application.

Mr. W. **Leonard**, joint parliamentary secretary to the Ministry of Supply, assured the House that there was now no serious risk of supplies of penicillin being insufficient to meet the medical, dental, and veterinary needs in this country, and during January we had been able to export 85,000 mega units. If control had been removed too early there might have been a sudden expansion of demand and we should have been short of penicillin for important medicinal uses. Indeed, in America it had been found necessary to reimpose control. The position in this country was now so improved that it would no longer be necessary to retain control over distribution on supply grounds. But the Minister of Health had been advised by his medical experts, including Sir Alexander Fleming, that there would be considerable danger in the uncontrolled use of penicillin. There was a real danger to patients and to others of rendering strains of some organisms resistant to penicillin. A draft Bill had been prepared to control the sale and supply of penicillin other than by order.

QUESTION TIME

Penicillin Supplies

Mr. **Somerville Hastings** asked the Chancellor of the Duchy of Lancaster whether his attention had been called to the fact that, except for the treatment of venereal disease, no penicillin is available for use in children's hospitals in the British zone of Berlin; and what action he had taken, or proposed to take.—Mr. J. **Hynd** replied: Since Dec. 1 five mega units of penicillin have been made available each month to the British sector of Berlin from official sources, for the treatment in hospitals, including children's hospitals, of serious cases of other than venereal disease. In addition 175 mega units have been allocated from very considerable supplies made available for the same purposes by "Save Europe Now" and the British medical profession. The possibility of producing penicillin under licence in Germany is being examined in consultation with the American authorities.—Mr. **Hastings**: Is the Minister aware that letters have appeared in the press pointing out how great the shortage is in our zone of Berlin ?—Mr. **Hynd**: There has, of course, been a great shortage of penicillin, and it has been difficult for Germany to get into the queue at all. But supplies received since Dec. 1 have met requirements.

Number of Service M.O.s

Mr. E. M. **King** asked the Minister of Defence how many medical officers there are per 1000 men in the Royal Navy, the Army, and the Royal Air Force, respectively; how many non-specialist medical officers hold specialist posts in these Services; and whether the proportions in South-East Asia are similar to those in other commands.—Mr. A. V. **Alexander** replied: The numbers of medical officers per 1000 personnel in each of the three Services are as follows:

	World-wide	*S.E. Asia*
Royal Navy	3·25	4·4
Army	2·75	2·75
Royal Air Force	3·03	3·9

The figures take into consideration members of the women's Services, but not families. The ratio in theatres other than S.E. Asia is dependent on the distribution of personnel and other factors, and varies accordingly. Non-specialist officers are not employed in specialist posts.

Replying to a further question, Mr. J. **Dugdale** stated that the ratio of medical officers to total personnel of the Navy at the close of the war in Europe was approximately 3 per 1000.

Mr. **Philip Noel-Baker** also stated that at the end of the war in Europe there was 1 medical officer in the R.A.F. to every 437 officers and other ranks. On Dec. 31, 1946, the proportion was 1 to 330.

Refugee Doctors

Dr. S. W. **Jeger** asked the Minister of Health whether, in view of the fact that a larger number of doctors than is at present available is necessary to implement his new national medical service next year and in view of the fact that the Central Medical War Committee has passed a resolution on this subject, he was now in a position to state his policy on the admission of refugee doctors with foreign qualifications to practise in this country.—Mr. A. **Bevan** replied: The views of the Central Medical War Committee on this matter were sought by the Home Office, acting in consultation with my department. I understand that the committee are consulting certain other professional bodies before communicating their views to the Home Office and I am not in a position to make any statement until these have been received and considered.

Medical Certificates for Vacuum Flasks

Sir E. **Graham-Little** asked the President of the Board of Trade on what grounds his department refused to supply a vacuum flask to a patient on a doctor's certificate until the doctor furnished a description of the exact nature of the illness; and whether this description, when furnished, was referred to a medical advisory committee.—Sir **Stafford Cripps** replied: Serious difficulties in obtaining components made it necessary to limit the issue of permits under the distribution scheme which is voluntarily run by Thermos (1925) Ltd. Insufficient flasks were available to allow the issue of permits against all medical certificates presented and it was decided that the only way to ensure that at least the most pressing cases were promptly met was to ask doctors to explain why in particular cases flasks were thought to be essential. The arrival of components from abroad has now somewhat eased the position and recently permits have been issued to all applicants furnishing medical certificates. The answer to the latter part of the question is "No."

Mr. L. J. EDWARDS, M.P. for Blackburn, has been appointed parliamentary secretary to the Ministry of Health in succession to Mr. Charles Key. Mr Edwards, who has been parliamentary private secretary to Sir Stafford Cripps, is secretary of the Post Office Engineering Union.

Obituary

THOMAS WILLIAM SHORE

O.B.E., M.D. LOND.

Dr. T. W. Shore, emeritus lecturer on biology at St. Bartholomew's Hospital medical college, who died at Oldham on Feb. 19 at the age of 85, came of a family of scientists, for his father, T. W. Shore, was well known as an archæologist and his brother Lewis Shore, who died in 1944, was a distinguished physiologist. Thomas William Shore was educated at Burnley Grammar School and at Hartley College, Southampton, where his father was principal. In 1879 he entered Barts with an entrance science scholarship, and a year later he took his B.SC., with first-class honours in zoology and botany. A student who fulfilled his promise, he carried off the Brackenbury and Lawrence scholarships, and after qualifying in 1883 he held a house-appointment till in 1884 he was appointed assistant demonstrator and later demonstrator in physiology. In 1886 he became lecturer in comparative anatomy and for some years he held this post along with the lectureship in biology to which he was appointed in 1892. As a teacher he was an outstanding success, for he had the power of making his subject seem very simple and of making unwilling students industrious.

As warden of the residential college (1891–98) and as dean of the hospital (1900–30) his organising ability found scope. With Sir Anthony Bowlby, Sir Wilmot Herringham, and Sir Holburt Waring he was responsible for joining the college ever more closely with London University, till in 1919 university professors of medicine and surgery were appointed and grants made from the University Grants Committee. Shore was also closely associated with the separation of the college from the hospital and gave able assistance in preparing the charter of incorporation which was granted in 1921. During the 1914–18 war he did good work as a member of the Central War Emergency Committee, and he was appointed O.B.E. in 1919. His juniors did not find it easy to get to know him, for he only appeared on official occasions and on the committees, which he managed with consummate skill.

GORDON ORMSBY LAMBERT

M.D. CAMB., F.R.C.P.

Dr. Lambert, consulting physician to the Royal Berkshire Hospital, Reading, died on Jan. 26, at the age of 69.

Educated in British Guiana and at Bedford School, Lambert studied medicine at Cambridge and at Charing Cross Hospital, to which he won a university exhibition. After qualifying in 1901 he held resident posts at Charing Cross Hospital and at the Victoria Hospital for Children, Chelsea, before appointment as resident medical officer at the Gravesend General Hospital. He graduated M.D. in 1906.

In 1913 he went to Reading as medical registrar at the Royal Berkshire Hospital. The next year he was appointed assistant physician, and in the years that followed became successively physician, senior physician, and, on his retirement from the staff in 1942, consulting physician and cardiologist. He was also consulting physician to Henley-on-Thames War Memorial Hospital and cardiologist for the Reading area to the Ministry of Pensions. In 1933 he was elected M.R.C.P. Lond. for published work, and in 1942 he became a fellow. From 1935 onwards he was a governor of Reading School, and for several years was chairman of the health committee of Reading town council.

His numerous publications on diseases of the heart included a monograph, *Cardiovascular Pain as a Biochemical Problem*, published in 1933. In his *Happiness in a Modern World*, which appeared in 1943, he set out his recipe for contentment in a restless age.

A colleague writes: "Lambert was a most careful physician. He was very keen on the hospital, where most of his time was spent; there was hardly a day in the year when he did not visit it. He played an important part in the Reading Pathological Society, of which he was twice president. His chief clinical interest was 'hearts'; and he was the first physician at the hospital to be appointed to take charge of the electrocardiographic department. He took everything very seriously, but had a sense of humour and could tell a good story when the spirit moved him. His outstanding characteristic was conscientious devotion to his work."

ROBERT VACHELL DE ACTON REDWOOD

F.R.C.S.E.

A FAMILY record of 145 years' association with the Rhymney Cottage Hospital was broken on Jan. 3 by the death of Dr. Redwood, who 44 years ago succeeded his father and grandfather as surgeon at the hospital. He died at his country home at Crickhowell, where he had lived for 15 years, in his 68th year. In 1903 he qualified at St. Mary's Hospital and in 1910 he obtained the Edinburgh fellowship. At Rhymney he held many public appointments, being M.O.H., certifying surgeon, vaccination officer, and infant and child-welfare, poor-law, workmen's compensation, and A.R.P. doctor for the district. A freemason, he was divisional surgeon for Monmouthshire for the Order of St. John of Jerusalem, and a serving brother of the Order. During the war, under the Emergency Medical Service, he was part-time surgeon for the county. An all-round sportsman, he played football for St. Mary's Hospital in 1900–01, when they won the international football challenge cup.

Dr. Redwood is survived by his wife.

ANDREW PATERSON

M.A., M.D. EDIN., DIPL. PSYCH.

Dr. Paterson's untimely death is a loss to psychiatry and neurology, which his researches had done much to illuminate. His early training was in philosophy. Having taken a distinguished degree at Edinburgh in philosophy and psychology in 1930, he pursued further studies at Munich. After graduating in medicine in 1935 and holding the post of house-physician at the Royal Infirmary, he worked with Prof. D. K. Henderson as assistant physician at the Royal Edinburgh Hospital for Nervous and Mental Disorders. In 1938 he moved to Cambridge as research assistant in psychiatry to the regius professor—at that time Professor Ryle—and at Addenbrooke's Hospital and in the Cambridge Psychological Laboratory he studied the psychology of abnormal behaviour in human beings and in animals. The war created an opportunity which gave full scope to Paterson's abilities and training: he took the post of pyschiatrist in the Brain Injuries Unit, at Bangour, where the Rockefeller Foundation provided the means for thorough research into the effects of brain damage. In this Paterson was associated with a psychologist, Oliver Zangwill, and their collaboration was most fruitful. A number of solid papers, illuminating the psychological changes associated with cerebral lesions, appeared chiefly in *Brain*; they bore witness to a thorough use of clinical and psychological methods of investigation, and showed also the capacity for broad yet critical generalisation in which Paterson excelled. It was clear that he had much to contribute to the training of neuropsychiatrists, and in 1946 he was appointed physician to the Maudsley Hospital. During his short tenure of this post his scientific approach to psychiatric problems and his capacity for bringing together psychological and clinical data, especially in the field of perception, revealed him as a stimulating teacher for advanced students, who appreciated greatly, as did his colleagues, his engaging personality and sympathetic yet shrewd understanding of human nature. Just before his fatal illness he was planning research into depersonalisation which gave promise of valuable results.

He died on Feb. 11, aged 40.

EDGAR THOMAS INKSON

V.C., D.S.O., M.R.C.S.

Colonel E. T. Inkson, who died on Feb. 19 at the age of 74, won his Victoria Cross in the South African War in 1901, when he carried a severely wounded officer to safety under heavy fire over exposed ground.

Born at Naini Tal, in India, the son of Surgeon-General J. Inkson, of the Army Medical Services, he was educated at Edinburgh Collegiate School and took the Conjoint qualification from University College Hospital, London, in 1898. He early chose the Army as his career and became a surgeon on probation in April, 1899. Ten weeks before the beginning of the South African War he received his commission and he was sent as a medical officer to the Royal Field Artillery. For his services he received, besides his Victoria Cross, three mentions in despatches. During the 1914–18 war Inkson enhanced his fine record by winning the D.S.O., and he was twice mentioned. During these years he was in command of a field ambulance and later of a general hospital. He retired in 1926. He leaves his wife, formerly Miss Ethel Bromley, with a son and daughter.

CHARLES EDWIN WHEELER

M.D. LOND.

Dr. Charles Wheeler, consulting physician to the London Homœopathic Hospital, died on Feb. 2 at the age of 78. Born in Adelaide, where his father, Dr. Henry Wheeler, was then in practice, he graduated B.SC. Lond. in 1889. After studying medicine at Leipzig and St. Bartholomew's Hospital he took his M.B. Lond. with first-class honours in 1892. A short spell of general practice in Kingston followed, after which he became resident medical officer in the Nordrach Sanatorium. Going to the London Homœopathic Hospital in 1904, he joined the honorary staff two years later and retired in 1928.

Wheeler's chief interest was homœopathy—he was for many years editor of the *Homœopathic World*, and was a past president of the British Homœopathic Society, the International Homœopathic League, and the Faculty of Homœopathy—but his knowledge was wide and he never ceased to plead that homœopathy should keep in the main stream of medicine. This view, he believed, was supported by many rediscoveries of modern medicine. An excellent speaker, he was an acceptable lecturer on his own specialty to many orthodox societies.

Medicine to him was one of the arts, and his versatility ensured his interest in the others—notably drama, music, poetry, and painting—his friends including E. V. Lucas, Henry James, John Masefield, Gilbert Murray, and Bernard Shaw. A founder of the Stage Society, he was also associated with Granville Barker at the Court Theatre, where his wife, Miss Ethel Arundel, whom he married in 1895, used to act. He was an omnivorous reader, from shockers to Arnold Toynbee, and his remarkable memory enabled him to cap almost any quotation. Apart from his original writings he produced translations of Dante's *Divine Comedy*, Hahnemann's *Organon*, and Ibsen's plays. A charming companion, the soul of kindliness and graciousness, he was charitable in the best sense of the word, even to examinees.

W. L. T.

WILLIAM DYSON

O.B.E., M.D. VICT.

Dr. William Dyson, who died at his home at Fallowfield on Feb. 5, was Manchester born and bred, and he served his native city as one of her leading dermatologists for 40 years. Born in 1871, the son of John Dyson, he was educated at Rossall School and Owens College. After taking his M.B. at the Victoria University in 1896 he held a house-appointment at the Royal Infirmary, and spent some nine years in general practice at Broseley in Salop before he turned to dermatology. In 1907 he worked in Vienna under Professor Riehl and Professor Finger, and on his return to Manchester the following year he was appointed to the Manchester and Salford Skin Hospital as assistant medical officer, in 1913 becoming assistant physician and in 1919 full physician. His great interest was in pigmentation, and for his M.D. thesis on Cutaneous Pigmentation in Normal and Pathological Conditions he was awarded the gold medal of the Victoria University in 1910. A keen Territorial medical officer, in the 1914–18 war he served overseas in Gallipoli, Egypt, and Palestine, earning an O.B.E. and mention in despatches. In 1920 he was appointed dermatologist to the Manchester Royal Infirmary and he also lectured on the pathology of skin diseases at the university.

Dr. Dyson leaves a widow, the daughter of Dr. Speirs, of Cleator, and three daughters. His only son, William Speirs Dyson, a promising surgeon and a good sportsman, was lost in 1934 on the Lake Rudolph expedition in the Rift Valley of Central Africa.

DR. WHITFIELD

Sir Ernest Graham-Little writes: Arthur Whitfield gave single-minded devotion to dermatology, and was in the line of succession to the outstanding teachers who have adorned that branch of medicine in the past fifty years. Of those I have known he ranks in my mind with Desnier, Brocq, and Darier in France, and in this country with Crocker and Colcott-Fox, to whom he dedicated his textbook. The salient characteristic of all these men, as also of Whitfield, was the reliance on personal individualist experience, upon which sure foundation their writing was based. I remember well that during a visit to the United States in 1919 I was assured by more than one authority that Crocker was still regarded in America as having written the most original and the greatest dermatological textbook in the English language. Whitfield's own handbook, *Skin Diseases and their Treatment*, published some thirty years ago, reveals in every one of its 300 pages the same originality and the same basis of knowledge. It was exhilarating to see him making a diagnosis. With a watchmaker's lens firmly fixed in his right orbit, he would carry out a detailed inspection of the case, using the technique of a Sherlock Holmes; and he would often solve the problem by observing a single lesion which would have escaped the scrutiny of less intent observers. It was his attention to detail, combined with a most extensive experience, that made him so exceptional and acceptable a teacher. The great college of London University, which he served so faithfully and indeed affectionately for so many years, mourns one of its most distinguished sons.

Elliott & Fry

HOWARD EVERSON CHASTENEY

Mr. H. E. Chasteney, who succeeded Sir Wilfrid Garrett at the end of 1945 as Chief Inspector of Factories, died on Feb. 18 from injuries sustained in a street accident. As head of the Factory Department he was intimately concerned with measures designed to improve the health as well as the safety of factory workers. Only a few weeks ago, in reviewing his first annual report, we were describing it as "a document on a subject without intrinsic appeal to many readers, which nevertheless grips the attention by its warm, sometimes anecdotal style." It is tragic that so valuable a career of public service, devoted largely to accident prevention, should have ended thus abruptly.

Chasteney was born in 1888 and educated at Nottingham High School and at Cambridge University where he distinguished himself in mathematics and natural sciences. He entered the Factory Department of the Home Office in 1913, but served in the Royal Engineers during the 1914–18 war. On returning to his job as inspector of factories, he worked in various parts of the country and gained a wide knowledge of industry and the people in it. Promotion came rapidly and he was appointed deputy chief inspector in 1938. During the late war he gave much attention to civil defence, but a notable contribution to industrial health was his chairmanship of a joint committee on the prevention of dust in steel foundries. The first report was published in 1944 and it bears witness to his thoroughness and sound judgment. He was also chairman of a companion committee which later dealt with iron foundries, and at a recent meeting he signed its final report. His engagingly modest and friendly personality, which did much to soften the asperities of official life, will be missed by all who knew him.

Births, Marriages, and Deaths

BIRTHS

ELLIOT.—On Feb. 9, at Edinburgh, the wife of Dr. T. E. Elliot—a son.

GAVEY.—On Feb. 17, in London, the wife of Dr. C. J. Gavey—a daughter.

GORDON.—On Feb. 8, in London, the wife of Dr. John Gordon—a son.

JOHNSTON.—On Feb. 1, at Glasgow, the wife of Dr. George Johnston—a son.

MERRY.—On Feb. 16, in Leeds, the wife of Dr. Christopher Merry, Colonial Medical Service, Trinidad—a son.

MILLS.—On Feb. 7, at Cambridge, the wife of Dr. J. N. Mills—a son.

NELSON-JONES.—On Feb. 11, at North Cheam, Surrey, the wife of Dr. A. Nelson-Jones—a son.

WARREN.—On Feb. 7, the wife of Dr. M. D. Warren—a son.

WYSE.—On Feb. 6, the wife of Major R. W. Wyse, R.A.M.C.—a son.

MARRIAGES

ALLEN—COLLINS.—On Feb. 1, in London, Richard Alfred Allen, M.B., to Joyce Gwendolen Collins, C.S.P.

EDWARDS—COLES.—On Jan. 30, at Kingsteignton, Devon, Joseph Rowland Goodman Edwards, M.B., to Betty Cecelia Coles.

LOVELL—WARREN.—On Feb. 8, at Sarisbury, Richard Robert Haynes Lovell, M.R.C.S., to Diana Warren.

POLLARD—BARKER.—On Nov. 11, at Brompton, Basil Ranson Pollard, M.R.C.S., lieutenant R.A.M.C., to Doreen Barker.

DEATHS

AMBROSE.—On Feb. 28, at Barnt Green, Worcs, William Cole Ambrose, B.A. Camb., M.R.C.S., aged 76.

AYDON.—On Feb. 23, at Stillorgan, Dublin, John Aydon, M.A. Camb., M.R.C.S., of Angmering, Sussex.

BREWER.—On Feb. 9, Henry Jeaffreson Brewer, M.R.C.S., aged 67.

COLYER.—On Feb. 10, Arthur Reginald Colyer, M.R.C.S.

CUMMINS.—On Feb. 8, at Smyrna Beach, Florida, Arthur Gordon Cummins, M.C., M.B. R.U.I., late R.A.M.C.

DARBYSHIRE.—On Feb. 16, at Exmouth, Harold Stewart Cassan Darbyshire, M.R.C.S.

DICKSON.—On Feb. 19, at Hythe, Kent, Robinson Simpson Dickson, O.B.E., M.D. Glasg., aged 78.

DUIGAN.—On Feb. 24, at Oxford, William Duigan, M.B. Camb.

DUNN.—On Feb. 2, William Dunn, M.B. Aberd.

DYSON.—On Feb. 5, William Dyson, O.B.E., M.D. Vict.

EAGER.—On Feb. 2, Richard Eager, O.B.E., M.D. Aberd., aged 65.

FAIRBANK.—On Feb. 23, at Canford Cliffs, Christian Beverley Fairbank, M.R.C.S., surgeon commander R.N. retd.

FEGAN.—On Feb. 27, at Leamington Spa, Richard Ardra Fegan, M.R.C.S., aged 77.

GENGE.—On Feb. 19, at Croydon, George Gilbert Genge, M.D. Lond., D.P.H.

GIBSON.—On Feb. 13, in London, John Basil Aylwin Gibson, M.A. Camb., M.R.C.S., aged 29.

GLADSTONE.—On Feb. 12, Reginald John Gladstone, M.D. Aberd., F.R.C.S., D.P.H., F.R.S.E.

GRAY.—On Jan. 21, at Totana, Murcia, Spain, Albert Germain Gray, M.B. Aberd., aged 70.

HALL.—On Feb. 4, Joseph Percy Hall, M.B. Lond., aged 75.

HENDERSON.—On Feb. 28, Fergus Leslie Henderson, M.B. Glasg.

ILES.—On Feb. 21, Mary Muriel Griffin Iles, M.D. Lond., D.P.H.

INKSON.—On Feb. 19, Edgar Thomas Inkson, V.C., D.S.O., M.R.C.S., colonel, late R.A.M.C., of Chichester.

JAMESON.—On Feb. 18, at Croydon, George Bernard Jameson, M.D. Edin.

JAYS.—On Feb. 2, Tom Jays, M.R.C.S., aged 78.

LANGRISHE.—On Feb. 28, at Edinburgh, John du Plessis Langrishe, D.S.O., M.B., D.P.H., lieut.-colonel R.A.M.C. retd., aged 64.

LEDGER.—On Feb. 7, at Torquay, Alfred Vernon Ledger, M.D. Brux.

MCARTHUR.—On Feb. 24, in London, Neil Murray McArthur, M.D. West Ont., surgeon lieut.-commander R.N.

MACAULEY.—On Feb. 26, at Ealing, Constantine Macauley, L.R.C.P.I.

MACDONALD.—On Feb. 16, at Oban, Duncan Macdonald, M.D. Glasg., aged 74.

MCDOUALL.—On Feb. 3, at Wahroonga, New South Wales, Herbert Crichton McDouall, M.R.C.S., D.P.H., aged 87.

MCGRATH.—On Jan. 28, Liam Henry McGrath, M.B. Belf., wing-commander R.A.F.

MCNEILL.—On Feb. 3, in London, Arthur Norman Roy McNeill, D.S.O., M.B. Glasg., D.P.H., colonel, late R.A.M.C.

MACKENZIE.—On Feb. 25, in London, Harry Malcolm Mackenzie, C.I.E., colonel I.M.S. retd.

MACMILLAN.—On Feb. 26, John McCallum Anderson Macmillan, M.D. Edin., F.R.C.S., lieut.-colonel I.M.S.

PARRY.—On Feb. 24, at Bradninch, Devon, James Hales Parry, M.R.C.S.

PATERSON.—On Feb. 11, Andrew Paterson, M.D. Edin., aged 40.

ROBBS.—On Feb. 7, at Grantham, Charles Haldane Denny Robbs, M.B. Lond., aged 72.

SELBY.—On Feb. 26, Prideaux George Selby, O.B.E., M.R.C.S., of Lynsted, Kent, aged 81.

SHORE.—On Feb. 19, at Oldham, Thomas William Shore, O.B.E., B.SC., M.D. Lond., F.R.C.S., aged 85.

SISAM.—On Jan. 27, William Sisam, M.D. Birm., D.P.H., aged 71.

WHEELER.—On Feb. 2, Charles Edwin Wheeler, B.SC., M.D. Lond., aged 78.

WIMBLE.—On Feb. 28, at Bushey, Herts, Herbert Charles Wimble, M.R.C.S., aged 80.

Notes and News

RHEUMATISM RESEARCH

AT the annual meeting of the Empire Rheumatism last December, Lord Horder, its president, announced t the council was undertaking a careful survey of some of cases of rheumatoid arthritis, with the aim of finding for specific research. Studies of this and of other conditions, if they are to be effective, must be nation and large funds are needed. The council now appeals £100,000 to enable the work to be carried through.

Manchester University, which produced a scheme some months ago (*Lancet*, 1946, ii, 609), is to appoint a clinical director of its research centre, at a salary of £1500–£2000 a year.

DIAGNOSIS OF VIRUS INFECTIONS

IN a Chadwick lecture on Feb. 18 Prof. S. P. Bedson, F.R.S., said that in virus work insufficient use is made of new diagnostic procedures. It is still widely-believed that all viruses are too small to be seen with the microscope, yet in quite a number of diseases microscopical demonstration of the causal virus is of diagnostic value. This is true of trachoma and of those conditions caused by the related virus of inclusion conjunctivitis; the virus of lymphogranuloma venereum can at times be demonstrated in smears made from inguinal buboes; and recent work has shown the usefulness of examining smears from the skin lesions of smallpox. Even where the virus cannot be seen, histological changes such as inclusion bodies can be looked for; their occurrence is always suggestive of virus infection, and sometimes, as with the Negri body in rabies, it is diagnostic.

It is still not generally appreciated, said Professor Bedson, that the serological reactions employed in bacteriology are equally applicable to the identification of viruses or the diagnosis of virus disease. Of these reactions the complement-fixation test is probably the most valuable; it can be used either to demonstrate the presence of the causal virus, as in smallpox, or for the detection of antibody, as in influenza, psittacosis, lymphocytic choriomeningitis, lymphogranuloma venereum, and mumps.

REABLEMENT FILM

A COLOURED documentary film dealing with the work at Roffey Park Rehabilitation Centre was given its first public showing at the London School of Hygiene on Feb. 27. Queen Mary was present, and this is said to be the first time that a scientific film has been accorded a Royal première. The film, which was made for the National Council for the Rehabilitation of Industrial Workers by Messrs. Kodak Ltd. and Associated British Pictures Corporation, is meant primarily for the industrial organisations which have used or are otherwise interested in this centre. It is therefore addressed to laymen, but it will have a wide appeal to doctors, for it shows the inter-relation of purely medical treatment with all the other facets of the work. This it does by following the passage through the centre of a man and woman who have broken down in industry, up to their return to work. The film is perhaps a little too idyllic, but nevertheless deserves an extensive showing as illustrating the short-term approach to problems of industrial maladjustment.

University of Cambridge

On Jan. 31 the following degrees were conferred:

M.D.—J. R. Bolton, R. F. Tredgold, B. J. O. Winfield, A. R. Kelsall, W. H. Tattersall.

M.B., B.Chir.—*A. V. Adams, *E. M. M. Besterman, *Gerald Raperport, *James Fiddess, *Desmond Seymour, *E. B. Davies, *P. A. Emerson, *A. D. R. MacAuslan, *James McMillan, *J. J. Morland, *J. C. Ward, J. A. Elliott, *D. C. Bradford, *R. J. Alcock, *P. W. S. Coghill, *C. S. Kirkham, *E. D. Marsh, *J. P. Paul, *J. P. Stephens, *A. D. Thomson, W. J. B. Rogers, E. S. O. Smith, *C. P. Bennett, *A. O. Chase, *W. M. B. Strangeways, *D. A. L. Bowen, *T. W. Backhouse, *J. P. Bull, *P. W. Rowsell, R. H. C. Robins, *J. H. Steeds, *D. W. Burnford, *K. G. Irving, *J. F. F. Rooney, *J. E. H. Stretton, *John Crossley, *G. R. Freedman, *I. S. M. Jones, *K. S. Murray, D. G. Miller, I. R. D. Proctor, *L. C. Lancaster, *H. E. S. Marshall, *Kenneth Till, *M. F. Smith.

* By proxy.

The titles of the degrees of M.B., B.Chir. have been conferred on Mrs. S. M. Godfrey.

University of Manchester

Mr. D. G. Evans, PH.D., has been appointed reader in chemical bacteriology, and Dr. R. A. Bailey and Miss Eugenie Willis, F.R.C.S., clinical demonstrators in anatomy.

University of Sheffield

Dr. Llywelyn Roberts has been appointed honorary lecturer in public health, Dr. J. Wilkie honorary lecturer in radiological anatomy, and Dr. Leslie Cook honorary lecturer in bacteriology.

Royal College of Surgeons of England

At a meeting of the council of the college, held on Feb. 13, with Sir Alfred Webb-Johnson, the president, in the chair, Prof. Louis Bazy, of Paris, was enrolled as an honorary fellow.

Mr. Neil Sinclair (West London), Mr. T. Twistington Higgins (Great Ormond Street), and Sir Stanford Cade (Westminster) were re-elected members of the court of examiners, and Mr. W. Kelsey Fry a member of the board of examiners in dental surgery. Prof. F. Wood Jones, F.R.S., was appointed Arris and Gale lecturer, and Dr. R. J. Last and Mr. H. F. Lunn, Arnott demonstrators. Sir Cecil Wakeley was appointed chairman of the editorial committee of the forthcoming *Annals of the Royal College of Surgeons of England.*

The Hallett prize for anatomy, applied physiology, and pathology was awarded to H. J. Richards (University of Sydney). Diplomas of membership, in public health, and in laryngology and otology, were granted to those named at the comitia of the Royal College of Physicians (*Lancet*, Feb. 8, p. 230). The diploma of M.R.C.S. was also granted to P. J. Horsey and F. S. Huxley, and the D.L.O. to R. T. Raymond-Jones.

Royal College of Physicians of Edinburgh

At a meeting of the college on Feb. 4, with Dr. D. M. Lyon, the president, in the chair, Dr. H. J. Parish (Petts Wood, Kent), Dr. R. C. Wood (Edinburgh), and Dr. J. A. Malloch (Edinburgh) were admitted as fellows, and Dr. W. A. Liston (Edinburgh) was elected to the fellowship. The following were elected to the membership:

J. M. Henderson, Nawab Ali, Sujata Chaudhuri, Isidore Schrire, J. P. Baird, Charles Groves, William Hunter, Jacob Du Toit, R. L. Tobias, A. O. Watt, H. M. Khan, R. W. Riddell, Vera S. Emanuel, Cecil Harris, H. C. Hastings, A. R. Currie.

Psychiatric Conference at Amsterdam

The Dutch Society of Psychiatry and Neurology are holding an international meeting in Amsterdam from June 13 to 15, to celebrate their 75th anniversary. English psychiatrists and neurologists who wish to attend should get in touch with the secretary of the Royal Medico-Psychological Association, 11, Chandos Street, London, W.1, before April 15.

Hunterian Society

The society's annual dinner, marking this year the 219th birthday of John Hunter, was held in London on Feb. 13. Among the guests were the Lord Mayor and Lady Mayoress, and the presidents of the three Royal Colleges. Replying, as president, to the toast of The Society, Dr. J. B. Cook recalled that whereas John Hunter's birthday is commemorated by the society on Feb. 13 each year, the Royal College of Surgeons celebrate the anniversary on the 14th. Hunter himself gave his birthday as the 14th; but a copy of the birth-certificate obtained by Dr. Cook from the Registrar-General in Edinburgh establishes that the correct date is the 13th. Mr. A. Dickson Wright, in proposing The Lord Mayor and the Corporation of the City of London, suggested that at the next annual dinner all fellows would be in uniform.

Postgraduate Teaching Hospitals

At a meeting of representatives of special hospitals organised for postgraduate teaching, held at the Hospital for Sick Children, Great Ormond Street, London, on Feb. 11, with Sir Ernest Gowers in the chair, it was unanimously decided to set up a representative body, to be known as the Association of Postgraduate Teaching Hospitals of Great Britain. Membership of the association is limited to hospitals or groups of hospitals having directly attached to them institutes federated or about to be federated to the British Postgraduate Medical Federation (University of London) or to provincial hospitals with institutes recognised and financially supported by a university as postgraduate teaching centres. The objects of the new association are "to keep under review all matters peculiarly affecting the interests of the member hospitals, and to act as a negotiating body directly with the Ministry of Health, universities, local authorities and other bodies on behalf of those hospitals on such matters as may peculiarly affect them." The acting hon. secretary is Mr. John Young, Royal National Throat, Nose, and Ear Hospital, Gray's Inn Road, W.C.1.

Polish Medical School

This school, which has been at the Paderewski Hospital, Edinburgh, since 1941, will shortly be moved to Poland, where it is proposed to provide a hospital of 2000 to 3000 beds.

Institute of Hospital Almoners

The annual general meeting of the institute will be held at Friends House, Euston Road, London, N.W.1, on Friday, March 14, at 6 P.M., when Dr. J. A. Charles, deputy chief medical officer of the Ministry of Health, will speak.

Course in Industrial Medicine

A course in industrial medicine will be held at the University of Leeds on Saturday and Sunday, May 3 and 4. The speakers will include Dr. A. J. Amor, Prof. G. P. Crowden, Dr. G. R. Hargreaves, Dr. F. F. Hellier, Dr. J. Vaughan Jones, and Dr. C. Sutherland. Further particulars will be found in our advertisement columns.

Arthur Davies Research Fund

This fund, which was founded to further research for the benefit of officers and men of the Mercantile Marine, has appointed Dr. Geoffrey Allen as a part-time worker at the Devonport pathological laboratories of the Dreadnought Seamen's Hospital, Greenwich. Dr. Allen has chosen fungal skin disease as the subject of his research.

Reunion of Army Physicians

A reunion dinner for former C.M.F. and M.E.F. physicians (including neurologists, dermatologists, psychiatrists, and radiologists) will be held at Grosvenor House, Park Lane, London, W.1, on Saturday, April 26, at 7.30 P.M. Applications should be sent not later than March 31 to Dr. W. MacLeod, 3, Drumsheugh Gardens, Edinburgh, or to Dr. A. Willcox, 66, Harley Street, W.1.

World Health Organisation

The organisation has inherited a fund of $1^1/_3$ million dollars which is to be used in partial continuation of UNRRA's activities. Provisional allocations have now been made from this fund to continue the teaching programme in China and the basic health training in Ethiopia; for fellowships in eight countries; for supplying lecturers and medical literature; and for contributions to the salaries of specialists at the New York and Geneva offices of the interim commission of the organisation.

Honorary Consultants

In recognition of their service as consultants to G.H.Q., India, during the war, the following to be honorary consultants to the India and Burma Offices:—

Brigadier S. M. Hepworth (radiologist); Brigadier G. W. Bamber (dermatologist); Brigadier E. E. Prebble (venereologist); Brigadier D. McAlpine (neurologist); Brigadier E. A. Bennet (psychiatrist); Brigadier H. K. Ashworth (anæsthetist); Brigadier G. F. O. Bridgeman, M.C. (ophthalmologist); Brigadier Grant Massie, C.B.E. (surgeon); Brigadier J. D. S. Cameron, O.B.E. (physician).

Society of Chiropodists

The first convention of the society will be held at Friends House, Euston Road, London, N.W.1, from March 20 to 22. Sir Hugh Lett will open the meeting on Thursday, the 20th, at 2.30 P.M., and other medical speakers will include Prof. A. B. Appleton, whose subject will be Posture, Mr. Philip Wiles (Pain and Deformity of the Metatarsals and Toes), Mr. Denis Browne (Deformities of the Feet in Children), Prof. A. J. E. Cave (the Foot as a Sensory Organ), and Dr. Allan Yorke (Hyperkeratosis of the Sole of the Foot). Further information may be had from the secretary of the society, 21, Cavendish Square, London, W.1.

Canadian Appointment

Dr. A. B. Stokes is resigning his post as medical superintendent of the Maudsley Hospital on his appointment as professor of psychiatry and physician-in-chief of the Toronto Psychiatric Hospital.

Dr. Stokes, who took the Conjoint qualification at King's College Hospital in 1931 and his B.M. Oxfd three years later, joined the staff of the Maudsley Hospital in 1935. On the outbreak of war he was appointed deputy medical superintendent of Mill Hill Emergency Hospital, later becoming medical superintendent, and in 1945, when the Maudsley Hospital was reopened, he was appointed to his present post. His published work includes papers on the treatment of myasthenia gravis and on mental disorder in Cushing's syndrome.

Biochemical Society

A meeting of the society will be held at Guy's Hospital medical school on Saturday, March 15, at 2.30 P.M.

Research Scholarships

The council of the British Medical Association is prepared to receive applications for the following scholarships: an Ernest Hart scholarship (value of £200), a Walter Dixon scholarship (£200), and four research scholarships (each £150). Scholars should be qualified to undertake research in any subject (including State medicine) relating to the causation, prevention, or treatment of disease, and preference will be given to doctors. Each scholarship is tenable for one year, beginning on Oct. 1, 1947. A scholar may be reappointed for not more than two additional terms, and he may also hold a junior appointment at a university, medical school, or hospital, provided the duties do not interfere with his work as a scholar. *Application must be made by May 31, on a prescribed form* which may be had from the secretary of the association, B.M.A. House, Tavistock Square, London, W.C.1.

Return to Practice

The Central Medical War Committee announces that the following have resumed civilian practice:

Dr. T. R. Lloyd Jones, 17, Queen Anne Street, London, W.1 (Langham 2576).

Dr. R. Louis Rose, 118, Newmarket Road, Norwich.

Lieutenant-General Sir Alexander Hood, F.R.C.P., has been elected chairman of governors of the Star and Garter Home for Disabled Sailors, Soldiers, and Airmen, Richmond, in place of Sir Arthur Stanley, who has resigned.

Dr. H. P. Chu, dean of the National Medical College, Shanghai, and formerly secretary of the Chinese Medical Association, has arrived on a three months' visit to this country arranged by the British Council. He is studying medical education and the training of nurses.

The firm of Ciba Limited has changed its name to Ciba Laboratories Limited.

Diary of the Week

MARCH 9 TO 15

Monday, 10th

Royal College of Surgeons, Lincoln's Inn Fields, W.C.2
3.45 P.M. Dr. L. E. Glynn: Aneurysms and Aneurysm Formation.
5 P.M. Prof. Frank Goldby: Intracranial Anatomy of the Trigeminal Nerve.
Medical Society of London, 11, Chandos Street, W.1
8.30 P.M. Dr. Horace Evans, Mr. Geoffrey Keynes: Thyrotoxicosis.

Tuesday, 11th

Royal College of Surgeons
3.45 P.M. Dr. P. R. Peacock: Ætiology of Gastric Cancer.
5 P.M. Professor Goldby: Anatomy of the Optic Pathways.
Royal Society of Medicine, 1, Wimpole Street, W.1
5 P.M. *Experimental Medicine and Therapeutics.* Brigadier J. S. K. Boyd, Prof. N. Hamilton Fairley, F.R.S.: New Antimalarials and Malarial Control.
5.30 P.M. *Psychiatry.* Dr. Russell Davis: Disorders of Skill.
London School of Dermatology, 5, Lisle Street, W.C.2
5 P.M. Dr. F. R. Bettley: Eczema.
Edinburgh Postgraduate Board for Medicine
5 P.M. *(Royal Infirmary.) Prof. J. H. Gaddum,* F.R.S.: *The* Introduction of New Remedies.

Wednesday, 12th

Royal College of Surgeons
3.45 P.M. Prof. Alexander Haddow: Carcinogenesis by Chemical Agents.
5 P.M. Prof C. M. West: Reproductive System.
Royal Society of Medicine
4.30 P.M. Mr. H. E. Griffiths: Analysis of Function.

Thursday, 13th

Royal College of Surgeons
3.45 P.M. Professor Haddow: Nature and Rôle of Tumour-producing Viruses.
5 P.M. Professor West: Reproductive System.
Royal Society of Medicine
5 P.M. *Ophthalmology.* Mr. O. Gayer Morgan, Dr. C. J. C. Britton, Dr. J. T. Ingram: Allergy in Ophthalmology.
London School of Dermatology
5 P.M.: Dr. J. L. Franklin: Occupational Diseases of the Skin.

Friday, 14th

Royal College of Surgeons
3.45 P.M. Mr. J. R. M. Innes, D.SC.: Animal Pathology.
5 P.M. Dr. T. E. Barlow: Bronchial Tree.

Appointments

Elliot, T. E., M.B. Edin., F.R.C.S.E.: asst. gynæcologist, Leicester Royal Infirmary.
Gordon, G. A. D., M.B. Edin., D.M.R.: radiologist, Bolingbroke Hospital, London.
Hyman, Geoffrey, M.B. Leeds, F.R.C.S.: visiting orthopædic surgeon, Royal Halifax Infirmary.
Le Vay, Marjorie K., M.B. Camb.: pathologist, South London Hospital for Women.
McLardy, Turner, M.B.E., M.B. Glasg.: asst. pathologist for neuropathology at the teaching and research laboratory, Maudsley Hospital medical school.
Moore, H. E., O.B.E., M.B. Manc.: M.O. and *acting chief M.O.* London, Midland, and Scottish Railway, Crewe.
Newnham, C. T., M.R.C.S.: asst. to chief M.O., Great Western Railway.
Rowntree, J. K., M.R.C.S.: asst. M.O., Great Western Railway, Swindon.
Rubin, E. L., M.D. Lpool, D.M.R.E., F.F.R.: radiologist, Royal Liverpool United Hospital.
Thomas, D. T., M.R.C.S., D.P.H.: M.O.H., Penarth.
Williams, B. W., B.M. Oxfd, F.R.C.S.: asst. surgeon, Royal Portsmouth Hospital.

London County Council:
Duke, J. H., M.B. Belf.: medical superintendent, group IV, St. George-in-the-East Hospital, Wapping.
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ATOMIC ENERGY*

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THE designations "atomic energy," "atomic bomb," &c., which are now in common use are somewhat lacking in precision. In the strict meaning of the term the energy which is derived from fuel of any kind is atomic energy. The energy obtained from the combustion of coal or oil is latent in the atoms of carbon and oxygen. These atoms, like all atoms, are built up on a common plan. Every atom, whatever its kind, consists of a cluster or cloud of electrons held together by the attraction of a positively charged nucleus, which, although it contains nearly the whole mass of the atom, is extremely small compared with the dimensions of the electron cloud. The atoms of one element differ from those of another in the magnitude of the electric charge on the nucleus and therefore also in the number of electrons in the cluster. The charge on the nucleus increases from 1 unit in the case of hydrogen to 2 for helium, and so on up to 92 in the case of uranium. The nucleus itself, although so minute, is a complicated structure, built up from protons and neutrons. It is thus possible to build two or more nuclei which have the same charge, and therefore belong to the same element, but which have different masses; in this way the occurrence of isotopes receives a simple explanation.

All the ordinary properties of matter, such as hardness, electrical conductivity, chemical affinity, &c., are determined by the configuration of the electron cluster and are practically independent of the structure of the atomic nucleus. Thus all the chemical and physical processes involved in normal scientific and industrial developments are concerned with the electron clusters alone.

This is because the usual physical and chemical agencies produce no change whatever in the properties of the nucleus and affect only the electron cloud. But what we are now accustomed to call "atomic energy" has its origin in the atomic nucleus. Processes have been found which can cause a disruption of the nucleus and a rearrangement of the particles which constitute it; and this rearrangement results in the release of a large amount of energy.

HIDDEN RESERVES OF ENERGY

The story of the development which led to our present knowledge of the nucleus and its properties goes back fifty years, to the discovery of radioactivity by Becquerel in 1896.

This discovery opened a new epoch of science, for, as Rutherford and Soddy showed, the phenomena of radioactivity could only be explained by the assumption that the atoms of uranium, radium, &c., were unstable and were continuously breaking up and changing into other elements.

One of the most striking facts in these phenomena is the amount of energy released in the form of radiation, an amount which, atom for atom, is enormously greater than that connected with any chemical reaction. This energy released had, however, no practical value, for the rate of release is very slow and it proved to be impossible to influence it in any way. For example, in the decay of 1 g. of uranium, energy is emitted at the rate of rather less than 1 calorie per year, so that it would take more than 100 years to raise 1 c.cm. of water to the boiling point. On the other hand, the lifetime of uranium is so long that the total amount of energy liberated during the transformation of 1 g. of uranium to lead would be 5,000,000,000 calories. We can compare this with the complete combustion of 1 g. of coal, which gives 8000 calories.

It became clear that there is a reservoir of energy in the interior of the atoms of matter which is enormously greater than that available from any known chemical process. But all attempts to influence the rate of transformation of a radioactive element proved futile and the prospect of any practical application seemed exceedingly remote.

The first successful attempt to affect the atomic nucleus was made by Rutherford in 1918, when he showed that when nitrogen was bombarded by the α-particles from radium C the nucleus in rare instances broke up, forming two other nuclei—hydrogen and oxygen.

After this discovery several other elements were transmuted by similar means, and later it was found that protons and deuterons, accelerated to high speeds in strong electric fields, also produced transmutations in many common elements. The neutron proved to be almost an ideal projectile for carrying out nuclear transformations, and, with it, nearly all the elements have been transmuted. In some cases, especially with slow neutrons, the reactions were very efficient.

Many interesting and even remarkable results in their scientific aspect were obtained in these experiments. But their practical value, as a means of making available the energy stored in the nuclei of atoms, was completely negligible.

The reason was simple. These nuclear transmutations are not only very rare events but they are not self-propagating. This is quite different from the chemical reactions with which we are familiar in our daily life, such as the burning of wood, coal, or oil. Once started, these reactions propagate themselves and they develop and spread, finally involving the whole bulk of material; thus the lighting of a fire releases enough heat to ignite the neighbouring fuel, and so on.

This was not the case for the nuclear reactions. It is clear that to tap the hidden reserves of energy in atomic nuclei and put them to practical use we must find a reaction which can propagate itself—for example, a reaction in which particles are emitted of the same kind that initiated it and in sufficient numbers to affect neighbouring nuclei, so that these in their turn may emit new particles to react with other nuclei, and so on, thus beginning a chain reaction which spreads through the whole mass.

NUCLEAR FISSION

The reaction which opened up this possibility was discovered early in 1939, when Hahn and Strassmann showed that the transformation of uranium produced by neutron bombardment was a very different process from what had hitherto been supposed, and that the uranium nucleus actually splits into two fragments of roughly equal mass.

This process is known as fission. A neutron is captured by a nucleus of uranium 235, forming a nucleus of uranium 236 in a highly excited state. This immediately divides into two nuclei of roughly equal mass and at the same time some 1 to 3 neutrons are emitted and some γ-radiation. The fragments fly apart with great speed, and, in their passage through matter, this energy of motion is transformed into heat. These fragments are unstable and may pass through a series of transformations emitting β-particles and γ-radiations, before they at last reach a stable configuration.

There are two important aspects of the fission process. First, a great amount of energy is released; secondly, more than one neutron is emitted in the fission. This second point is of crucial significance, for it is this which opens up the possibility that the reaction can be propagated from atom to atom, developing a whole chain of fissions from one single event. Such a chain process developing in a mass of uranium might take place at an ever-increasing rate and might involve so many atoms that there would be an appreciable, and possibly an overwhelming, liberation of energy. In this way we might get a new type of combustion of matter which would give an energy yield a million times greater than we get from the combustion of the same weight of coal.

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Investigation showed that natural uranium is unable by itself to sustain a chain reaction. The reason for this is that the common isotope 238, which forms more than 99% of natural uranium, undergoes fission only when the bombarding neutrons have a high energy; it is the isotope 235 which is particularly susceptible to fission, and this is present in natural uranium only to the extent of 0·7%.

In order to make a small and efficient system which would sustain a chain reaction it was therefore necessary to separate uranium 235 from ordinary uranium. This separation is a very difficult operation since the two isotopes are almost identical in every property but that of mass, and even in mass they differ by little more than 1%. Nevertheless the separation has been accomplished in two different ways, by an electromagnetic method and by a gaseous diffusion process, and both processes have provided adequate amounts of uranium 235.

This uranium 235 can be used to make an atomic bomb, in which the energy is released so rapidly that a violent explosion occurs, or it can be used in such a way as to release the energy gradually.

For many purposes, and especially for those purposes which are of interest in biology and medicine, it is of little importance to have a system of small size. If this limitation is removed, it is possible, by a special device, to build an atomic reactor which uses natural uranium and so to avoid the need for the very difficult and very costly separation of the isotopes. Before describing how this is done, I must make some general observations on the chain reaction and the conditions for its realisation.

MAINTENANCE OF CHAIN REACTION

Suppose we have a large block of fissile material and that a neutron enters and causes one of the nuclei to undergo fission. Energy will be released and two neutrons will be produced. These two neutrons will move through the block until each eventually hits another nucleus. We now have two fissions, liberating more energy, and four neutrons. These in turn produce fissions, so that we have a series of successive generations of energy and neutrons. The number of neutrons, and therefore also of fissions, is doubled in each generation, so that in quite a small number of generations, between 50 and 100, an appreciable fraction of the atoms of the block will undergo fission and a large amount of energy will be set free.

The multiplication of the effect in successive generations clearly depends on the conservation of the neutrons produced in the fissions. If too large a fraction of these neutrons is unable to carry on the chain of fissions the reaction will die out quickly and the amount of energy released will be negligible. Neutrons can be lost in two ways. First, the block of fissile material, or the reacting system as a whole, may be too small or its shape may be unsuitable; in this case too many neutrons will be able to escape out of the block before they are able to produce further fissions. The proportion which escape can be reduced by increasing the size of the block, and there will be a certain size, called the critical size, which will just permit the reaction to develop. There is thus a striking difference in behaviour between an atomic explosive and ordinary explosive. A small amount of T.N.T. produces a small explosion and a large amount produces a large explosion. But a small piece of fissile material produces no effect whatever; an explosion will only occur when the amount is greater than the critical size.

Secondly, the system must not contain more than a limited amount of material which absorbs neutrons without undergoing fission, for in this way again the neutrons will be wasted and useless for continuing the chain reaction.

These two conditions must be satisfied before a chain reaction can develop.

If atomic energy is to be used as an explosive, the more rapidly the reaction can proceed the greater will be the amount of energy set free and therefore the greater the explosive effect. It is thus an advantage to use pure or nearly pure uranium 235 (or plutonium, another fissile material). The fission neutrons have speeds of the order of 10^9 cm. per sec., and, since they do not have to travel many centimetres in pure uranium 235 before they produce new fissions, the time between successive generations is of the order of 10^{-8} second. Thus in less than a millionth of a second a considerable fraction of the mass of 235 will have undergone fission. A large amount of energy is thus suddenly liberated, raising the temperature of the mass of material to many millions of degrees and the pressure to many millions of atmospheres. The sudden expansion of the hot gases produces a very violent explosion.

For the purposes of the peaceful applications of atomic energy it is obviously necessary to control the chain reaction so that the energy can be released continuously and at a predetermined rate. It would seem at first sight that the control of a reaction which can develop so rapidly and in doing so liberates such enormous amounts of energy must be exceedingly difficult. This is fortunately not the case, and in practice control is a relatively simple matter.

Control depends on the regulation of the flux of neutrons in the reacting system so that at a predetermined level the flux remains constant, only exactly as many neutrons causing fission in one generation as in the previous generation. The surplus neutrons which are produced in the fissions are removed and made unavailable for carrying on the reaction. The reaction will then proceed at a constant rate. This balance of the neutron flux can be achieved either by allowing the excess neutrons to escape or by capturing them in some absorbing material.

If the description I have given of the fission process were quite accurate, this balance of the neutron flux would be exceedingly delicate and control of the reaction would be very difficult. Briefly, the reason for this is that the neutrons have such high speeds—even those we call slow neutrons—that the time between successive generations cannot be made longer than a very small fraction of a second, while any control mechanisms will take a time of the order of a second to act. Thus, if a balanced reaction *could* be achieved, a slight temperature change or mechanical disturbance might affect the balance and cause the neutron intensity to rise at an uncontrollable rate, resulting in a violent explosion.

The fact is, however, that not quite all the neutrons which are liberated in the fission process are emitted instantaneously. Some of the fission products transform after a time with the emission of a β-particle into nuclei which are so unstable that they emit neutrons. Thus the total neutron emission consists of the "prompt" neutrons emitted in the fission process itself and the "delayed" neutrons from some of the fission products, liberated on the average a few seconds after the fission.

Although these delayed neutrons form only a very small fraction of the total neutron emission they have a profound effect on the problem of control, for they can be used to reduce the rate at which the chain reaction develops. This is done in the following way: The assembly of fissile material is arranged to be only a very small degree above the critical size, so that the prompt neutrons alone cannot maintain the reaction but need the help of the delayed neutrons. Thus each generation of neutrons has to wait for the delayed neutron emission before a sufficient increase in intensity can occur to keep the reaction going. The rate at which the neutron level can rise is limited by the delay, on the average a few seconds, and is therefore quite slow. The control devices are thus given time in which to act and to take charge, and to hold the neutron intensity and the level of the reaction at any desired value.

THE GRAPHITE PILE

Earlier in this lecture I said that natural uranium is unable by itself to sustain a chain reaction, no matter how large the block of metal is made. This is because the abundant isotope 238 can capture neutrons without undergoing fission and because it undergoes fission only by very fast neutrons. It thus removes neutrons without contributing enough to replace them, and, since this isotope is 140 times more abundant than the 235 isotope, the effect is to prohibit the reaction.

This difficulty could be overcome by reducing the proportion of the 238 isotope—that is, by a process of isotope separation. Although no large reduction would be required the process would be very difficult and very costly.

A simpler and more economical way is to make use of the fact that slow neutrons are much more effective in producing fission in 235 than are fast neutrons. Slow neutrons are also more easily captured by the 238, and so there is still a strong competition between the 235 and 238, but, provided the neutrons can be made to move slowly enough, the chain reaction becomes possible with ordinary uranium.

The neutrons are emitted in the fission process with speeds of the order of 10^9 cm. per sec. They can be slowed down by causing them to make collisions with light atoms, such as hydrogen, deuterium, helium, carbon, &c. In each collision some of the energy of motion of the neutron is transferred to the atom with which it has collided. The neutron is slowed down in a series of steps. The slowing-down process, or moderation as it is called, cannot continue indefinitely since the atoms of the material in which the collisions take place, the moderator, are themselves in motion by reason of their thermal agitation. The process of slowing down can only proceed as far as the stage when the energy of the neutrons is on the average equal to the energy of thermal agitation of the atoms of the moderator. At normal temperature the average speed of the neutrons will then be about 2 km. per sec. This stage will be reached more quickly the lighter the atom of the moderator, so that hydrogen will be the most effective material, with deuterium next, and so on.

There is, of course, the possibility that the moderator itself may capture neutrons, and this limits the choice of moderator; also very considerable amounts of moderator are required.

Only two materials have so far been successfully used—deuterium in the form of heavy water, and carbon in the form of graphite. Heavy water has some advantages, but it is very expensive, whereas graphite is relatively cheap and abundant. Graphite is therefore the most convenient material to use as the moderator.

Owing to the inevitable, though small, loss of neutrons by absorption in the graphite the working margin is small; the competition of the uranium 238 is so severe that there are few neutrons to spare. It is therefore necessary to keep down the loss of neutrons by leakage, which implies a rather large critical size of the reacting system, so that some tons of uranium and of graphite are required.

For reasons depending on the nuclear properties of uranium, the most effective arrangement of the uranium and the graphite is one in which lumps of metallic uranium are disposed at regular intervals throughout a large block of graphite. The best size of the uranium lumps and of the spacing can be calculated from the nuclear constants of the materials.

In practice it is necessary to arrange for a coolant to be circulated around the uranium lumps in order to remove the heat generated by fission, and it may on occasion be necessary to replace the uranium without disturbing the assembly of the pile. For these reasons the arrangement used is a rod lattice of cylindrical symmetry, in which short rods or slugs of uranium are loaded in horizontal cylindrical channels in the graphite block.

If a uranium 235 nucleus in one of the uranium rods undergoes fission the neutrons liberated in the fission will in general fly out of the rod into the graphite, where they are gradually slowed down, wander around, and finally enter another rod of uranium. There they will either produce fission in an atom of uranium 235 or be captured by a uranium 238 nucleus, with the former process slightly predominating. The energy of the fission fragments will be converted into heat in the uranium metal rods and there will be a flux of neutrons and γ-radiation throughout the pile, with an intensity proportional to the rate of the chain reaction or the power level at which the pile is operating.

The essence of control is to make the assembly of uranium and graphite only a very small degree above the critical size. The chain reaction can then only be maintained by the contribution of the delayed neutrons, and the rate at which the neutron level can change is very slow.

The reaction can then be controlled by pushing into or pulling out of the pile control rods made of cadmium or boron. These substances absorb slow neutrons very strongly, so that a small movement of the control rod by means of a simple mechanical device will suffice to regulate the reaction. These controls can be connected with instruments which measure the neutron density in the pile and thus the power level, and in this way the pile can be kept automatically at a predetermined level.

The power level of a pile is limited only by the rate at which the heat can be removed and by the physical and chemical properties of the materials. As the power increases the temperature of the uranium rods rises and the safe limit of this temperature fixes the maximum power at which the pile can be run. Since uranium oxidises rather easily the rods must be clad with a protecting jacket of aluminium if more than a very small power is required. Even then high temperatures cannot be reached, on account of corrosion of the aluminium. If very high powers are desired, as in the piles for the production of plutonium, the cooling must be very effective, and in these piles a very large circulation of water is used to remove the heat rapidly. For piles of moderate power, however, sufficient cooling can be obtained by pulling or blowing air through the channels in which the uranium rods are placed. In this way a power of a few thousand kilowatts can be achieved and this is enough for most research purposes, including the applications to biology and medicine which I shall shortly describe.

The neutron and γ-radiation intensities inside a pile operating at a few thousand kw. are very high. The γ-radiation alone is equivalent to the radiation from a few tons of radium. Most of this radiation will be absorbed in the pile itself, but the fraction which escapes would still be very dangerous to human life. It is therefore necessary to enclose the pile within thick concrete walls.

MEDICAL APPLICATIONS OF THE PILE

The chief purpose for which the graphite pile has been used so far has been the manufacture of plutonium. When uranium 238 captures a neutron an unstable isotope of mass 239 is formed which passes through two successive β-transformations and turns into plutonium. This is an easily fissile material which can be used to make atomic energy reactors, either bombs or controlled reactors.

The plutonium has to be separated chemically from the uranium, a troublesome operation owing to the intensity of the radiations emitted by the fission products and on account of the large amounts of material which have to be handled.

To produce the quantities of plutonium which are needed to make reactors, a large graphite pile dissipating some hundreds of thousands of kilowatts is required. Owing to the difficulties in removing such a large amount of heat from a system of this kind the construction of these large piles is a formidable operation.

A much smaller pile, say of a few thousand kilowatts, of the air-cooled type, is sufficient for all general scientific purposes, including the applications to medicine and biology. Such a pile can make only a gramme or two of plutonium a day, a quantity of no military significance. It is thus possible to pursue some of the peaceful applications of atomic energy without at the same time setting up a plant to produce weapons of destruction. The medical applications in particular belong to the category of what we may call the "safe" developments of atomic energy.

There are various ways in which the graphite pile can be used in medicine and biology, not all of equal importance.

(1) The pile as *a source of neutrons and gamma-radiation.* By making a channel in the concrete wall enclosing the pile, a beam of neutrons and γ-rays can be allowed to escape. This beam can be used for experimental purposes, both physical and medical, but it has probably very little therapeutic value. The neutrons in the beam are mostly of low energy; and such experience as we have on the relative efficiencies of neutrons and X rays in the treatment of malignant tumours has not indicated that neutron therapy has any advantages.

(2) The pile can be used for *the production of radioactive substances.* These are produced in two ways.

First, the two fragments into which the uranium nucleus divides are radioactive and undergo transformation into further active elements, sometimes a whole series of transformations taking place. The fission itself occurs in a variety of ways, so that as a result of a large number of fission processes a wide variety of radioactive isotopes is produced, from zinc to the heavier rare earth, with the majority in the region of barium and strontium. The amounts of material, measured by their radioactivity, which can be produced in this way are very large indeed, so large that it may not be practicable to deal with the main bulk.

Secondly, radioactive isotopes can be produced in the pile because it is a copious source of neutrons. The pile is so constructed that there will be more neutrons than are required to maintain the chain reaction, the surplus neutrons being removed by the control rods. Part of the function of the control rods can be assumed by substances inserted in the pile, which, by absorbing some of the surplus neutrons, form radioactive substances. In this way radioactive isotopes of nearly all the elements can be made. (The number known at present is about 450.) The amounts of the substances produced in this way depend on the number of surplus neutrons available, the power level of the pile, the amount of the bombarded material which is inserted, and its reactivity to neutrons.

This second method of producing radioactive substances is similar to the use of a cyclotron for the same purpose. It is, however, more restricted, for the cyclotron can provide a greater diversity of bombarding particles—protons, deuterons, and α-particles as well as neutrons—while the pile is a source of neutrons only. Even these are mostly of low energy, so that large yields can be obtained only in cases where the substances are made by means of a neutron capture process, the (n, p) and (n, γ) processes. On the other hand, the flux of neutrons is so intense that the yields are, on the average, at least a thousand times greater than with the largest cyclotron.

USES IN RADIOTHERAPY

These radioactive substances can be used as sources of radiation in radiotherapy, as an alternative to radium and radon both in beam therapy and in interstitial and intracavitary therapy.

The pile can produce some hundreds of curies per day of mixed fission products. If these were separated from the uranium metal in which they are formed, highly concentrated sources of radiation could be prepared which would be very suitable to replace radium in teleradium therapy. Alternatively, small blocks of uranium metal could be irradiated in the pile and used without separation; in this case the preparation is easy, and the dangerous and costly separation process is avoided, but the source will not be so concentrated.

At least two other materials which can be prepared in sufficient quantity—cobalt 60 and tantalum 182—would be suitable as sources of γ-radiation and substitutes for radium in beam therapy. For interstitial and intracavitary therapy, several other radio-elements would be satisfactory substitutes for radium or radon.

A single pile of a few thousand kilowatts should be able to produce sufficient material to treat at least 10,000 cases a year and in addition to maintain several large beam units for teleradium therapy. It should thus provide all requirements for radium therapy in this country.

SELECTIVE IRRADIATION

Next, the radioactive substances can be used for selective irradiation of cells and tissues, depending on the selective absorption of suitable radioactive isotopes in specific cells and tissues. In such cases the chemical and physiological properties of the substance are of first importance, since these determine the selective absorption in the tissues which it is desired to irradiate. Further, a radioactive isotope which emits β-rays of low energy will in general be desirable, in order to limit the action to those specific tissues or cells.

So far only two radioactive isotopes have been proved to be useful therapeutically—phosphorus and iodine.

Radiophosphorus has proved very effective in the treatment of polycythæmia and useful in the treatment of myelogenous leukæmia.

In polycythæmia doses of 2–4 mc. of radiophosphorus have caused the disappearance of the symptoms. The patient is enormously relieved and the remission may last for two years without further treatment.

In the case of myelogenous leukæmia, among some 150 patients treated with radiophosphorus the results were fairly good. The growth of the cancer cells is restrained to some extent and the symptoms are lessened, but life is prolonged by no more than a few months at most. The use of radiophosphorus has one advantage over the conventional X-ray treatment in that there is less radiation sickness involved; on the other hand there is some difficulty in arriving at the correct dose, with an indefinite hazard from the effects of the radiations.

In lymphatic leukæmia there seems to be no advantage whatever in the use of radiophosphorus.

Radio-iodine has been shown to be effective in the treatment of overactivity of the thyroid and of a particular but rather unusual form of thyroid cancer.

Because of the great avidity of the thyroid for iodine, especially when overactive, it is possible to place the radiation directly inside the cells which it is desired to irradiate. About 50 cases of hyperthyroidism have been treated with radio-iodine and in 40 of these the disorder was controlled. Some patients who had not responded to other forms of treatment responded well to radio-iodine. The duration of the remission has not yet been established and it is not certain that there may not be untoward after-effects from the radiation. It seems possible, however, that treatment with radio-iodine may possess some advantages over other forms of treatment, and it is worthy of extended experiment.

Some attempts have been made to treat cases of thyroid cancer with radio-iodine, and in one or two cases of an unusual form of cancer a pronounced effect was obtained. In the more malignant forms, however, there was no evidence of any benefit. In fact only a small fraction of thyroid cancers pick up iodine preferentially and the more malignant the tumour the less is the possibility of affecting it by means of radio-iodine.

On the whole the results of this new method of selective irradiation may appear somewhat disappointing. Such success as has so far been achieved is mainly with relatively benign diseases which respond to the normal methods of treatment. We must remember, however, that this new method is in its infancy and that its development and scope have been limited. Progress is likely to be slow and it would not be reasonable to expect immediate success.

TRACERS

The most promising medical application of these radioactive substances lies in the investigation of the fundamental chemical processes of the body through their use as "tracers."

Nearly all the ordinary chemical elements can now be obtained in radioactive modifications. These have exactly the same chemical properties as the usual forms, so that if a radio-isotope is mixed with a sample of the same element it will accompany the stable form through any series of chemical processes, however complicated these may be, and it can always be recognised by its radioactivity. The radioactivity acts as a label enabling us to detect the presence of a particular group of atoms and to follow this group throughout the chemical processes. Thus if we wish to study the distribution of a certain element in a series of biological processes we can mix with it a radio-isotope and we can then follow the distribution by means of the radioactivity.

The use of radio-isotopes also largely increases the sensitivity of the methods of detection and estimation. This may be an important advantage in such cases as the metabolism of very toxic metals or drugs, where an amount of the material sufficient to permit detection by chemical means in specific tissues may cause alterations in physiology or even death.

The radioactivity also permits us to detect the element at a distance so that the samples need not be specially purified and in some cases need not be removed from the experimental animal. It may also in some circumstances permit a continuous examination of the accumulation of material in an organ without interfering in any way with its normal functioning.

In short, the use of radioactive tracers does not merely supplement the direct chemical approach to the problems of metabolism but it opens up new possibilities in clarifying and analysing their most intimate details.

The first attempt to apply these methods was made by Hevesy in 1923, when he used a radioactive isotope of lead to investigate the metabolism of that element in plants. At that time, however, only the naturally occurring radio-elements were obtainable, none of which are normal constituents of biological systems. The technique was therefore very limited in its application. It was not until the discovery of artificial radioactivity in 1933 and the development of the cyclotron that radio-isotopes of the common elements became available, providing this new and powerful method of research for the biologist. The first to use it were Chiewitz and Hevesy in 1935, who investigated the metabolism of phosphorus in rats, using radiophosphorus as a tracer. Since that time the method has been applied in nearly all the biological sciences and much new and significant information has been secured, some of which could have been acquired by none of the former methods.

There are three general ways in which the tracer technique has been applied.

(1) *By Examining Samples.*—The technique most widely used, and one which is applicable to all radio-elements, is to follow the distribution in the tissue by quantitative measurement of the radioactivity in samples of the tissues after removal from the body. Thus radiophosphorus may be mixed with inactive phosphorus and converted into sodium phosphate, which is then administered, mixed with the food or as a subcutaneous injection, to a rat. After the lapse of an appropriate time the rat is killed and the various organs and tissues removed. The amount of the administered phosphorus which has reached the various tissues can now be found by a simple measurement of the radioactivity.

Further, the conversion of the administered phosphorus into various complex organic compounds by the physiological processes of the body may be observed. Here the compound must be isolated from the tissues and its radioactivity measured. In this way the rôle of phosphorus in metabolism has been studied in considerable detail. It has been possible to estimate how much finds its way to the different parts of the body, such as the bones, teeth, liver, kidneys, &c., how long it takes to arrive there and by what path, how long it stays, and so on.

The rate of conversion to cephalin and lecithin, the formation of phosphatides in livers, the origin of milk phosphorus, the synthesis of hæmoglobin from iron, of thyroxine and diiodotyrosine from iodine, and many similar questions have been studied by this means.

The method is, of course, not restricted to the administration of simple inorganic compounds. Complex organic compounds can be labelled by including radio-elements in their molecules. Thus thiamine (vitamin B_1) has been labelled by synthesising it from radiosulphur, and its fate in the body has been followed by measuring the distribution of the radiosulphur in the various tissues.

(2) *By Direct Measurement of Radioactivity.*—If the radio-isotope emits penetrating γ-rays its presence can be detected through several centimetres of tissue. The presence in a particular organ can then be detected by placing a Geiger-Müller counter over the organ and measuring the intensity of the γ-radiation. This technique has been used to observe the selective absorption of iodine by the thyroid and the circulation of the blood, using radiosodium as a tracer.

An extensive study of the iodine metabolism of the thyroid gland in both normal and goitrous human beings has been made by this method. The deposition of the administered iodine in the thyroid is measured with a Geiger-Müller counter placed against the subject's neck. In this way the patient is not disturbed by any surgical treatment and the changes in the amount of radio-iodine in the thyroid can be followed over a considerable period.

Experiments by Hamilton and Soley, by Hertz, and others showed that thyroids of patients with thyrotoxicosis accumulate and retain a large proportion of the administered radio-iodine, that the thyroid tissue can be destroyed selectively by the irradiation of the radio-iodine without apparent damage to the other tissues of the body, and that the iodine is deposited preferentially in the regions of the thyroid tissue which are the most hyperplastic.

(3) *By Photography.*—A third method of observation makes use of the photographic action of the radiations from the radio-isotope. Thin sections of the tissue under investigation are placed against photographic films. After an adequate interval the films are developed and will show areas of darkening corresponding to the regions of the tissue in which the radio-isotope has been deposited. The sections are stained and each section is compared under the microscope with its corresponding film. In this way a correlation can be established between the histological structure of the tissue and the deposition of the labelled element. This method of observation is more qualitative than the others, but it has certain advantages in addition to its simplicity.

ILLUSTRATIVE USES OF RADIO-ISOTOPES

I wish now to give some examples of the use of radio-isotopes in the solution of certain problems.

(1) *Permeability of Membrane of Red Cell.*—In human beings the concentration of sodium ions in the blood plasma is about twenty times that inside the red cell, while the potassium concentration inside the cell is about twenty times that in the plasma. Although potassium and sodium ions behave in much the same way chemically, and although there are well-marked changes in the concentrations of chloride and bicarbonate ions during the cycle of respiration, so that the membrane of the cell is clearly permeable to these, this peculiar difference is maintained. To explain this behaviour it has generally been supposed that the membrane of the red cell possesses a selective impermeability to the positively charged basic kations, so that once a cell was born with its peculiar sodium and potassium concentrations it could maintain these concentrations against the very different concentrations in the blood plasma by not exchanging across the surface of the membrane.

This problem was attacked by Cohn by means of the tracer technique. A small amount of labelled sodium chloride, too small to raise the sodium concentration appreciably, was injected and in some minutes it was distributed uniformly throughout the blood. Samples of blood were then drawn from time to time so that any penetration of radiosodium into the red cells could be measured. It was found that penetration did in fact take place and that eventually the concentration of radiosodium in the red cells and in the plasma assumed the normal ratio. Similar results were obtained with radiopotassium. This proved conclusively that there is a continuous exchange of kations through the membrane of the red cell, and that some mechanism other than impermeability must be present in order to preserve the difference in concentrations.

(2) *Effect of X Rays on Cellular Division.*—The preliminary stages of mitosis involve the transfer of nucleotides from the cytoplasm to the chromosomes, their conversion from ribose into desoxyribose nucleotides, and their polymerisation into long chains. At the end of each mitosis the nucleotides are surrendered by the chromosomes. Thus there is a cyclical chemical process.

It is well known that radiation by X rays inhibits cell division in growing tissues and therefore influences their chemical changes at some stage. In remarkable contrast, full-grown tissue is hardly affected by moderate doses of X radiation. Hevesy has studied this question by determining the rate of formation of the desoxyribose nucleic acid before and after irradiation by X rays, using radiophosphorus as an indicator. He found that X rays inhibited the formation of desoxyribose nucleic acid not only in growing tissues but also in full-grown tissues, and to about the same extent in each. The greater part of the inhibiting action disappears in a hours after the irradiation.

Hevesy's results explained the difference in the of X rays on growing and full-grown tissue (the grown tissue has time to recover) and suggested important clues to the sensitivity of tissue to X and to some difficulties in the treatment of by radiation.

(3) *Blood-transfusion.*—Some interesting examples the tracer technique are afforded by work carried in the United States during the war in studies of su shock and in the development of methods for preservation of whole blood for transfusion.

In this work the radio-element used was radio-iron, since iron is a constituent of hæmoglobin. Two radio-isotopes of iron are known—Fe^{55} which has a half-life of 4 years, and Fe^{59} which has a half-life of 44 days. Because of the difference in the rates at which they lose their radioactivity it is easy to distinguish one of these types from the other.

In the experiments on blood-transfusion one of these radio-isotopes of iron was injected into the recipient of the blood-transfusion, thus labelling his red corpuscles, and the other type of radio-iron was injected into the blood-donor, so as to label the red corpuscles of the blood used for transfusion. This device enabled several important investigations to be carried out concerning the interaction of blood types, which have clarified some points in blood-transfusion and have applications in obstetrics as well as in surgery.

A very important contribution of this technique was the determination of the best methods for the preservation of whole blood and for setting up the technical standards for the blood-donor programme in the U.S.A. By this device of labelling the red corpuscles of the donor's blood direct evidence was obtained on the potency of this blood after various durations of storage when admixed with various suggested preservatives. At the end of any given storage period the blood was transfused into a recipient and shortly afterwards the amount of the donor's blood which still remained active in the recipient's blood-stream was determined by measurement of the radio-iron. It was by this method that the U.S.A. standards for blood storage were established.

CONCLUSION

These few examples of the applications to medicine and biology of this new technique of investigation will perhaps suffice to show its extraordinary delicacy and power and its ability to attack problems which have hitherto been inaccessible to direct experiment. It can hardly be questioned that the development and wider use of this technique will bring rapid and remarkable progress in our knowledge of the fundamental chemical processes in the body and in our knowledge of health and disease.

To derive the full benefit from this new method we must have ample supplies of these radioactive materials. Many of them, and all those which are isotopes of the chemical elements directly concerned in body metabolism, can be made by means of a cyclotron. But the quantities which can be made in this way are relatively small. An atomic pile, because of its more copious supply of neutrons, will in general make far larger quantities—of the order of a thousand times more than can be made by a large cyclotron. Thus a single pile of moderate power would be able to supply all the tracer elements needed in this country. Such a pile has no direct military application, it has no significance for the production of atomic bombs, for its rate of manufacture of plutonium is too small. It is essentially a "safe" development of atomic energy and one which, by enabling us to discover more, and more quickly, about the human body, may bring untold benefits in its train.

ADDED INFECTIONS IN BURNS

A STUDY OF 233 CASES

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Bourdillon and Colebrook (1946) described a first attempt to keep burns uninfected by dressing them in a dust-free atmosphere, along with other precautions. They analysed the few added infections that took place during the first twelve months of this régime, and concluded that, in more than 1400 dressings, neither hæmolytic streptococcus nor *Ps. pyocyanea* was transmitted in the course of dressing from any patient to another.

A few added infections with these organisms and with *B. proteus* did take place, but the evidence seemed to point clearly to transmission at some other time than during the dressing. It was suggested that such transmission might easily happen in the wards if the covering of the burns became imperfect at any time, or if the patient interfered with it.

In some situations—e.g., the face, and the buttocks near the perineum—it is manifestly impossible to secure and maintain complete covering. In children the neck, chin, and shoulders, which are often accidentally scalded, are notoriously difficult to seal off effectively with dressings, especially after the children have recovered from the early shock and cannot be kept still.

We report here a further study of infection acquired apart from dressing the wound. The investigation overlaps that reported by Bourdillon and Colebrook (1946) and deals with the twelve months August 1, 1945–August 1, 1946, during which we always recorded, when we started a dressing, whether the wound still had perfect or imperfect cover, or had been exposed at any time since the last dressing. The records, illustrating the importance of cover in relation to site of burn, were as follows:

Site	*Perfect cover*	*Imperfect cover*	*Total*
Limbs	770	96 (11%)	866
Trunk	123	80 (40%)	203
Buttocks	29	77 (72%)	106
Face and neck	69	54 (44%)	123

Our daily records also show the order in which patients are dressed and the clinical condition and bacteriological flora of each burnt area at the time of its dressing. All these data taken together enable us to decide, with a considerable degree of probability, whether any particular lesion acquired its added infection at the time of dressing, or between one dressing and the next—i.e., in the ward.

The organisms we have used as indicators of added infection are hæmolytic streptococci, *Ps. pyocyanea*, and *B. proteus*, partly because they are easily recognised in culture and, in the case of hæmolytic streptococci at least, because strains can often be identified by their serological reactions. They were chosen as indicators also because of the strong impression (in the case of hæmolytic streptococci it may be said to be a certainty) that these three organisms are more often associated with delayed healing and with unsuccessful grafting operations than are most of the other organisms commonly found on granulating surfaces.

Added infections (or contaminations) with other organisms, especially *Staph. aureus*, have taken place during this period—indeed they have been very common—but up to now we have made no serious attempt to trace the source from which they are transmitted to the burns. Such a task is likely to be very difficult.

METHODS

Bacteriological Examinations.—Swabs from the wounds have been planted, usually within two or three hours, on plates of 5% horse blood-agar, and on plates of 1% 'Cetavlon' agar (Harper and Cawston 1945). These plates were incubated only aerobically, owing to difficulties of supply and labour. When *B. proteus* was known to be present or was suspected, swabs were planted by Cawston's modification of the Fry method (Colebrook et al. 1945) and by the more recent method of Pearce (1946).

Dressings have been carried out as described by Bourdillon and Colebrook (1946). In most cases, except when it was almost healed, the burn was covered with tulle gras (with or without penicillin cream under it), then dry sterile gauze, then absorbent wool, extending well beyond the gauze, and finally crêpe bandages. The bandages have been held in place whenever necessary with strips of strapping or, in many cases, if there was any likelihood of interference with the dressing by the patient's fingers, with a light shell of plaster-of-paris. Burns of the face, if not severe, were sometimes left without dressings, being only smeared with penicillin cream from time to time.

ADDED INFECTIONS AND THEIR PROBABLE SOURCES

The term "added infection" is used to denote the growth of one of the three indicator organisms from a burnt area of a patient who had been free from such infection on admission, such organisms being obtained at any time during the patient's stay in hospital.

Bourdillon and Colebrook (1946) described the principles which guided them in deciding whether each added infection was or was not probably acquired in the dressing-station. The same considerations apply to the data given below, but our evidence is somewhat more complete, our records showing whether the burnt areas were imperfectly covered, and therefore liable to infection from without, when their added infections were first detected.

Between August 1, 1945, and August 1, 1946, 233 cases were admitted, almost half of them children. The burns of 13 cases were already infected on admission with one or other of the three indicator organisms—9 of them with hæmolytic streptococcus. During this period no dressings have been carried out in the open wards. All first dressings (of fresh burns) were done either in the plenary treatment room or in the shock room, neither of which is supplied with dust-free air. All the subsequent 1419 dressings were done in the dust-free atmosphere of the dressing-station, except 107 in the saline bathroom, which is not air-conditioned.

Streptococcus hæmolyticus has been responsible for added infection in 12 patients (5%) after admission. Only 2 of the 12 had extensive burns; 1 of them acquired her streptococcus after eight weeks, and it had no clinical ill effects. The other patient acquired her streptococcus during the eleventh week of her recovery and lost it within three days. This took place during a phase of breakdown of her grafted areas, which seemed to be due to an acquired sensitivity to tulle gras. In none of the remaining 10 patients was the arrival of hæmolytic streptococcus on the burns associated with any signs of acute sepsis, and in none did the organism persist more than a few days. It may be said, therefore, that, among the whole 224 patients admitted without streptococcal infection during the period, the clinical effects of added infection with that organism have been practically nil. Of the 12 patients with such added infections, 3 had never been in the dressing-station and 9 had not followed a streptococcus-infected case in the dressing-station at the last dressing. One patient did follow a streptococcus-infected patient in the dressing-station, but the infected lesion (a finger) had been exposed in the ward, where there was another streptococcus-infected patient; *hence it is doubtful where the infection took* place. We conclude that 11 of the 12 certainly, or very probably, acquired their streptococci outside the dressing-station. The burnt areas of 8 of these are known to have had imperfect cover immediately before their added infection was detected; 6 were anatomically difficult to keep perfectly covered, being burns of neck, chest, buttocks, or thighs.

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* Receiving a part-time grant from the Medical Research Council.

Ps. pyocyanea was responsible for added infection in 9 patients (4%). In most of them the infection persisted for days or weeks, and we were unsuccessful in eliminating it by any local applications, including proflavine and 'Phenoxetol.' Apart from some possible delay in healing, the infections appeared to produce little clinical effect. None of the 9 patients had followed a pyocyaneus-infected patient in the dressing-station at the last dressing. It is therefore certain, or very probable, that all acquired their infection outside the dressing-station. The burnt areas of 5 of the 9 patients were imperfectly covered immediately before their added infection was detected. One other patient was ambulant and had visited a patient admitted with pyocyaneus.

B. proteus was responsible for added infection in 14 patients (6%). Of these 14 patients, 4 had never been in the dressing-station and the remaining 10 had not followed a proteus-infected patient in the dressing-station at the last dressing. All of them, therefore, had certainly, or very probably, acquired their infection outside the dressing-station. The burnt areas of all of the patients were imperfectly covered immediately before their infection was detected, and 11 were so situated as to be difficult to cover adequately (buttocks, chin, neck, &c.).

Summing up these data, of the 220 patients whose burns were free from all the three indicator organisms on admission, 29 (13·2%) acquired one or more of them at some time during their stay in hospital. Of these 29 patients, 14 were children under 5 years of age and 4 were older children. (Of the 29 patients, 5 acquired more than one of the three indicator organisms.) In only one instance was there reason to suspect that the infection may have been transmitted at the time of dressing in the dressing-station. In all the other cases it probably took place in the ward in the interval between dressings.

It is evident, too, that the risk of added infection has been closely related to success or failure in keeping burnt areas adequately covered with dressings. Further evidence on this point is provided by the fact that, out of 1104 dressings of areas recorded as having perfect cover when they arrived in the dressing-station, only 9 (0·8%) acquired an added infection with one of the three indicator organisms; whereas among 315 dressings of areas recorded as having imperfect cover, 27 (8·6%) acquired an added infection.

The exact source of all these added infections is not evident. It is conceivable that a few of them may have been due to transfer of the organism from the patient's skin or from some other part of the patient's body—e.g., the respiratory, alimentary, and urinary tracts. It is unlikely that such transmission was common, in view of the following facts. Hæmolytic streptococci were not isolated from throat swabs of 7 of the patients who acquired an infection of their burns with that organism (only 2 patients had a positive swab, and 3 were not swabbed). And these streptococci are rarely found on the skin or in the fæces of normal persons (Colebrook et al. 1935, Hare and Maxted 1935). Pyocyaneus and proteus are still more rare in the throat and on the skin. Both may be found in pathological conditions in the bowel or in the urinary tract, but they are rarely found in normal persons. It seems very probable, therefore, that most of the added infections in our patients have arisen by transfer of infective material in some way from a source outside the patient.

We know that clouds of organisms, often including potential pathogens, are liberated whenever bedding is shaken, and therefore also during the routine process of bed-making (Bourdillon and Colebrook 1946, Willits and Hare 1941). In this connexion it should be remembered that most hospital laundries do not a to sterilise blankets (Colebrook et al. 1945). A and often larger scatter of organisms into the air place whenever dressings are applied (Bourdillon Colebrook 1946). Pathogens must also be intro sometimes on the clothing of doctors, nurses, and visito especially when these are throat- or nose-carriers streptococci (Willits and Hare 1941); and they are carried by flies (Shooter and Waterworth 1944) and by drinking-utensils, bedpans, and thermometers, if t are not sterilised. The interchange of fluffy toys, or materials used for occupational therapy, constitutes another possible pathway for infection which is sometimes overlooked.

PREVENTION OF ADDED INFECTIONS IN THE WARDS

No single remedy is likely to secure a high degree of immunity from these infections. The following procedures have seemed to us of chief importance:

1. Maintenance of perfect cover.
2. Restraint of bacterial growth on the burnt surfaces, and rapid elimination of reservoirs of infection.
3. Rapid restoration of the epithelial covering by early and repeated grafting.
4. Anti-dust measures and elimination of flies.
5. Segregation of infected cases in cubicles.
6. Routine purification of the air of the wards.

(1) *Maintenance of Perfect Cover.*—The close connexion which has been shown between the incidence of added infection and the adequate covering of the burns makes it obvious that continuous attention to this detail is all important. Our practice has been to cover the whole of the burnt area with sterile gauze extending beyond the limit of the lesion and, over this in turn, to apply wool about $^3/_4$–1 in. thick, extending well beyond the gauze, to avoid infection from without, like the wool plug of the bacteriologist's test-tube. The whole dressing is then secured with crêpe bandages, which again extend well beyond the wool. We emphasise the necessity for these bandages in dealing with burns dressed at infrequent intervals (5–10 days). Admittedly they are expensive, but not unduly so if they are washed and repeatedly resterilised. Economy in bandages can be easily offset by a longer stay in hospital.

Finally, to defeat the patient who is likely to jump about in bed and cause his bandages to work loose, we often fix the bandages with long strips of strapping carried on to the unburnt skin or, still more effectively, with a thin shell of plaster-of-paris over the crêpe bandages. This last procedure is, in our experience, the only answer to the exploring fingers possessed by so many children.

Some simple rules may be recommended for burns of particular situations:

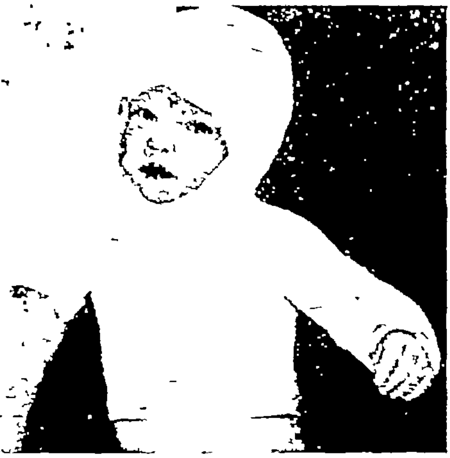
(*a*) For burns of the neck and shoulders (very common in young children and difficult to keep covered) the dressing should extend on to the head and over the chest. For children a plaster-of-paris shell is almost essential (see figure).

(*b*) For burns of the arm, forearm, or leg, bandage from the phalanges to above the elbow or knee joint (with the joints in the correct position for function).

(*c*) For burns of the trunk, bandage the whole trunk and both shoulders. If the burn extends down past the iliac crest, include the appropriate hip. A plaster-of-paris shell is often advisable.

(*d*) For burns of the face, to avoid infection during the first few days before repair has started, and to prevent excessive exudation into the loose tissues, the dressing should cover the whole face except for small apertures giving access to the mouth and nostrils; and firm pressure should be applied over plenty of wool, particularly over the eyes and forehead. After two or three days the eyes may usually be uncovered. This applies only to severe burns of the face. Superficial flash burns can often be treated without dressings if a bacteriostatic cream is applied.

Sandeep



Thin plaster-of-paris shell over crêpe bandages to maintain perfect cover of burns of neck and shoulders in a child.

(e) For burns of the buttocks (common in young children) it has been found helpful to elevate the legs with strapping extension on a gallows frame.

A complete antibacterial barrier having been obtained by these devices, daily careful examination of the bandages during the ward round is essential. Never was the proverb "A stitch in time saves nine" more apposite.

(2) *Restraint of Bacterial Growth on the Burn and Elimination of Reservoirs of Infection.*—Since it has been clearly demonstrated that sensitive organisms—e.g., hæmolytic streptococci—can be rapidly eliminated from superficial lesions, such as burns, with penicillin (Clark et al. 1943) and sulphanilamide (Colebrook and Francis 1941), there can be little doubt that these agents will also check the free outgrowth of many organisms which are somewhat less sensitive—e.g., staphylococci, diphtheroids, coliforms, and non-hæmolytic streptococci. We have therefore used as our routine dressing for the past three years a cream containing penicillin and sulphathiazole in a bland base (Clark et al. 1943); and results have been so satisfactory that we have seen no reason to change it. (The only reservation we make is that an occasional patient becomes hypersensitive to some ingredient in the cream, and for that reason it is undesirable to continue it for more than three or four weeks as a rule.)

After the first application of this routine cream the dressings are left undisturbed for 7–12 days; after subsequent dressings usually for 5–7 days. If on admission or at any subsequent dressing a wound is found to have acquired hæmolytic streptococci, a course of four or five applications of penicillin cream at two-day intervals is instituted. We attach great importance to this practice, since it eliminates reservoirs of hæmolytic streptococci. As the range of our chemotherapeutic attack is expanded to include organisms such as pyocyaneus, proteus, and the coliform bacilli, it will no doubt become possible to reduce considerably the number of added infections.

(3) *Rapid Repair of Epithelial Skin Covering.*—It will always be difficult to keep large granulating surfaces free from added infections for many weeks, and the longer they are not covered with epithelium the more fibrous tissue will be formed beneath them, leading often to serious loss of function. For all these reasons grafting should be carried out as early as possible—sometimes during the first week. And if, as often happens, it does not succeed in completely covering the burnt area it should be repeated without delay. The practice of taking rather more skin than is required at the first grafting operation and storing the unused part in the refrigerator (Mathews 1945) for subsequent use is of the greatest value. Repeated regrafting of unhealed areas with stored skin, or with small grafts obtained under local anæsthesia, should be a routine dressing procedure, not an operation requiring the use of an operating-theatre and an anæsthetist.

(4) *Anti-dust Measures and Elimination of Flies.*—Bed-making is responsible for a large part of the dust in the ward, and the sweeping of floors, if these are not oiled, for its repeated dissemination through the air. By the oiling of blankets after they are laundered (Harwood et al. 1944) and of floors (Andrewes et al. 1940) both these sources of air-borne contamination can be very much reduced. The ward floors in the burns unit have been oiled once in three weeks and, apart from their being a little slippery for a few hours, no inconvenience has been caused by it. The oiling of blankets has not proved difficult, except inasmuch as it involves one additional process for the laundry staff; nor has it required any new apparatus. The oil cannot be detected by touch or smell. No ill effects of its use have been detected, except perhaps some shrinkage of the blankets.

Even in temperate climates flies can be a nuisance in a burns ward during hot weather. There is bound to be a slight odour from the extensively burnt patient, who is only dressed once in 5–10 days, even if the burn remains uninfected. Occasional spraying with 5% D.D.T. in white spirit has been helpful but will not keep the ward entirely free from flies if their breeding-places—e.g., refuse bins—are not sought and systematically dealt with. A muslin canopy should be used over the whole bed of every extensively burnt patient during hot weather, for a single fly can carry infection to or from such a patient. The complete fly-proofing of wards by fitting fine-mesh gauze to windows and doors is hardly necessary in temperate climates, though one single-bed ward might well be so protected for the exceptionally severe burn which is bound to be somewhat smelly while sloughing.

(5) *Segregation of Infected Cases in Cubicles.*—Single-bed wards have not been available to us hitherto, but there is no doubt that they would reduce the risk of transfer of infection by dust. The ideal burns unit would have perhaps half its bed accommodation in single-bed wards—the rest in wards of 2–4 beds. The windows, doors, and fireplaces of cubicles should be so designed as to allow of being easily sealed off for sterilisation with formalin or other vapour.

(6) *Routine Purification of Air of Wards.*—The great scatter of microbe-carrying particles from bed-clothes and dressings (Bourdillon and Colebrook 1946, Hamburger et al. 1944, Willits and Hare 1941) is a fact which cannot be ignored in any attempt to control cross-infection in hospital wards. The peak load of bacteria in the air which accompanies bed-making or surgical dressings can certainly be reduced by dilution with outside air. Even in a large city the bacterial density of the outside air is much less than that of hospital wards (Colebrook 1946). But ventilation by windows is somewhat capricious and may lead to dissemination of dust besides dilution. Much more controlled and potentially effective ventilation is provided by a plenum system such as has been in use for forty years in the wards of the Royal Victoria Hospital, Belfast (Henman and Lea 1903).

Other procedures worthy of serious consideration in this connexion are the introduction of bactericidal mists—e.g., of triethylene glycol—and of lactic acid (Lovelock et al. 1944) after bed-making; or indirect ultraviolet radiation combined with convection currents, as used by Wells et al. (1942) and Wells (1943) in schools in America. The evidence of Puck et al. (1945) showed that, by combination of anti-dust measures with vaporisation of triethylene glycol, the concentration of streptococci in the air of wards housing patients with pharyngitis was greatly reduced. Further experience is required exposed in the ward, where there was another streptococcus-infected patient; hence it is doubtful where the infection took place. We conclude that 11 of the 12 certainly, or very probably, acquired their streptococci outside the dressing-station. The burnt areas of 8 of these are known to have had imperfect cover immediately before their added infection was detected; 6 were anatomically difficult to keep perfectly covered, being burns of neck, chest, buttocks, or thighs.

Ps. pyocyanea was responsible for added infection in 9 patients (4%). In most of them the infection persisted for days or weeks, and we were unsuccessful in eliminating it by any local applications, including proflavine and 'Phenoxetol.' Apart from some possible delay in healing, the infections appeared to produce little clinical effect. None of the 9 patients had followed a pyocyaneus-infected patient in the dressing-station at the last dressing. It is therefore certain, or very probable, that all acquired their infection outside the dressing-station. The burnt areas of 5 of the 9 patients were imperfectly covered immediately before their added infection was detected. One other patient was ambulant and had visited a patient admitted with pyocyaneus.

B. proteus was responsible for added infection in 14 patients (6%). Of these 14 patients, 4 had never been in the dressing-station and the remaining 10 had not followed a proteus-infected patient in the dressing-station at the last dressing. All of them, therefore, had certainly, or very probably, acquired their infection outside the dressing-station. The burnt areas of all of the patients were imperfectly covered immediately before their infection was detected, and 11 were so situated as to be difficult to cover adequately (buttocks, chin, neck, &c.)

Summing up these data, of the 220 patients whose burns were free from all the three indicator organisms on admission, 29 (13·2%) acquired one or more of them at some time during their stay in hospital. Of these 29 patients, 14 were children under 5 years of age and 4 were older children. (Of the 29 patients, 5 acquired more than one of the three indicator organisms.) In only one instance was there reason to suspect that the infection may have been transmitted at the time of dressing in the dressing-station. In all the other cases it probably took place in the ward in the interval between dressings.

It is evident, too, that the risk of added infection has been closely related to success or failure in keeping burnt areas adequately covered with dressings. Further evidence on this point is provided by the fact that, out of 1104 dressings of areas recorded as having perfect cover when they arrived in the dressing-station, only 9 (0·8%) acquired an added infection with one of the three indicator organisms; whereas among 315 dressings of areas recorded as having imperfect cover, 27 (8·6%) acquired an added infection.

The exact source of all these added infections is not evident. It is conceivable that a few of them may have been due to transfer of the organism from the patient's skin or from some other part of the patient's body—e.g., the respiratory, alimentary, and urinary tracts. It is unlikely that such transmission was common, in view of the following facts. Hæmolytic streptococci were not isolated from throat swabs of 7 of the patients who acquired an infection of their burns with that organism (only 2 patients had a positive swab, and 3 were not swabbed). And these streptococci are rarely found on the skin or in the fæces of normal persons (Colebrook et al. 1935, Hare and Maxted 1935). Pyocyaneus and proteus are still more rare in the throat and on the skin. Both may be found in pathological conditions in the bowel or in the urinary tract, but they are rarely found in normal persons. It seems very probable, therefore, that most of the added infections in our patients have arisen by transfer of infective material in some way from a source outside the patient.

We know that clouds of organisms, often including potential pathogens, are liberated whenever bedding is shaken, and therefore also during the routine process of bed-making (Bourdillon and Colebrook 1946, Willits and Hare 1941). In this connexion it should be remembered that most hospital laundries do not to sterilise blankets (Colebrook et al. 1945). A and often larger scatter of organisms into the air place whenever dressings are applied (Bourdillon Colebrook 1946). Pathogens must also be intr sometimes on the clothing of doctors, nurses, and especially when these are throat- or nose-carriers streptococci (Willits and Hare 1941); and they are carried by flies (Shooter and Waterworth 1944) and drinking-utensils, bedpans, and thermometers, if t are not sterilised. The interchange of fluffy toys, materials used for occupational therapy, con another possible pathway for infection which is sometimes overlooked.

PREVENTION OF ADDED INFECTIONS IN THE WARDS

No single remedy is likely to secure a high degree of immunity from these infections. The following procedures have seemed to us of chief importance:

(1) Maintenance of perfect cover.
(2) Restraint of bacterial growth on the burnt surfaces, and rapid elimination of reservoirs of infection.
(3) Rapid restoration of the epithelial covering by early and repeated grafting.
(4) Anti-dust measures and elimination of flies.
(5) Segregation of infected cases in cubicles.
(6) Routine purification of the air of the wards.

(1) *Maintenance of Perfect Cover.*—The close connexion which has been shown between the incidence of added infection and the adequate covering of the burns makes it obvious that continuous attention to this detail is all important. Our practice has been to cover the whole of the burnt area with sterile gauze extending beyond the limit of the lesion and, over this in turn, to apply wool about $^3/_4$–1 in. thick, extending well beyond the gauze, to avoid infection from without, like the wool plug of the bacteriologist's test-tube. The whole dressing is then secured with crêpe bandages, which again extend well beyond the wool. We emphasise the necessity for these bandages in dealing with burns dressed at infrequent intervals (5–10 days). Admittedly they are expensive, but not unduly so if they are washed and repeatedly resterilised. Economy in bandages can be easily offset by a longer stay in hospital.

Finally, to defeat the patient who is likely to jump about in bed and cause his bandages to work loose, we often fix the bandages with long strips of strapping carried on to the unburnt skin or, still more effectively, with a thin shell of plaster-of-paris over the crêpe bandages. This last procedure is, in our experience, the only answer to the exploring fingers possessed by so many children.

Some simple rules may be recommended for burns of particular situations:

(*a*) For burns of the neck and shoulders (very common in young children and difficult to keep covered) the dressing should extend on to the head and over the chest. For children a plaster-of-paris shell is almost essential (see figure).
(*b*) For burns of the arm, forearm, or leg, bandage from the phalanges to above the elbow or knee joint (with the joints in the correct position for function).
(*c*) For burns of the trunk, bandage the whole trunk and both shoulders. If the burn extends down past the iliac crest, include the appropriate hip. A plaster-of-paris shell is often advisable.
(*d*) For burns of the face, to avoid infection during the first few days before repair has started, and to prevent excessive exudation into the loose tissues, the dressing should cover the whole face except for small apertures giving access to the mouth and nostrils; and firm pressure should be applied over plenty of wool, particularly over the eyes and forehead. After two or three days the eyes may usually be uncovered. This applies only to severe burns of the face. Superficial flash burns can often be treated without dressings if a bacteriostatic cream is applied.

greatly improved and the B.P. reduced to 218/102 mm. After a month's therapy her B.P. was 210/110 mm., but a month later it rose again, and two months later it was 240/110 mm. In spite of the return of the B.P. to slightly higher than its previous level, she was emphatic that her headaches were better than they had been for some years. Up to date, nine months since the beginning of treatment, the B.P. varies between 210/100 and 240/110 mm., but her symptomatic relief continues, and she still gets occasional but much less severe headaches. She also remarked that her feet, which had previously been very cold, were much warmer since therapy; no doubt this was due to the vasodilator action of the drug.

CASE 2.—A male caretaker, aged 52, had led an extremely sedentary existence for twenty years because of varicose veins and varicose ulcers. For the last ten years he had had severe headaches and dizziness, and before admission he had been at rest in bed at another hospital for over a month; but this had not relieved the headaches, and he was so giddy when he got up that he could only sit about the ward.

EFFECTS OF POTASSIUM THIOCYANATE ON HYPERTENSIVE DISEASE

Predominant symptoms	Cases	Effect on symptoms				Effect on blood-pressure		
		Complete relief	Much relief	Partial relief	No effect	Permanently reduced	Temporarily reduced	No effect
Headache and giddiness	27	1	21	5	0	0	18	9
Other symptoms—e.g., insomnia and tinnitus	8	0	0	0	8	0	5	3

On examination he had benign hypertension, with a B.P. of 265/150 mm. Hg. He had considerable enlargement of the heart but no evidence of cardiac failure and no evidence of malignant hypertension.

After treatment with potassium thiocyanate to keep the blood-thiocyanate level at 6–8 mg. per 100 c.cm. there was great relief in the attacks of giddiness and in the headaches. This was striking to all observers, for the patient would now help in ward duties and could walk about without giddiness. After a month's treatment the B.P. was reduced to 198/134 mm. A month later, however, it had risen to 210/140 mm., but there was still considerable symptomatic relief. The patient has continued to obtain relief from symptoms over the past six months, although the B.P. has now risen to 230/140 mm.

COMMENTS

These 2 cases are exceptionally good examples of the value of potassium thiocyanate therapy, because in case 1 no period of rest accompanied or preceded the administration of the drug, and in case 2 the previous period of rest had been so extensive and without benefit that there seemed to be little doubt that the relief in symptoms was due to the thiocyanate. In the 25 other cases symptomatic relief continued so long as the optimal blood-level was maintained, but in all cases the fall in B.P. was only temporary.

The dosage was adjusted to keep the blood-thiocyanate level at 6–8 mg. per 100 c.cm. Rather higher levels, up to 15 mg. per 100 c.cm., have been used by other clinicians, but low levels are equally efficacious and safer. The optimal level varies enormously from patient to patient and can be found only by trial and error. The usual procedure was to give 0·2 g. in chloroform water thrice daily for three days, followed by once daily for the remainder of the week; at the end of the week the blood-thiocyanate level was estimated and the dose raised or lowered as seemed necessary. Some patients maintain a satisfactory blood-thiocyanate level on as small a dose as 0·2 g. thrice weekly. This plan has been found to be safer than starting with larger doses and being prepared to reduce them. Weekly estimations of the blood-thiocyanate levels are done for the first month. After this the dose necessary to keep the level correct remains fairly constant, and less frequent blood estimations become necessary, provided there is no indication of any renal disease which may impair excretion.

No toxic symptoms of any sort were encountered in this series, beyond nausea and loss of appetite in one patient in whom the blood-thiocyanate level had risen to 16 mg. per 100 c.cm. and whose symptoms rapidly disappeared after reduction of the dosage. Serious toxic symptoms have, however, been reported (Wald et al. 1939, del Solar et al. 1945), including extreme lassitude, nausea, vomiting, muscular weakness, rashes, thyroid gland enlargement, coma, and death. In all these cases the blood-thiocyanate level had been high. For this reason it is not justifiable to use potassium thiocyanate unless safer measures have failed.

An objection to this form of therapy is that frequent blood examinations are necessary to ensure safety; but this also applies to many other drugs, such as thiouracil, which nevertheless have a place in therapeutics. The technique of blood-thiocyanate estimation is simple and once learnt can be carried out with ease and speed in any small laboratory. The principle is that of colour comparison with a standard of known concentration.

The *technique* (Ravin 1940) is as follows:

Reagents:

(1) 20 % aqueous trichloracetic acid.
(2) Acid ferric nitrate (5 % ferric nitrate in 2·5 % v/v nitric acid).

Colour Standards:

0·567 g. of potassium dichromate with 38·3 g. of cobaltous chloride hexahydrate is dissolved in 500 ml. of distilled water. This is stock, and corresponds to 20 mg. CNS ion per 100 ml. serum. Prepare standards by dilution from the stock, corresponding to 1 to 20 mg. CNS ion per 100 ml., and seal in comparator tubes.

Technique:

In a tube place 2 ml. of distilled water, 1 ml. of serum, and 1 ml. of trichloracetic acid solution. Mix well, stand 10–15 min. and centrifuge or filter until clear. Place 2 ml. of the clear supernatant fluid in a comparator tube and add 0·4 ml. of acid ferric nitrate reagent. Mix well and compare with standards. If very high values are encountered, repeat with 0·5 or 0·25 ml. of serum.

The most exacting part is the preparation of the standard, but Lovibonds have now made a disk for their comparator, and this simplifies the technique and avoids error which might arise from the standard losing its colour.

In cases of malignant hypertension some relief has also been obtained where headache was a troublesome symptom before there was a rise in the blood-urea, but after this stage no benefit was derived from the drug. In one case with papillœdema, however, where the patient was nearly blind (to the extent of being unable to count fingers), there was considerable improvement of vision after thiocyanate treatment was started, but whether this was due to the drug is difficult to decide. The usual course of malignant hypertension, with terminal uræmia or cardiac failure, did not seem to be influenced in any way, but only 10 cases were treated.

CONCLUSION

It was with a somewhat sceptical attitude and some reluctance that I began to use potassium thiocyanate, owing to the many claims in the past for various drugs in the treatment of hypertension. An attempt has been made to define the true value of this drug, chiefly as regards its value in the relief of headache, and 27 cases of benign hypertension were treated in which headache and giddiness were prominent symptoms. Besides these, 8 cases of benign hypertension, presenting with symptoms other than headache and giddiness, and 10 cases of malignant hypertension were treated. The benign cases were selected and restricted to long-standing cases of hypertension with a history of symptoms for some years. Those in which a functional element was suspected were not chosen for treatment.

The conclusion reached is that this drug has a definite but very limited place in the treatment of hypertension and should be restricted to cases in which hypertensive regarding possible harmful effects of such bactericidal vapours on patients exposed to them at intervals over long periods.

Whatever methods are used, the frequent cleaning of the air of wards housing burnt patients must be regarded as a desirable goal. Sanatorium conditions would probably be ideal, both for avoiding infection and for healing.

COMMENT

The problem of controlling added infections of burns with *Staph. aureus* remains untouched. These infections, which are very numerous, may well play a prominent part in the slow healing of burns during the later stages of recovery, and also in the ætiology of the dermatitis which is apt to complicate these later stages. The elimination of added infections of this class is likely to present great difficulties in view of the prevalence of *Staph. aureus* in the air of hospital wards besides on the skin and in the nose of so many normal persons.

SUMMARY AND CONCLUSIONS

During a twelve months' period—involving more than 1400 dressings—cross-infection by hæmolytic streptococci, *Ps. pyocyanea*, and *B. proteus* introduced while dressing burns has been almost entirely eliminated by doing the dressings in a dust-free atmosphere, using a strict aseptic technique and adopting a penicillin-sulphathiazole cream as a routine application.

During the same period a few added infections by these three indicator organisms have occurred (33 in all), but the circumstances in all but one instance make it highly probable that the infections were acquired apart from the act of dressing the burn. Most of these added infections occurred in patients whose burns had been imperfectly covered for a period before they were re-dressed, and it seems likely that dust was the infecting agent in most cases.

The incidence of added infection in burns which were found to be imperfectly covered when they arrived for re-dressing was 10 times as high (8·6%) as that of the burns which had perfect cover throughout the period between dressings (0·8%).

Among the 224 patients admitted without streptococcal infection only 12 (5%) acquired this infection at any time during their stay in hospital; and the clinical effect of these few added infections was practically nil.

This investigation takes no account of added infections with *Staph. aureus*, which are numerous and possibly important in relation to slow healing.

Our thanks are due to Sister A. Magee, and the nurses who have worked with her, for their loyal coöperation ; W. Cawston and A. Hood for most of the laborious bacteriological work ; and Drs. S. D. Elliott and V. D. Allison, of the Central Public Health Laboratory, for invaluable help in typing streptococci.

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HYPERTENSIVE HEADACHE
TREATED WITH
POTASSIUM THIOCYANATE

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MANY drugs have been used in hypertensive disease, and nearly all have been abandoned as of little value in controlling either the course or the symptoms. Among them was potassium thiocyanate, which was first used in 1903 by Pauli, but, owing to its toxic effects, was abandoned without a careful study being made of its therapeutic and toxic doses, there being then no known method of estimating it quantitatively in the blood.

Potassium thiocyanate was again tried in America by Barker and others in 1936, and more recently by a few clinical observers in Great Britain. A simple method of estimating the level in the blood-stream has now been devised, so that toxic doses can more easily be avoided. When the blood-levels of the drug are carefully controlled it has been found to be a comparatively safe and valuable remedy for some of the symptoms of benign hypertension.

The mode of action and full range of usefulness of potassium thiocyanate have not yet been fully investigated. It is known to be a normal physiological constituent of the blood and saliva, and therefore one view is that it acts by replacement, the salivary thiocyanate being low in many cases of malignant hypertension. It seems most unlikely, however, that the ætiology of hypertension is so simple as this. Thiocyanate is also a vasodilator, but the symptomatic relief it gives does not correspond to any lowering of the blood-pressure that may occur.

The symptoms which respond most readily to this drug are headache and dizziness. In 27 cases of benign hypertension in which these symptoms were prominent, all the patients experienced striking relief within two weeks of the institution of treatment. The cases were selected with care, and as far as possible those in which there was an overlying functional element were not included, so that symptomatic relief could be more accurately assessed. In cases where different symptoms, such as noises in the head, insomnia, and mental changes, were more prominent the drug was not found to be of any great value beyond what might possibly be attributed to a functional response. In 8 such cases treatment did not bring any benefit. Other observers, however, have thought that some benefit was derived from this drug in all cases (D'Silva and Evans 1944).

The effect on the blood-pressure varied widely. The drug usually caused some lowering of both systolic and diastolic readings after one or two weeks' treatment, but this lowering of the pressure was not maintained, although symptoms continued to be relieved. There seems to be no definite relationship between the lowering of the pressure and the relief of symptoms (see accompanying table).

ILLUSTRATIVE CASE-RECORDS

CASE 1.—A housewife, aged 53, had severe headaches and giddiness daily for seven years, causing severe incapacity. She was sensible and coöperative, and there was no suggestion of a functional element. Blood-pressure (B.P.) was 230/110 mm. Hg, and there was considerable enlargement of the left ventricle. She had been treated for some years with regular doses of phenobarbitone without effect. Examination was otherwise normal. There was no evidence of malignant hypertension.

Since she had an invalid husband to look after it was impracticable for her to be admitted to hospital for a preliminary rest, and therefore she was given potassium thiocyanate as an outpatient and attended regularly for blood estimations. The blood-thiocyanate level was kept at 4–8 mg. per 100 c.cm. After two weeks her headaches were

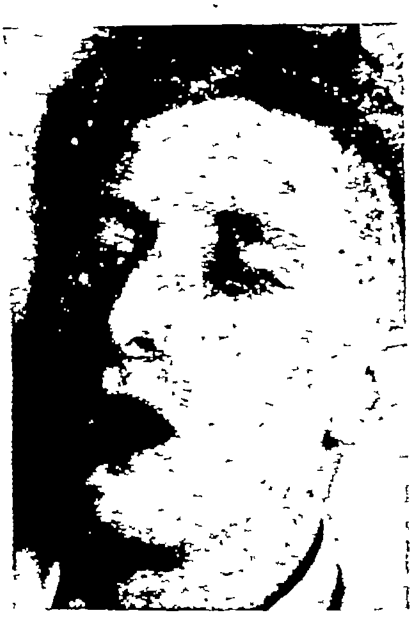


Fig. 3—Lesion on eyes, nares, and mouth.

Blood-culture was sterile.

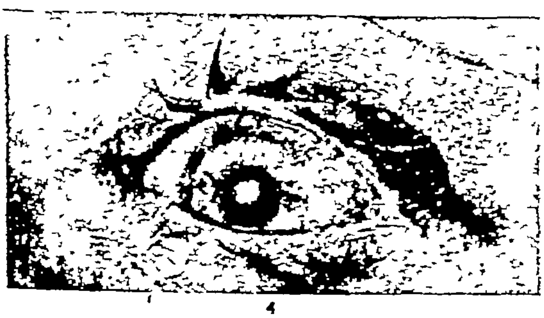
The temperature came down to normal on June 1 and remained normal (fig. 6). The eyes were now clear, but the mucosa of the mouth was still inflamed and purulent, and the patient salivated excessively. The urethritis was still severe but improving. The skin of the penis and part of the scrotum were excoriated.

The patient's general condition was now rapidly improving, and the lesions were gradually receding. By June 3 the skin lesions were only brown discoloured patches. There was no scarring. The lung signs had lasted only two days. The patient was now eating voraciously.

On the 13th the mouth was clear, and the urethral discharge had disappeared. The prepuce, however, was densely adherent to the glans penis and could not be retracted; circumcision was therefore performed. On the 21st the patient was allowed up, and two weeks later he was discharged well.

DISCUSSION

Very few cases of this syndrome occur in females. The age-incidence seems to be between 22 months and 19 years. Of 9 reported cases collected by Ageloff (1940) only 2 escaped total blindness, and these remained partially blind. The ocular lesions include corneal ulceration with scar formation; bilateral suppurative keratitis with perforation, leading to phthisis bulbi and total blindness: chemosis, subconjunctival hæmorrhage, iridocyclitis, and hazy corneas, with vision limited to partial perception of light; and pseudomembranous conjunctivitis, with corneal involvement and symblepharon.



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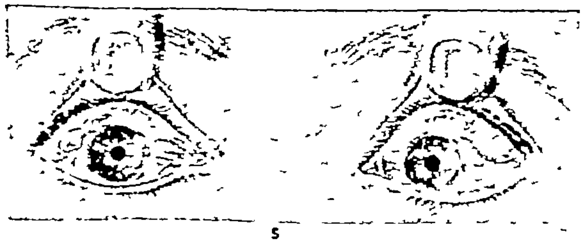

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Figs. 4 and 5—Eye lesion twelve days after admission.

The condition in the mouth varies from simple stomatitis and gingivitis to a severe pseudomembranous inflammatory process, with great swelling of the mucosa, tongue, lips, palate, and cheek, causing much pain in swallowing. Healing is usually complete.

The cutaneous lesions have been described as maculopapular, occasionally vesicular and bullous. These resolve as a rule with crusting and scaling, occasionally leaving brown and pigmented areas which finally disappear. The average time for resolution of the skin lesions appears to be 18–21 days.

The ætiology must be regarded as unknown. Chick and Witzberger (1938) described a case accompanied by Vincent's infection of the mouth and suggested Vincent's organisms as an ætiological agent, but this view has not been substantiated by other workers. Sutton and Sutton (1939) believe that the most likely explanation of the condition is allergic sensitisation. Biopsy in our cases and in others (Ageloff 1940, Edgar and Syverton 1938) have revealed only a non-specific inflammation of the skin. Erythema exudativum multiforme, as first described by Hebra (1866), is characterised by a maculopapular or vesicular eruption on the face, neck, and extensor surfaces of the hands, forearms, and legs. Hebra, however, emphasised the absence of constitutional symptoms and the presence of only mild, if any, oral or ocular involvement. Nevertheless Stevens-Johnson disease may be a severe or atypical form of this condition.

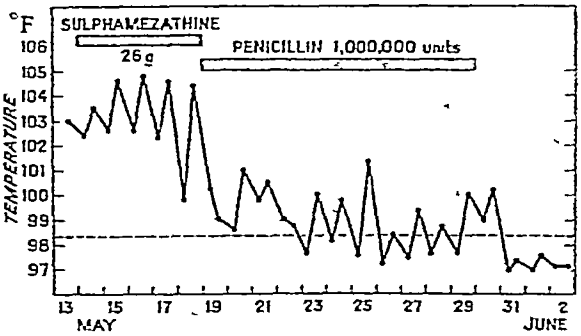

Fig. 6—Temperature chart.

The present case is very similar in many features to the disease seen in two men, aged 19, by Kove (1945). One of his cases was treated with sulphadiazine, with complete recovery. The second was desperately ill and had both sulphadiazine and penicillin. After three months' stay in hospital complete recovery resulted, except for mild chronic conjunctivitis and bilateral ocular synechiæ. In neither of his cases were the lungs affected. In our case there was undoubtedly a transitory pulmonary consolidation, confirmed radiologically, though the sputum did not become more profuse with the onset of the pneumonic lesion, and the flora did not change.

SUMMARY

A case of fever, associated with severe constitutional symptoms and eruptions affecting the skin and mucosa (stomatitis, conjunctivitis, and urethritis), is described.

I wish to thank Mr. E. V. Willmott, A.R.P.S., for the photographs.

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headache is a predominating and troublesome symptom and does not respond to simpler forms of therapy. In many such cases, however, the effects of potassium thiocyanate were very striking and gave great relief, and therefore the drug should not be withheld if its administration is practicable.

This drug does not affect the course of the disease; nor does it permanently lower the blood-pressure, even in cases in which there is much symptomatic improvement. Potassium thiocyanate should be regarded purely as a palliative, so it has a limited though definite place in therapeutics.

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STEVENS-JOHNSON SYNDROME

REPORT OF A CASE

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IN 1922 Stevens and Johnson in the U.S.A. called attention to a syndrome characterised by fever, a bullous skin rash, stomatitis, and ophthalmia. According to Rosenberg and Rosenberg (1940) the first cases were described in France by Alibert and Bazin in 1822. Other examples have been reported under the names "erythema exudativum multiforme bullosum with conjunctivitis and stomatitis," "erythema exudativum multiforme pluriorificialis," or "Stevens-Johnson syndrome," but the condition is so rare that few clinicians are familiar with it.

The following case was seen at the British Postgraduate Medical School in 1945.

A man, aged 20, was admitted on May 13, 1945, with severe malaise, sore throat, and vomiting. Four days before admission he had developed a productive cough and felt generally unwell. A day later he had started vomiting after food and lost his appetite. Two days before admission his eyes had felt gritty, especially in the morning, and he had been unable to open them owing to pain and discharge. The day before admission he had had pain on micturition. There was no previous history of any important illness.

His temperature was 103° F, pulse-rate 100/min., respirations 30/min. There was bilateral conjunctivitis, numerous small vessels running inwards from either canthus towards, but not reaching, the limbus. There were also some vesicles on the conjunctiva. The discharge from the conjunctiva was mucopurulent. The nares were ulcerated, and the upper lip was covered with pustules. On the inside of both cheeks there were numerous discrete white patches, up to ¼ inch across, which could not be scraped off. There were also patches of white exudate on the tonsils. There was no urethral discharge. There were numerous rhonchi over both lungs. The liver was not enlarged and the spleen was not palpable.

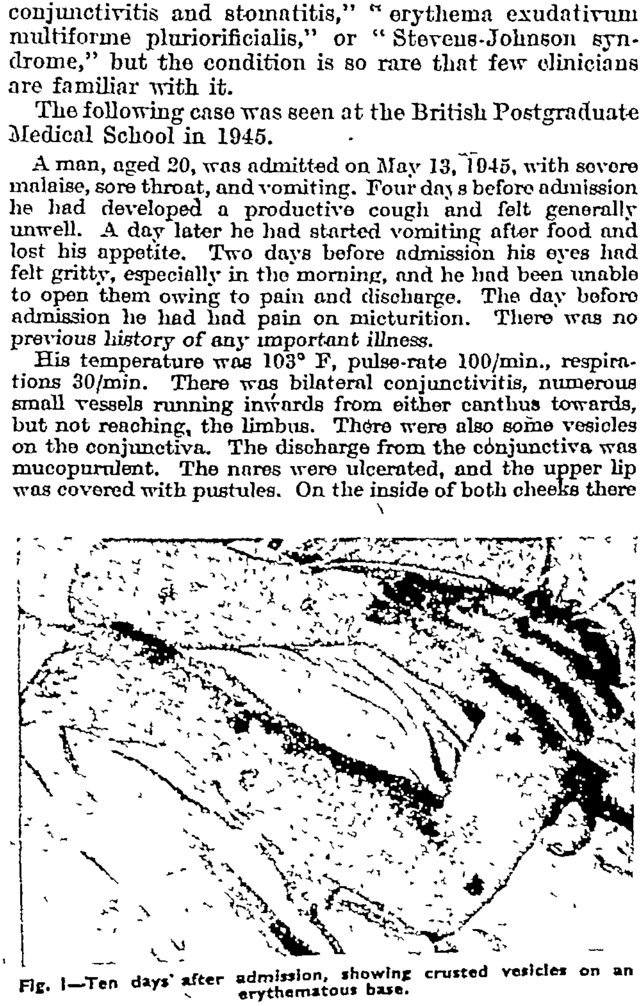

Fig. 1—Ten days' after admission, showing crusted vesicles on an erythematous base.

Report on throat swab next day: "No hæmolytic streptococci, no *C. diphtheriæ*, no Vincent's organisms." The sputum culture grew *H. influenzæ*, *Strep. pneumoniæ*, and neisseriæ. The blood-count showed red cells 4,500,000 per c.mm., Hb 94%, leucocytes 8000 per c.mm. (polymorphs 75%, lymphocytes 20%, monocytes 5%). Wassermann and Kahn reactions were negative.

Progress.—On May 15 a purulent urethral discharge developed. This grew no predominant organism on culture. Vesicles on an erythematous base were now appearing on the skin of both arms. The vesicles contained a pale fluid which was sterile on culture and free from cells. The vesicles were mostly on the dorsum of the arms (fig. 1).

On May 17 the same type of vesicle appeared on the thighs and legs, more on the extensor than on the flexor surfaces (fig. 2), and on the lower chest and abdomen. The vesicles varied in size and tended to crust early, the skin over them being dark.

The patient by now presented a florid picture; pus was pouring from the eyes and mouth (fig. 3) and from the urethra; the sputum was copious and purulent; the temperature ranged from 102° to 104° F, not responding to 'Sulphamezathine.' Pulse-rate 110/min., respirations 30/min.

On the 19th penicillin therapy was begun, 15,000 units being injected intramuscularly every three hours. The general condition improved, as judged by the temperature and the patient's subjective symptoms, but the lesions remained the same. The temperature now varied between 99° and 101° F.

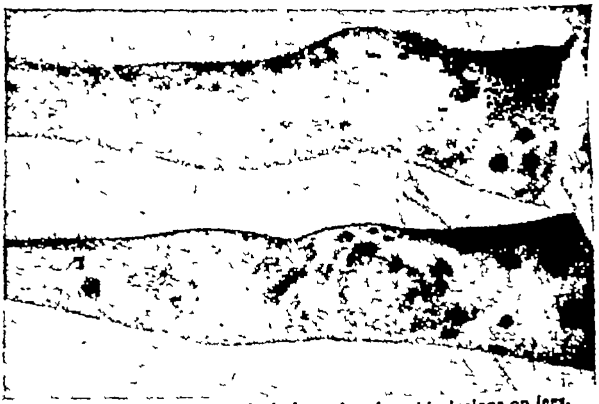

Fig. 2—Ten days after admission, showing skin lesions on legs.

The eyes (figs. 4 and 5) were seen by Dr. P. M. Moffatt, who reported on the 24th that the skin of the upper lids presented scabs of subsiding vesicles; in the conjunctivæ were elongated greyish swellings (fig. 5) which appeared to contain turbid fluid; and there were some granular swellings in the upper quadrants of the bulbar conjunctivæ, possibly the remains of vesicles which had subsided. Subconjunctival ecchymoses surrounded the limbus of each eye. The palpebral conjunctivæ showed nothing more than congestion. There was some mucopus in the lower fornices. The corneæ were clear and the fundi normal. The patient had a feeling of soreness and grittiness in the eyes and discharge. He resented exposure to bright light during examination. Irrigations with boric-acid lotion and eye-drops of 'Albucid' 10% every two hours were prescribed.

These swellings disappeared from the conjunctivæ by June 1, but there was still some congestion of the conjunctival blood-vessels, and traces of the ecchymoses could be seen. The watering and discharge were much less. The condition cleared by June 15, except for some slight injection of the conjunctival blood-vessels.

On May 28 the patient developed slight consolidation at the base of the right lung, with a pleuritic rub. There was a severe cough, with much watery and viscid sputum, which clung to the gums and teeth.

The throat swab at this time grew a heavy growth of *Staph. aureus.* A biopsy specimen of one of the vesicular lesions on the arm showed "slight vascular engorgement of the corium and a little œdema of the malpighian cells."

until complete resolution on the 19th day of illness. The papules had scaled off and the vesicles had dried by the 14th day of illness. Red or brown stains remained at the sites of the papulovesicular lesions, but there was neither pitting nor induration. The last areas to clear were the hands and feet.

DIFFERENTIAL DIAGNOSIS

In both patients the rash might have been mistaken for erythema multiforme, but the character and distribution of the lesions, the absence of burning and tingling, the formation of vesicles in the mouth, and the severity of the illness were against such a diagnosis.

The absence of the usual prodromata and backache, the distribution and character of the papules, their failure to mature, and the appearance of fresh spots over a period of some days excluded smallpox.

The bullæ in the mouth suggested pemphigus, but the development of the skin vesicles on existing papules and not on normal skin, the absence of raw areas on rupture of the skin vesicles, and the course of the illness were against it.

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COMMENTS

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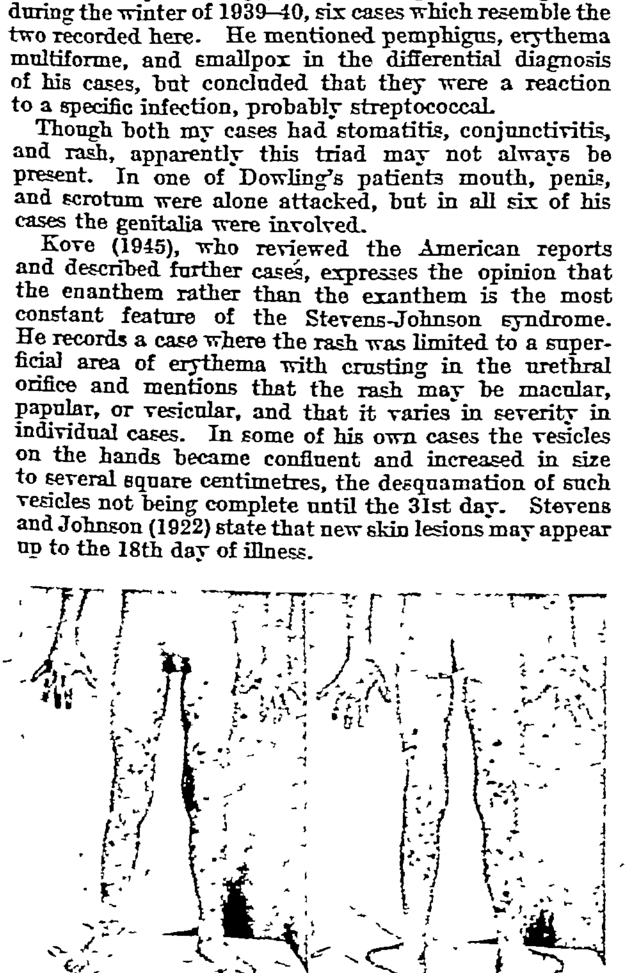

Fig. 2—Case 2, showing distribution of rash on limbs.

Stomatitis appears to be a constant feature of the syndrome and may be severe enough to make swallowing difficult and to necessitate intravenous infusions. According to Kove (1945) the sloughing of membranous exudation in the mouth may continue up to the 30th day.

The involvement of the eye may be serious. In two cases described by Stevens and Johnson (1922) there resulted blindness in one and impaired vision in the other.

The patients may be acutely ill. Temperature of 106° F, with profound prostration and toxæmia on the 2nd day of illness, has been recorded (Kove 1945). Fever may persist for some weeks (Stevens and Johnson 1922, Kove 1945) or may be of short duration, as in the two cases recorded here (4–6 days).

This syndrome may be preceded by or coincident with other conditions. In both my cases there was an antecedent lesion of the lips; circumoral herpes in one case, and an infected laceration in the other. One case recorded by Kove (1945) was preceded by mumps, the patient being in hospital five days before fever, stomatitis, and conjunctivitis developed. Cases associated with Vincent's angina (Chick and Witzberger 1938) and complicated by a bronchopneumonia or otitis media (Kove 1945) have been described.

Either a leucopenia or a mild leucocytosis may be present, but there are no characteristic laboratory findings (Kove 1945). A very comprehensive laboratory investigation was made in one case by Edgar and Syverton (cited by Kove 1945), who failed to recover a transmissible agent from vesicular fluid by animal inoculation.

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URINARY EXCRETION OF PHOSPHATASES IN MAN

A. S. V. Burgen
M.B. Lond., M.R.C.P.

From the Department of Pharmacology, Middlesex Hospital Medical School

Various methods have been used to estimate urinary phosphatase. Demuth (1925), Dmochowski (1933), Kutscher and Wolbergs (1935a and b), and Kutscher and Wörner (1936) all estimated the phosphate liberated from various ester phosphates. The fact that there are in urine relatively large amounts of inorganic phosphate which cannot be removed without loss of phosphatase reduces the accuracy of this method. Rabaté and Courtois (1941) estimated the glycerol liberated from sodium glycerophosphate with periodic acid and iodine titration, but the method is insensitive, and glycerophosphate is a poor substrate for acid phosphatase. The method of King and Armstrong (1934) could not be used directly, because the Folin-Ciocolteu reagent for phenol reacts strongly with uric acid, and the precipitation of uric acid by silver lactate (Folin and Denis 1915) is tedious and time-consuming; Scott and Huggins (1942), however, removed the chromogenic substances by twelve hours' dialysis and then used the King-Armstrong method.

The method we finally adopted was to use monophenyl phosphate substrates and to estimate the liberated phenol by the very sensitive diazo method of Theis and Benedict (1924), which is unaffected by uric acid. The urinary phenols do not interfere with the estimation except in very concentrated urines, which should be diluted before

STEVENS-JOHNSON SYNDROME

REPORT OF TWO CASES

J. O. MURRAY
M.D. Edin., D.P.H.
MEDICAL OFFICER OF HEALTH, CITY OF ROCHESTER

EARLY in 1945 a patient was admitted to St. William's Infectious Diseases Hospital, Rochester, with an unusual eruption which was not typical of any common exanthem or any well-known skin disease. Just over a year later another patient with a similar skin condition was admitted to the same hospital. There was no connexion between these two patients, and on neither occasion were any further cases observed among contacts or persons residing near them.

CASE 1.—A boy, aged 16 years, a clerk, with a previous history of measles, whooping-cough, mumps, and chickenpox in early childhood, had been playing rugby football on Feb. 10, 1945, when he received a kick which split his lower lip and adjoining skin; no sutures were inserted. The injury caused him some local discomfort, but he felt well enough to continue work until the 23rd, when he became feverish, with headache, sore eyes and mouth, and diffuse pains in the limbs. He went to bed and later in the day noted spots on his thighs and arms. During the next two days similar spots appeared on the lower abdomen and shoulders. He was admitted to hospital on the 26th, up to which time he had not taken any drugs.

On admission: He was well nourished, mentally alert, and complained of discomfort in mouth and eyes only. No abnormalities were found in his cardiovascular, respiratory, nervous, lymphatic, or genito-urinary systems; temperature 97° F, pulse-rate 84, respirations 20 per min.

Mouth: There was a black scab at and adjoining the site of his lip injury. The pharynx was slightly inflamed. Lips were fissured and encrusted with blood and bled easily. There were irregular patches of greyish membrane on the buccal mucosa, tongue, and gums. Some patches were black from extravasated blood, and where the membrane was sloughing there were superficial red ulcerated areas on the tongue. The membrane was about 2 mm. thick. He could eat only with great discomfort but took fluids freely.

Eyes: The eyelids were slightly swollen, and the palpebral and bulbar conjunctivæ were injected; there was a slight purulent discharge from both palpebral fissures.

Skin: The rash was centrifugal in distribution and mainly symmetrical but did not favour extensor surfaces; it was profuse on hands, feet, legs, and forearms, and was well marked on thighs and buttocks. Except near the symphysis pubis, the trunk was free, as were the face and scalp. The skin lesions were painless and free from irritation.

The eruption consisted of macules and papules, most being about 0·5 cm. in diameter, though a few were over 1 cm. in diameter. They were oval or circular and superficial. The intervening skin was unaffected. The papules were slightly raised and surrounded by small irregular erythematous areolæ. There was no vesiculation or pustulation. The papules were matt red, some having a purplish or violet tinge.

Temperature, pulse-rate, and respiration were normal throughout his stay in hospital, and there were no toxic manifestations. Mouth discomfort was the worst feature. There was no diarrhœa or vomiting.

Treatment consisted of eye douches of boric-acid solution, frequent alkaline antiseptic mouth-washes, and swabbing: sulphapyridine was given for four days after admission.

Progress. The eye lesions had cleared by three days after admission (7th day of illness), and there was evidence of improvement in the stomatitis after four days' treatment, the mouth becoming free from membrane by the 16th day of illness, by which time epithelisation was well established, though there was some residual cheilosis.

The macules noted on admission chiefly on forearms and hands had become papular within a few days. There was no vesiculation at any time, though some papules eventually showed a whitish dry desquamative centre. By the end of a week (11th day of illness) all the papules were receding, becoming flat and hard before dropping off. They had disappeared completely by the 21st day of illness, the last to disappear being on the palms. Irregular circular pigmented areas, reddish-brown or faintly violet in tinge, remained to mark the sites of the lesions. On the palms this staining persisted for 8 weeks from the onset of illness.

CASE 2.—A cabin boy, aged 15 years, was admitted to hospital for observation as a smallpox suspect on March 11, 1946. He had had coryza, with some circumoral herpes, for several days but was not off work and did not feel ill.

On the 6th his mouth and tongue had become sore, and next day he had had headache, giddiness, shivering, and diffuse pains in the limbs (but no backache), and his eyes had begun to smart and water. He took to his bed, and on the 9th spots appeared, first noted round both ankles. Later in the day they were seen on the legs, but the rash did not appear on the arms until the evening.

He noted fresh spots on the legs, forearms, hands, and scrotum on the 10th. After this date no other spots appeared. His only previous illness was diphtheria in 1940. There was no evidence of successful vaccination.

On admission: A thin youth with delayed development of the secondary sex characteristics. Though below average intelligence, he was alert and coöperative during examination. There was no toxæmia. Temperature 98·4° F; pulse-rate 84; respirations 22 per min. No abnormalities were found apart from mouth, eye, and skin lesions.

Mouth: The lining mucosa of his lips and mouth were swollen. Lips and gums were bleeding slightly; black blood was encrusted on the fissured lips (fig. 1). On the gums, buccal mucosa, and tongue were large patches of greyish membrane 2–3 mm. thick; one vesicle containing clear fluid was noted on the palate. In some areas the membrane was sloughing, leaving raw superficial bleeding areas. The swelling of the mouth and tongue, and the discomfort of the patient, prevented a clear view of the fauces, which, so far as could be seen, were not involved. Breath was very offensive, the odour resembling that of diphtheria.

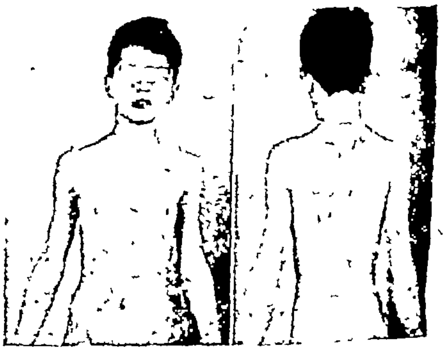

Fig. 1—Case 2, showing absence of rash from trunk.

Eyes: The eyelids were swollen and the conjunctivæ œdematous and injected. There was a profuse purulent discharge from both eyes. Culture of pus gave a growth of *Staph. pyogenes.* There was no corneal involvement.

Skin: A profuse papular and vesicular rash involved all areas except the face, scalp, and trunk, which were quite free (figs. 1 and 2). Two papules were present on the scrotum. The rash was most profuse on the hands. There was no preference for extensor surfaces.

In appearance the rash at first was similar to that in case 1 but later differed in that many, but not all, of the papules became vesicular, without, however, showing either loculation or umbilication. The vesicular fluid was faintly turbid. The papules *ruptured from one to three days* after their appearance.

The fluid from a vesicle was examined by Prof. A. W. Downie, of Liverpool, for variola-vaccinia antigen and proved negative. A differential blood-count on the 20th showed polymorphonuclear neutrophils 47%, eosinophils 2%, basophils 1%, monocytes 6%, lymphocytes 44%. No abnormal cells were seen.

Treatment. The eyes were frequently douched with boric-acid solution, and 'Collosol argentum' was instilled thrice daily. The mouth was treated with antiseptic mouth-washes and swabbing. Penicillin cream was applied to the mouth and skin lesions. No internal treatment was given.

Progress. On the 3rd day after admission (9th day of illness) the papules were beginning to shrink, vesicles had ruptured and some were beginning to dry, but at this stage the mouth showed little improvement. The eyes were free from swelling, injection, and discharge by the 11th day of illness. By this time there was a definite improvement in the stomatitis, and improvement continued uninterrupted until complete resolution on the 19th day of illness. The papules had scaled off and the vesicles had dried by the 14th day of illness. Red or brown stains remained at the sites of the papulovesicular lesions, but there was neither pitting nor induration. The last areas to clear were the hands and feet.

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In both patients the rash might have been mistaken for erythema multiforme, but the character and distribution of the lesions, the absence of burning and tingling, the formation of vesicles in the mouth, and the severity of the illness were against such a diagnosis.

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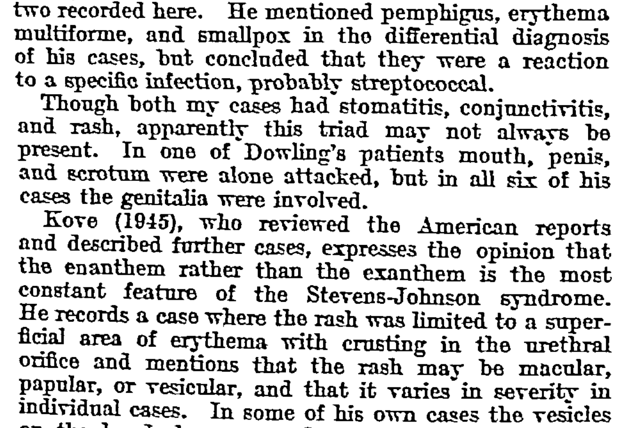

Fig. 2—Case 2, showing distribution of rash on limbs.

Stomatitis appears to be a constant feature of the syndrome and may be severe enough to make swallowing difficult and to necessitate intravenous infusions. According to Kove (1945) the sloughing of membranous exudation in the mouth may continue up to the 36th day.

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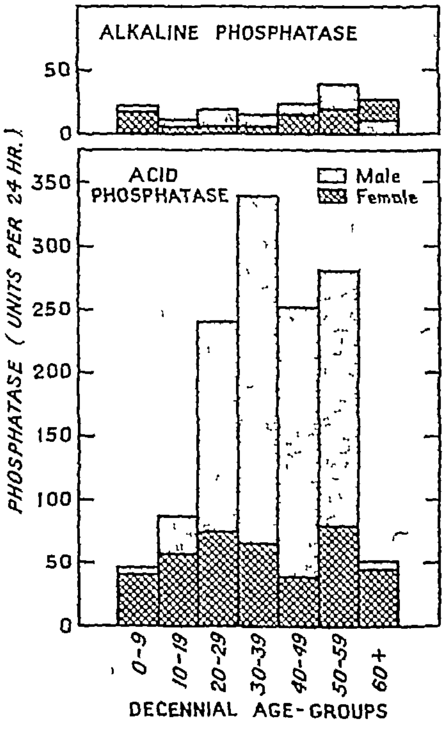
The method we finally adopted was to use monophenyl phosphate substrates and to estimate the liberated phenol by the very sensitive diazo method of Theis and Benedict (1924), which is unaffected by uric acid. The urinary phenols do not interfere with the estimation except in very concentrated urines, which should be diluted before estimation. Phenolic drugs, especially salicylates and sulphonamides, interfere with the reaction. In all cases 24-hour specimens of urine were used for the estimation.

METHODS

Preparation of Alkaline Substrate, pH 9·4.—Dissolve 10·3 g. of sodium barbitone and 1·09 g. of disodium phenyl phosphate in 1 litre of water.

Preparation of Acid Substrate, pH 4·9.—Dissolve 18·91 g. of citric acid in 180 c.cm. of normal NaOH, dilute to about 500 c.cm. with water, then add 100 c.cm. of *N*/10 HCl and 1·09 g. of disodium phenyl phosphate, and make up to 1 litre with water. Add a few drops of chloroform as a preservative and keep in the refrigerator.



Daily output of phosphatase in King-Armstrong units in decennial age-groups.

Phosphatase Determination.—(1) In two test-tubes put 10 c.cm. of substrate, and place the tubes in a water-bath at 37·5° C. After five minutes add 0·5 c.cm. of urine which has been diluted with an equal volume of water, and mix. After exactly thirty minutes add 2 c.cm. of protein precipitant (one part of 10% sodium tungstate, one part of $^2/_3 N$ H_2SO_4, and eight parts of distilled water), mix by inverting several times, and remove from the water-bath. If the solution becomes cloudy, allow it to flocculate for five minutes, then centrifuge, and remove 10 c.cm. of the supernatant fluid; otherwise transfer 10 c.cm. of the solution to a clean tube and add 1 c.cm. of 1% gum acacia, 1 c.cm. of 50% sodium acetate, and 1 c.cm. of phenol reagent (1·5 g. of *p*-nitroaniline dissolved in 40 c.cm. of conc. HCl and diluted to 500 c.cm.; take 25 c.cm., cool in iced water, add 0·75 c.cm. of 10% sodium nitrite, and mix; this reagent keeps for twenty-four hours). Mix and allow to stand for a minute, then add 2 c.cm. of 20% Na_2CO_3.

(2) An unincubated control is prepared by adding protein precipitant to a mixture of substrate and urine without preliminary incubation. Then proceed as above.

(3) A blank, prepared by using 10 c.cm. of water instead of the incubated substrate, gives a pale yellow colour.

(4) A standard is prepared by taking 0·5 c.cm. of standardised (10 mg. per 100 c.cm.) phenol (King and Armstrong 1934), which is equivalent to 25 units of phosphatase per 100 c.cm. of urine and gives an orange-red colour.

The colour was estimated in a Millikan photo-electric colorimeter, using a micro 3 green filter and setting to zero with the blank.

RESULTS

The results of the estimations in 50 males and 25 females out of an ordinary hospital population without genito-urinary disease are shown in the accompanying figure. The acid-phosphatase output in females is about the same for all ages, at a mean level of 50–60 King-Armstrong units per twenty-four hours. In males, however, a remarkable rise in the excretion begins in the second decade, reaches a maximum of 300–400 units in the fourth decade, and then falls away abruptly after the sixth decade, until it is almost equal to the female again. There was considerable intra-group variation, but the differences between males and females in age-groups 20–59 years were highly significant (P=0·01–0·001 by Fisher's "t" method). The alkaline-phosphatase excretion is scanty and highly irregular and shows no significant variation with age or sex.

The source of the urinary phosphatase has been the cause of speculation since Demuth (1925) surveyed organ and secretion phosphatases. Kutscher and Wolbergs (1935a) found a diurnal variation in the urine acid phosphatase which was maximal in the early morning and after lunch. These results were confirmed by Courtois and Biget (1943), who found a similar acid phosphatase in men after cystotomy and ablation of the prostate; their figures, however, were not significant quantitatively. Wolbergs (1936) found that the urine of adult women contained about a quarter of the phosphatase activity of the urine of adult men. Waldschmidt-Leitz and Nonnenburg (1935) suggested that the acid phosphatase was derived from the red blood cells, but King et al. (1945) showed that packed red cells contained 200–400 units of acid phosphatase per 100 c.cm., an amount sufficient to explain all the female output on the accepted rate of hæmolysis of the red blood cells but inadequate to explain most of the male output. Gutman and Gutman (1938, 1941) and Gutman (1942) have shown a rise in the acid-phosphatase content of the prostate from a few units per g. before puberty up to 250–1150 units per g. in the adult, and that prostatic fluid contains large amounts of the enzyme.

The great rise of acid phosphatase in the urine in the reproductive period of males points to most of the "excess" male over female output being derived from the prostate. Scott and Huggins (1942) found similar changes in the acid-phosphatase content of the urine and showed that the first part of the urine passed by males, which is known to have a greater prostatic admixture, contained more phosphatase than later samples. But 24-hour specimens which we collected from suprapubic cystotomy in 3 men gave values of 104, 140, and 223 units per day. These values, considering that the men's ages were 68, 66, and 55 years, are within the range for urethral urine at the same ages, suggesting that the urinary acid phosphatase is at least in part being excreted through the kidney and not directly into the urethra.

In disease of the prostate no significant difference in the output of acid phosphatase has been noted, either in benign hypertrophy or in carcinoma. Breedis et al. (1943) showed that there was a considerable decrease in the alkaline phosphatase in the kidney and an increased alkaline-phosphatase output in the urine of rats poisoned with uranium. Wilmer (1944) showed a similar decrease in the kidney alkaline phosphatase in human nephritis. In view of these findings it was thought that an increase in the alkaline-phosphatase output in the urine might be found in human nephritis. In a few cases of human acute, subacute, and chronic nephritis, however, no significant increase in the output of urinary alkaline phosphatase was found.

SUMMARY

The daily excretion of phosphatases in the urine of men and women has been examined.

The alkaline phosphatase is scanty and irregular and shows no variation with age or sex.

In females the average daily excretion of acid phosphatase is about 50 units at all ages.

In males the level of excretion is the same as in females in childhood, but from puberty onwards there is a sharp increase, reaching a maximum of 350 units in the fourth decade and falling off again in old age.

No alteration in phosphatase excretion has been found in disease of the prostate or in nephritis.

I wish to thank Prof. Samson Wright and Dr. D. Slome for much help and encouragement. The expenses of this research were partially defrayed by a grant from the Medical Research Council to Prof. Samson Wright.

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Preliminary Communication

ACTIVITY OF PENICILLIN ESTERS

AMONG the various procedures for prolonging the time during which penicillin remains in the blood-stream at a therapeutic level, with an accompanying reduction in the rate of urinary excretion, the use of water-insoluble penicillin esters has been suggested. I have made a detailed study of the methyl and benzyl esters of "pure" penicillin, having an activity of 1500 I.U./mg. The details of this work will be published elsewhere in full[1]; meanwhile the general conclusions may be of interest to penicillin users.

I find that some species of animals, including mice, rats, and guineapigs, have in their sera an esterase that hydrolyses the methyl and benzyl esters of penicillin in 10 minutes. This enzyme, or complex of enzymes, is absent from the sera of rabbits and man. When the esters are injected into the rabbit or man no therapeutic effect is exerted. No penicillin can be detected circulating in the blood of rabbits or men during periods between 1 and 48 hours after injection. Furthermore, it appears that the ester, though it exerts no antibacterial effect, is destroyed in the body, for it cannot be found in the blood or urine of rabbits and men after injection. On the other hand, the enzymatic hydrolysis of these esters in mice, rats, and guineapigs, with the resulting liberation of penicillin, confers on them an antibacterial action of the same order as that of corresponding quantities of the free antibiotic.

These conclusions have consequences both in applied therapeutics and in laboratory technique. It is clear that the esters cannot have any value as compounds for prolonging the penicillin effect when injected into man, because, not being hydrolysed, they have no antibacterial effect at all. On the other hand, the existence of a penicillin esterase in the sera of mice, rats, and guineapigs makes these sera, particularly those of guineapigs, useful agents for investigating the effect of the esters in various species of animals. Incubation at 37°C with guineapig serum, for example, causes liberation from the methyl and benzyl esters of free penicillin, which can then be estimated in the usual manner. This method gives a convenient and quick method of detecting penicillin esters in different organs and body fluids, and should also prove useful in testing therapeutic agents.

Glaxo Laboratories Ltd., Greenford, Middlesex. J. UNGAR.

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1. Ungar, J. *Brit. J. exp. Path.* (in the press).

Medical Societies

ASSOCIATION OF CLINICAL PATHOLOGISTS

THE association's annual meeting was held in London on Jan. 24 and 25, under the chairmanship of Dr. J. G. GREENFIELD.

The Interpretation of Blood-sugar Levels in Children

was discussed by Dr. J. L. EMERY, who showed cases of cœliac disease with clinical hypoglycæmia despite normal fasting blood-sugar levels. The pallor and sweating are relieved by glucose without a rise in the blood-sugar, and adrenaline also relieves the symptoms. Clinical manifestations should be recognised as real evidence of hypoglycæmia irrespective of the blood-sugar content, especially since symptoms may occur, even with a rising blood-sugar, following administration of insulin.

Dr. N. F. MACLAGAN described a *modification of the Lange colloidal gold curve* using buffered solutions. The advantages of buffered solutions are that they are more exactly reproduced and give more dependable results, because they are unaffected by traces of acid and alkali and because false positives are less common. The standard ten tubes are unnecessary since it is only the precipitation in the lower dilutions which indicates globulin increase.

Dr. B. E. TOMLINSON, speaking on the *chronic appendix*, said that there was no appreciable difference between the appendices in 100 surgical cases and those in 100 bodies following sudden death. In the surgical cases, however, localised inflammatory changes were seen in the internal muscle layer; these suggested a retrogressing lesion. Local areas of fibrosis and local collections of eosinophils were demonstrated in the muscle coats; but as far as the mucosa was concerned eosinophil counts were often higher in the controls than in the surgically removed appendices. He concluded with a plea for more exact pathological appraisal of the surgically removed appendix.

Dr. J. T. DUNCAN described the widespread lesions which may be found in *torula meningitis*. Infection, he suggested, usually takes place via the tonsil or by trauma of the skin, and the organism, *Cryptococcus neoformans*, has a predilection for the central nervous system and the lungs. It is hard to recognise this organism unless it is properly stained, preferably by muci-carmine. There are probably more cases of torula meningitis than is appreciated, for with a careful look-out they are identified fairly often.

Dr. V. D. ALLISON and Miss B. HOBBS discussed the *epidemiology of pemphigus neonatorum* from observation of 200 cases seen in one large and two small epidemics, using serological typing of *Staphylococcus pyogenes*. This showed that the sources of infection are the upper respiratory tract and skin of carriers. Carriers are commoner among nurses than the general public; and one series of cases originated from a carrier whose task it was to fold clean napkins in a laundry. It is important not to incriminate an attendant until it has been proved that the serological type found in her agrees with that causing the epidemic. It may be worth applying penicillin to the anterior nares of chronic tonsil carriers.

Dr. J. G. GREENFIELD, reviewing the *causes of cerebral abscess*, emphasised the importance, in the differentiation from meningitis, of estimating the sugar in the cerebrospinal fluid; this is early reduced with meningitis, while with abscess it usually remains normal until meningitis supervenes. Usually the cerebrospinal fluid is clear; the cell-count in his cases varied from 4 to 800 per c.mm., with lymphocytes predominating: and protein varied from 10 to 200 mg. per 100 ml. The organisms were very variable: of 45 cases, 15 were due to staphylococcus, 10 to anaerobic streptococcus, 10 to fusiform bacillus, 6 to *pneumococcus*, and 6 to *proteus*. The *prognosis* is best with pneumococcal and streptococcal infections.

Dr. C. E. DUKES, speaking on the *hereditary factor in polyposis of the intestine*, described families in which the disease was transmitted as a dominant character; the gene can be carried by male or female.

Dr. S. C. DYKE showed that in the *treatment of refractory anæmia with folic acid* there may be a double rise in reticulocytes. In pernicious anæmia and in refractory anæmias expected reticulocyte and red-blood cell levels are always reached. In 2 cases of pernicious anæmia with previous histamine-fast achlorhydria the acid returned in the gastric secretion after treatment with folic acid.

In a discussion on the *laboratory applications of the Rhesus factor* a general plea was made for the adoption of Fisher's nomenclature. It was considered that every prospective mother should be Rh-grouped, and that difficult cases should be referred to the laboratories at the Lister Institute.

Reviews of Books

A third edition has appeared of CLINICAL PRACTICE IN INFECTIOUS DISEASES (Edinburgh: E. & S. Livingstone, pp. 679, 22*s.* 6*d.*) by Dr. E. H. R. Harries and Dr. Maurice Mitman. After publication of the second edition in 1943, a fire at the printers destroyed the blocks, and made reprinting impossible. The book has therefore been completely revised, and contains a new chapter on the pneumonias, and short sections on the common cold, febrile herpes, epidemic nausea and vomiting, epidemic myalgia, and infective polyneuritis. The account of penicillin has been expanded, and a note added on streptomycin. Social conditions are discussed in relation to epidemiology, and more space has been given to "influenzal" meningitis, food-poisoning, homologous serum jaundice, typhus, virus diseases of the nervous system (which includes a critical review of the Kenny method of treating poliomyelitis), mass chemoprophylaxis, and many other subjects of recent and growing interest. This valuable work is thus larger by some 100 pages than in its last edition.

Dr. Wilfrid Sheldon's DISEASES OF INFANCY AND CHILDHOOD (5th ed., London: J. & A. Churchill, pp. 775, 30*s.*) bids fair to become as popular as Still's. The advent of penicillin is the outstanding new development since the last edition, and its use is well described in a brief appendix. The sections on tuberculosis, cœliac disease, and poliomyelitis have been revised, and growing interest in the newborn period is reflected in the text.

ACIDOSIS (London: W. Heinemann, pp. 225, 18*s.*) is written by Dr. Esben Kirk, chief physician to the medical service of Holstebro District Hospital, Denmark, and was first published in 1942 to convince his colleagues of the importance of treating acidosis with isotonic sodium bicarbonate solution. His specialised approach to the problem detracts from the value of his otherwise interesting survey of a perplexing problem; and few British clinicians will agree with his emphasis on isotonic sodium bicarbonate in the treatment of diabetic coma.

By recording belief as fact and omitting pros and cons, Prof. Rolland J. Main, PH.D., of the Medical College of Virginia, has usefully summarised the salient facts of human physiology. His SYNOPSIS OF PHYSIOLOGY (London: H. Kimpton, pp. 341, 18*s.*) is intended to serve as a quick reference book for students already acquainted with their subject. It gives plenty of numerical data, supplemented with useful tables and few but graphic diagrams. While unsuitable for either the advanced student or the beginner, it is satisfactory for its own purpose.

Dr. F. M. R. Walshe, F.R.S., writes in the preface to the 5th edition of his DISEASES OF THE NERVOUS SYSTEM (Edinburgh: E. & S. Livingstone, pp. 351, 16*s.*) that he has made such minor additions as the advance of knowledge, the flux of opinion, and the suggestions of correspondents make expedient. The student will again find the principles of neurological diagnosis and the common diseases of the nervous system well described; but the psychoneuroses are still given only 23 pages. It might be better to omit this section from a textbook in which it is hardly at home.

Nineteen new coloured photographs appear in the edition of Dr. Henry Semon's unique ATLAS OF THE Cu SKIN DISEASES (Bristol: J. Wright, pp. 343, 50*s.*), unfortunately some of them are below the original standard, the colour-values being erratic, or blurred. T text is terse and highly informative. It is noteworthy that Dr. Semon roundly condemns the local use of sulphonamides in skin diseases.

Prof. Maurice Loeper is professor of clinical medicine to the Faculté de Médecine of Paris. His collection of essays (HÉPATITES RARES, Paris: Masson, pp. 214, fr. 290) is not confined to hepatitis but includes chapters on oxaluria and liver disease, anæmia in cirrhosis, and cystic disease of the liver. The theories presented often seem strange, and many statements are unsupported by data. The bibliography refers mainly to Continental work.

Dr. F. M. Pottenger, medical director of his own sanatorium in California, sets out his views on the reflex action of the spinal and automatic systems in visceral disease. The 6th edition of his SYMPTOMS OF VISCERAL DISEASE (London: H. Kimpton, pp. 442, 25*s.*) is essentially the same as its forerunners. He urges the relationship of many apparently unconnected symptoms with the morbid process, sometimes using readily acceptable evidence, at others evidence which lacks scientific support. The work can only be recommended to those who know enough to read it critically.

In AMPUTATION PROSTHESIS (London: J. B. Lippincott, pp. 305, 50*s.*) Dr. Atha Thomas, associate professor of surgery in the University of Colorado, and Mr. Chester C. Haddan, president of the Association of Limb Manufacturers of America, have collaborated to discuss the problems faced by surgeon and limb-maker in fitting prostheses. They cover well such topics as the moulding of the stump by bandaging, re-education of the stump muscles, functional values of stumps of various lengths, and the training of the patient in the use of his limb, and they lay emphasis on the importance of fit and alignment. A good section deals with prostheses in children.

Mr. H. E. Cox, D.SC., is an experienced public analyst, and the techniques detailed in his CHEMICAL ANALYSIS OF FOODS (3rd ed., London: J. & A. Churchill, pp. 317, 24*s.*) are probably those commonly used in his laboratory. Though they have stood the test of time, many of them have been superseded in the eight years since the last edition, and might well have been omitted in this one. Thus the Kjeldahl method described is now out of date, and there is no mention of the selenide catalyst which has accelerated the tempo of all total nitrogen assays. Fuller accounts of some of the more modern methods would have been welcome. The scope of the book is wide, and there is an appendix on the preservative regulations and prohibited colouring matters.

Mr. W. H. Maxwell's compendious, indeed discursive, guide to the engineering side of water-supply (CURRENT WATERWORKS PRACTICE, London: B. T. Batsford, pp. 254, 18*s.*) will be useful on the M.O.H.'s reference shelf, and rural doctors will find it interesting in the light it throws on the problem of getting pure water into every home, however remote. The fact that gas prefers to run uphill and electricity doesn't mind is poor compensation for the fact that water refuses to do so; and the community is only just beginning to realise that gravity cannot be made an excuse for penalising the rural population. Mr. Maxwell might usefully turn his attention next to this side of the problem. His photographs of big dams and reservoirs are beautiful.

There are twenty contributors to PREOPERATIVE AND POSTOPERATIVE TREATMENT (2nd ed., London: W. B. Saunders, pp. 584, 35*s.*), under the editorship of Lieut.-Colonel Robert L. Mason, of the Cushing General Hospital, Framlingham, Massachusetts, and Dr. Harold A. Zintel, of the University of Pennsylvania school of medicine. In the first part, which covers such general problems as the management of the surgical patient with heart disease, the strong influence of physiology on American surgery is well seen. Of particular interest are the chapters on water balance and on postoperative venous thrombosis; in the latter, ligature of large veins is freely recommended. Though the second part, arranged under regional headings, is insufficiently concise and has important omissions—for example, the eye, and elective surgery of the chest and head are not mentioned—the book as a whole is interesting and instructive.

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References—Shortage of space precludes list of references, but full documentation may be obtained on application to Clinical Research, Dept. 9.B

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THE LANCET

LONDON: SATURDAY, MARCH 15, 1947

First Things First

If we return again and again to the problems of nursing, it is because the coming effort to improve medical services in this country will be wholly frustrated unless there are enough nurses properly trained for their work. Since State registration was introduced in 1919 the General Nursing Council has been the body that decides what training is proper, and its curriculum has been one of the principal factors regulating recruitment to the profession. At a time, therefore, when this recruitment is patently insufficient, the council may fairly be asked to justify its requirements and to show that these are related to the requirements of the nation.

The question is all the more necessary because the syllabuses confronting the student nurse have just been redrafted, and apparently there is to be an increase rather than a decrease in the number of subjects covered. The draft has not been published, but at the council's meeting on Feb. 28 it moved a medical member, Dr. Russell Brain, to strenuous protest. It embodies, he said, the very faults that medical educators are trying to eliminate from the medical course, and many of the sort of facts that 90% of doctors forget as soon as they are qualified and never need again. Commenting on the proposed content of the 40 lectures leading up to the preliminary examination, he asked what for example is the use of the nurse knowing "the names and position of the bones of the cranium and face, the bony structure of the orbit, nose, mouth, and base of the skull, and the principal characteristics of the bones of the cranium, maxilla, and mandible," or the "special characteristics of vertebræ from the cervical, dorsal, and lumbar regions"—peculiarities of practical interest only to an orthopædic surgeon. All that can be said in favour of including the thymus, he thought, is that the little known about it could burden nobody's memory: but why should the nurse have to learn the effect of hyper- and hypo-parathyroidism? The "position, structure, and functions of the mid-brain, pons, and cerebellum" cannot usefully be considered without much more study than she has time for, and the same is true of "a brief outline of the limb plexuses." The title of the course is "elementary anatomy and physiology," but there is in fact no elementary way of dealing with such topics. Dr. Brain invited the council to refer the syllabus back to its education and examination committee, but he found no seconder for his motion. So the draft syllabus was passed, subject to the approval of the Ministry of Health.

A glance at papers set this year for the preliminary and final State examinations shows how cogent were Dr. Brain's objections to putting further detail into the syllabus:

> "Describe the shoulder girdle. What are the chief muscles attached to it?"
>
> "What do you understand by the term sewage effluent? What means are taken for its purification?"
>
> "Describe a case of acute rheumatic fever and give an account of the nursing and medical treatment of this condition. Enumerate the complications which might arise."

Why should the nurse be examined on the medical as well as the nursing treatment of a case? And what is gained? Having set a specialised question, the examiner finds himself obliged to mark it on a low standard, whereas a question of general importance can be marked on a high one. The nursing syllabus, even in its present form, contains too many items that are not of general importance. Admittedly, any or all of them might appropriately be mentioned in teaching a group of intelligent girls, but that is quite different from setting them down in black and white as subjects that may figure in the examination and must therefore be tackled by every conscientious student and every conscientious teacher, at Grimsby and Gillingham as well as at Guy's. Ability to divine *what is relatively unimportant, and pay no attention* to it, is not a gift with which young students are generally endowed.

The medical profession appreciates and admires the work of those who, both here and in America, have overcome great difficulties in their constant endeavour to raise the quality of nursing and the status of the nurse. As W. M. Firor,[1] the American surgeon, puts it, "the road travelled by the nursing profession has been a long and ever broadening one. The leaders have tried to keep nursing education abreast of the rapidly advancing front in medical knowledge." But this laudable effort, as he points out, has had "at least two undesirable consequences that make it imperative for the leaders in nursing education to pause and take their bearings. These . . . are: first, the failure of this program to attract and to hold an adequate number of young women to meet the needs of the country; and second, the nurse of today is not being trained primarily to care for the patient." Has not the time in fact come to reconsider the nursing curriculum in the light of its essential purpose? Education, alike for medicine and for nursing, should, we suggest, be directed always towards the good of the sick—not towards advancing the status of nurse or doctor. The General Nursing Council no doubt has the ultimate welfare of the sick very much in mind; yet, here as in America, there is reason to believe that "the nurse of today is not being trained primarily to care for the patient." Moreover the council, holding a position where its power exceeds its responsibility, seems sometimes to forget that, if patients are to be nursed at all, there must be not only good nurses but enough nurses. The present syllabus and examinations are too much for many girls who become student nurses, and so long as training is uniformly based on them a substantial proportion of useful entrants will be lost through discouragement and dismay. Certainly at this stage any increase of bookwork must make a bad situation worse. What is needed, on the contrary, is a shift of emphasis towards bedside nursing. We have to make arrangements that will attract well-educated women into a profession demanding all their powers, but will nevertheless permit any sensible girl to attain the title of nurse if she shows aptitude for the care of the sick.

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[1] *Surg. Gynec. Obstet.* January, 1947, p. 122.

Cardiac Catheterisation and Beyond

THE technique of intracardiac catheterisation,[1] based *mainly on the pioneer work at the Bellevue* Hospital, New York, and on subsequent research in Atlanta and at the British Postgraduate Medical School, *continues to develop, and its use has now* spread to many hospitals in the United States as well as to Sweden, France, and Switzerland. In practised hands the method is free from risk and no more difficult than ureteric catheterisation; its applications are only beginning to be explored.

COURNAND and his colleagues [2] in New York have used the cardiac catheter for optically recording intracardiac pressure pulses on the right side of the heart. To the end of a catheter of sufficiently wide bore they attach a small membrane manometer recording optically on moving photographic paper. By means of a double-lumen catheter simultaneous records may be made from two parts of the cardiovascular system, such as the right auricle and ventricle, or the right auricle and peripheral veins. The maximum pressure reached in the right ventricle is, of course, the same as the systolic pressure in the pulmonary artery, and in normal people this has been found to average 25 *mm. Hg. In patients with emphysema without* heart-failure the pulmonary systolic pressures ranged from normal to 57·5 mm. Hg, and there was apparently no correlation between pulmonary hypertension and the severity of the emphysema. One case of mitral valve disease had a pulmonary systolic pressure of 43 mm. Hg though *there was no rise in the right* auricular pressure. When heart-failure develops, a whole series of changes take place in the intra-auricular and *intraventricular pressure curves. In a patient* with emphysema and heart-failure the pulmonary systolic pressure was raised to 68 mm. Hg, and in mitral stenosis with severe failure it was much higher—in one case it reached 103 mm Hg, falling to 57 mm. Hg as the patient recovered from the failure. In other forms of heart-failure (hypertensive and arteriosclerotic) the pulmonary systolic pressure rises to 50–80 mm. Hg. Ordinary arterial hypertension without failure, however, does not affect the pressures on the right side of the heart, the pressure in the pulmonary artery remaining normal. By studying the pulse pressure and the amplitude of the auricular and ventricular pressure waves conclusions can be drawn regarding the changes in output per beat during the respiratory cycle [3] Inspiration assists the filling of the chambers of the right heart, *so stroke* output is increased; while during expiration the output of the right auricle and ventricle falls. In the early part *of inspiration the increased output* of the right ventricle is accommodated in the lungs, but a little later the left ventricle gets the increased flow and the systemic arterial pressure rises. This technique opens up new possibilities for the detailed analysis of human cardiodynamics in health and disease.

Proceeding along simpler lines of measurement of filling pressure and output per minute, HOWARTH, MCMICHAEL, and SHARPEY-SCHAFER [4] at Hammersmith have continued *their* studies on heart-failure. They found that in "low output heart-failure" venesection lowers the venous pressure and raises the *output of the heart.* By *comparison in similar* grou of cases, they showed that lowering venous pressu by mechanical means and by digitalis have identic *effects on cardiac output. Venesection, howeve* lowers the blood-pressure, while digitalis may leave unchanged or even raised; so the heart is actuall doing more work *after digitalis than after venesectio* Whether this can be interpreted as a stimulating actio of digitalis on the heart is uncertain, but these studie seem to have established the importance of a primar reduction in venous pressure by *means of digitalis* i the treatment of the failing heart. WARREN an others [5] have drawn attention to the possibility errors in the estimation of cardiac output arisin from incomplete mixing of blood in the right auricl Duplicate samples taken in this situation were foun to differ from one another in oxygen content by mor than 0·4 vols. per cent. in a fifth of the cases studie Similar studies by COURNAND [6] showed, howeve that the differences between duplicate samples fro the right heart were very seldom more than 0·4 vol per cent MCMICHAEL [7] thinks that anomalous sample are obtained only about once in 20 cases. *Any* erro arising from incomplete mixing is readily detectabl by comparing right ventricular with right auricula samples and by duplicate sampling at *critical point* in all experimental observations; if this is done the results obtained should be highly accurate, but *isolated observations may be open to suspicion.*

The catheter's potentialities as an instrument of investigation do not end at the heart. A cathete *with an angle bend near the tip* can be passed through the auricle into the inferior vena cava, and unde fluoroscopic screen control it may be manipulated into the hepatic or renal veins. BRADLEY and his colleagues [8] have made quantitative studies of the hepatic blood-flow in man by an ingenious method Bromsulphthalein, a substance which is removed from the blood-stream by the liver, is infused into a vein at a rate equal to the rate of excretion, so that the blood-level remains constant. The concentration of bromsulphthalein in the blood entering the liver is taken to be the same as that in the peripheral blood, and by sampling the hepatic-vein blood the amount extracted from each 100 ml. can be *estimated.* A sampl calculation may make this clear.

Rate of removal (or infusion) of bromsulphthalein = *4 80 mg./min.; peripheral serum concentration* = 1·08 mg./ 100 ml.; hepatic vein serum level = 0·57 mg./100 ml; hæmatocrit = 43%.

$$\text{Estimated hepatic blood-flow} = \frac{4{\cdot}80 \times 100}{1{\cdot}08 - 0\ 57} \times \frac{100}{100-43}$$
$$= 1651 \text{ ml./min.}$$

A considerable range of values can be obtained in one subject—e g., from 945 to 1618 ml /min.—according to the position of the catheter in the liver It is possible that the rate of flow does vary in different parts of the liver, and it is a slight drawback to the method that *mixed* hepatic-vein blood cannot be obtained. BRADLEY and his colleagues, and WARREN

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1. See *Lancet*, 1946, i. 541.
2. Bloomfield, R. A., Lauson, H. D., Cournand, A., Breed, E. S., Richards, D. W. *J. clin Invest* 1946, 25, 639.
3. Lauson, H. D., Bloomfield, R A., Cournand, A. *Amer. J. Med.* 1946, 1, 315.
4. Howarth, S., McMichael, J., Sharpey-Schafer, E. P. *Clin. Sci.* 1946, 6, 41.
5. Warren, J V., Stead, E. A., Brannon, E. S. *Amer. J. Physiol.* 1946, 145, 458.
6. Cournand, A. *Fed Proc.* 1945, 4, 207.
7. McMichael, J. *Ibid*, p. 212.
8. Bradley, S. E., Ingelfinger, F. J., Bradley, G. P., Curry, J. J. *J. clin. Invest.* 1945, 24, 890.

and others[9] have passed the catheter into the right renal vein. They studied the clearance of sodium *p*-aminohippurate by the kidney and found that, on the average, 85–88% is removed by the kidney, thus proving the value of clearance of this substance as an index of renal blood-flow. The further work with catheterisation of the renal vein now being done in America may throw light on some of the obscurities of renal physiology and pathology.

Epidemiology of Lobar Pneumonia

LOBAR pneumonia is an infectious disease caused most commonly by pneumococcus types I, II, V, and VII. Its greatest prevalence is among males of 15–65 and, though sulphonamides or penicillin can reduce the case-mortality by more than half, the disease is a major cause of illness and death in a very important section of the community. Yet little is known of its mode of spread, and few direct attempts have been made to control its incidence.

War-time outbreaks of pneumonia, among young men brought together for training, can be studied in more detail than is possible in civilian practice. **HODGES** and **MCLEOD**,[10] for example, describe experience in an army technical school in the Mid-west of the United States, where during three successive winters there were over 1600 cases of primary pneumococcal pneumonia, with a weekly attack-rate sometimes above 150 per 1000 men. The area has a hot dry summer and a bitterly cold winter, with long spells of cold damp weather in spring and autumn. The barracks and classrooms were of rude design with rough concrete floors that favoured dust, while the heating was uneven and ventilation in winter very poor. The men stayed 16–24 weeks in the camp, spending six hours a day in the classrooms, and apart from a continual influx and outflow the community of 8000–17,000 remained pretty well isolated. In short, the conditions were well suited to the epidemic spread of respiratory infections, especially in the first winter when most of the intake were new recruits. The first case of pneumonia was admitted in September, 1942, and in the following January there was a rapid increase in admissions, which remained at a high level until May when there was a sudden drop. Next winter the curve began to rise in November, reaching a peak in December, but the incidence was lower in the spring months, probably because sulphadiazine was used as a prophylactic. A big reduction in the third winter is attributed to inoculation with polysaccharides of the prevalent pneumococcal types. Other training-camps in the area did not have similar outbreaks and it seemed likely that acute respiratory disease among unseasoned troops in the first winter predisposed to dissemination of the epidemic pneumococci—whose order of frequency was type II (35% of all cases), I, V, VII, XII, and IV. Pneumococci of the epidemic types were found in the dust of both classrooms and barracks, in the same proportions as in the throats of carriers The investigators found no evidence that transfer from another climate, chill, or fatigue significantly predisposed to pneumonia.

During the third season an attempt was made to ascertain the relationship, if any, between carrier-rates and the incidence of pneumonia. The total pneumococcal carrier-rate, rising from 40% in the summer to 60–70% in the winter, bore no close relation to the incidence of pneumococcal pneumonia or other respiratory infections. There was a good correlation between the carrier-rate of specific epidemic types (e g., IV and XII, which were predominant in the third winter) and illness due to these types: yet carrier-rates of 10–20% of these two types were found in the early winter months, before there was much pneumonia. This suggests that some other factor had to come into play before clinical infection could take place, and **HODGES** and **MCLEOD** believe that this factor is an antecedent non-bacterial respiratory infection. The winter prevalence of pneumococcal pneumonia showed a close time-relation to upper-respiratory infections including influenza, with a relative incidence of 1 : 10: but in the first winter, when presumably there were few carriers of the epidemic pneumococcus types, an outbreak of acute respiratory disease was unaccompanied by pneumonia. When the carrier-rate became high outbreaks of influenza in 1943 and 1945 were associated with peaks of pneumococcal pneumonia. It is of course a traditional observation that pneumonia is often preceded by a common cold.

Against lobar pneumonia in civil life this study points to three lines of attack. The first is to reduce (where we can) the incidence of non-bacterial respiratory infections. The second is to reduce the carrier-rate of epidemic pneumococcus types in places where pneumonia is occurring with unusual frequency; for this purpose chemoprophylaxis might be effective, but in view of the viability of pneumococci in dust it should be combined with dust control. The third is to raise specifically the resistance of the susceptible community by inoculation with the capsular polysaccharides of the prevalent pneumococcus types. **MCLEOD** and his colleagues,[11] with a single injection containing 0·03–0·06 mg. of each of the polysaccharides of types I, II, V, and VII, practically eliminated pneumonia due to these four types in the treated group, while incidence in the control group was reduced probably because of an overall reduction in carrier-rates of these epidemic types: the incidence of pneumonia due to types XII and IV, against which no protection was attempted, remained unaffected. For groups of people exposed to abnormal risk of infection—such as foundry-workers, miners, and recruits in training-camps—this simple safeguard may well commend itself.

The National Situation

THE economic situation debated by Parliament this week must colour our lives for years to come. The means chosen to retrieve that situation will affect the whole social framework, of which medicine is a part. On another page a correspondent challenges the dictum "export or starve" and urges that instead of dislocating our economy by an increasingly difficult policy of forced exports we should set about producing far more food, ensuring rapid expansion of agriculture by paying higher prices to the farmer. The arguments advanced, and their sociological implications, deserve close attention.

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[9] Quoted by Goldring, W., Chasis, H. Hypertension and Hypertensive Disease. New York, 1944, p. 219.

[10] Hodges, R. G., McLeod, C. M. *Amer. J. Hyg.* 1946, 44, 183, 192, 207, 231, 237.

[11] McLeod, C. M., Hodges, R. G., Heidelberger, M., Bernhard, W. G. *J. exp. Med.* 1945, 82, 445.

Cardiac Catheterisation and Beyond

The technique of intracardiac catheterisation,[1] based mainly on the pioneer work at the Bellevue Hospital, New York, and on subsequent research in Atlanta and at the British Postgraduate Medical School, continues to develop, and its use has now spread to many hospitals in the United States as well as to Sweden, France, and Switzerland. In practised hands the method is free from risk and no more difficult than ureteric catheterisation; its applications are only beginning to be explored.

Cournand and his colleagues[2] in New York have used the cardiac catheter for optically recording intracardiac pressure pulses on the right side of the heart. To the end of a catheter of sufficiently wide bore they attach a small membrane manometer recording optically on moving photographic paper. By means of a double-lumen catheter simultaneous records may be made from two parts of the cardiovascular system, such as the right auricle and ventricle, or the right auricle and peripheral veins. The maximum pressure reached in the right ventricle is, of course, the same as the systolic pressure in the pulmonary artery, and in normal people this has been found to average 25 mm. Hg In patients with emphysema without heart-failure the pulmonary systolic pressures ranged from normal to 57·5 mm. Hg, and there was apparently no correlation between pulmonary hypertension and the severity of the emphysema. One case of mitral valve disease had a pulmonary systolic pressure of 43 mm. Hg though there was no rise in the right auricular pressure. When heart-failure develops, a whole series of changes take place in the intra-auricular and intraventricular pressure curves. In a patient with emphysema and heart-failure the pulmonary systolic pressure was raised to 68 mm. Hg, and in mitral stenosis with severe failure it was much higher —in one case it reached 103 mm. Hg, falling to 57 mm. Hg as the patient recovered from the failure. In other forms of heart-failure (hypertensive and arteriosclerotic) the pulmonary systolic pressure rises to 50–80 mm. Hg. Ordinary arterial hypertension without failure, however, does not affect the pressures on the right side of the heart, the pressure in the pulmonary artery remaining normal. By studying the pulse pressure and the amplitude of the auricular and ventricular pressure waves conclusions can be drawn regarding the changes in output per beat during the respiratory cycle[3] Inspiration assists the filling of the chambers of the right heart, so stroke output is increased; while during expiration the output of the right auricle and ventricle falls. In the early part of inspiration the increased output of the right ventricle is accommodated in the lungs, but a little later the left ventricle gets the increased flow and the systemic arterial pressure rises. This technique opens up new possibilities for the detailed analysis of human cardiodynamics in health and disease.

Proceeding along simpler lines of measurement of filling pressure and output per minute, Howarth, McMichael, and Sharpey-Schafer[4] at Hammersmith have continued their studies on heart-failure. They found that in "low output heart-failure" venesection lowers the venous pressure and raises the output of the heart. By comparison in similar groups of cases, they showed that lowering venous pressure by mechanical means and by digitalis have identical effects on cardiac output. Venesection, however, lowers the blood-pressure, while digitalis may leave it unchanged or even raised; so the heart is actually doing more work after digitalis than after venesection. Whether this can be interpreted as a stimulating action of digitalis on the heart is uncertain, but these studies seem to have established the importance of a primary reduction in venous pressure by means of digitalis in the treatment of the failing heart. Warren and others[5] have drawn attention to the possibility of errors in the estimation of cardiac output arising from incomplete mixing of blood in the right auricle. Duplicate samples taken in this situation were found to differ from one another in oxygen content by more than 0·4 vols. per cent. in a fifth of the cases studied. Similar studies by Cournand[6] showed, however, that the differences between duplicate samples from the right heart were very seldom more than 0·4 vols per cent. McMichael[7] thinks that anomalous samples are obtained only about once in 20 cases. Any error arising from incomplete mixing is readily detectable by comparing right ventricular with right auricular samples and by duplicate sampling at critical points in all experimental observations; if this is done the results obtained should be highly accurate, but isolated observations may be open to suspicion.

The catheter's potentialities as an instrument of investigation do not end at the heart. A catheter with an angle bend near the tip can be passed through the auricle into the inferior vena cava, and under fluoroscopic screen control it may be manipulated into the hepatic or renal veins. Bradley and his colleagues[8] have made quantitative studies of the hepatic blood-flow in man by an ingenious method Bromsulphthalein, a substance which is removed from the blood-stream by the liver, is infused into a vein at a rate equal to the rate of excretion, so that the blood-level remains constant. The concentration of bromsulphthalein in the blood entering the liver is taken to be the same as that in the peripheral blood, and by sampling the hepatic-vein blood the amount extracted from each 100 ml. can be estimated. A sample calculation may make this clear.

Rate of removal (or infusion) of bromsulphthalein = 4 80 mg./min.; peripheral serum concentration = 1 08 mg./100 ml.; hepatic vein serum level = 0·57 mg./100 ml, hæmatocrit = 43%.

$$\text{Estimated hepatic blood-flow} = \frac{4{\cdot}80 \times 100}{1{\cdot}08 - 0\ 57} \times \frac{100}{100-43}$$
$$= 1651 \text{ ml./min.}$$

A considerable range of values can be obtained in one subject—e.g., from 945 to 1618 ml /min.—according to the position of the catheter in the liver It is possible that the rate of flow does vary in different parts of the liver, and it is a slight drawback to the method that *mixed* hepatic-vein blood cannot be obtained. Bradley and his colleagues, and Warren

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1. See *Lancet*, 1946, i, 541.
2. Bloomfield, R. A, Lauson, H. D., Cournand, A., Breed, E. S., Richards, D. W. *J. clin Invest* 1946, 25, 639.
3. Lauson, H. D., Bloomfield, R. A., Cournand, A. *Amer. J. Med.* 1946, 1, 315.
4. Howarth, S., McMichael, J., Sharpey-Schafer, E P. *Clin. Sci.* 1946, 6, 41.
5. Warren, J V, Stead, E A., Brannon, E. S. *Amer. J. Physiol.* 1946, 145, 458.
6. Cournand, A. *Fed Proc.* 1945, 4, 207.
7. McMichael, J. *Ibid*, p. 212.
8. Bradley, S. E., Ingelfinger, F. J., Bradley, G. P, Curry, J. J. *J. clin. Invest.* 1945, 24, 890.

A large part of India's health campaign, in James's words, consists of "encouraging the will to be healthy, and spreading the knowledge of the meaning of health"; and wide circulation of his booklet will certainly help this aim. Nevertheless a health service, no matter how complete, cannot by itself solve India's health problem. Until there is a substantial rise in the standard of living people will continue to die of starvation and of the diseases attendant on malnutrition; the nutritional and dietary surveys by members of the Servants of India Society[2] emphasise this fact. These studies include accounts of famine conditions in Malabar, Madras, and Kanara, and contain many valuable family dietary surveys, which illustrate vividly the shortcomings of the typical Indian diet and the poverty of the Indian peasant. The curses of inadequate price control and of ineffective administrative measures are here translated into terms of mouthfuls of rice and morsels of meat and fish. The great volume of facts revealed by these painstaking studies underline the need for rigid control of the price and distribution of all foodstuffs, and not only the basic cereals. Stress is also laid on the need for irrigation and subsidies to encourage food-production. For India, at present, food is the best medicine.

COLDS AND CONSTITUTION

NEWS of the reopening of the laboratory's offensive against the common cold reawakens interest in the other means of studying civilised man's most persistent enemy. With so much clinical and epidemiological material on every hand, there is little excuse for any failure to extract all possible information from observations in the field. Yet opinion is still divided even on so simple a topic as whether some people catch colds more frequently than others.

A group of workers at Boston[3] endeavour to answer this query. Under the rather formidable title of Stability of Resistance to the Common Cold, they analyse the incidence of upper respiratory infections during four years among the boys at the Phillips Exeter Academy. Previous work at the Harvard School of Public Health[4] had suggested that the frequency of colds in individuals was not, as deduced by Gafafer and Doull,[5] explicable by the operation of the laws of chance, and the Exeter Academy study provides fresh evidence that each person has a relatively constant incidence; the number of colds each year seemed to be characteristic for the individual, and slightly increased as the investigation progressed from 1935 to 1939. Sargent and his associates deduce that some factor such as the constitution must play a significant part in determining the incidence of a disease which appears to be thus correlated with the individual host, but the value of their study is somewhat lessened by the inclusion of all cases of coryza, pharyngitis, laryngitis, bronchitis, tonsillitis, and even pneumonia under the heading of common colds, even though 95% of all cases were diagnosed as "nasopharyngitis." It is probable that epidemic influenza, for instance, was thereby included, and it would surely have been fairer to have used for such a mixture a term such as A.R.D. (acute respiratory disease), as adopted by the United States Army.[6]

The thesis that constitution affects the incidence of an acute infection is not new, and has been applied by several authors to poliomyelitis.[7,8] Constitutional factors which determine the incidence of disease could, of course, be genetic, as suggested by Webster's work on the inbreeding of mice,[9] or might depend on individual influences such as the hormones. Mention of hormones in connexion with the common cold reminds one of some remarkable and unexplained facts recorded by the School Epidemics Committee of the Medical Research Council.[10] Boston boys may develop colds by numbers, but the M.R.C. report suggests that British schoolgirls suffer from colds three or four times as frequently as their male coevals—though boys and girls suffer equally from influenza.

VITAL STATISTICS AND THE M.O.H.

IN discussing innovations in the methods of national vital statistics at the meeting of the Society of Medical Officers of Health on Feb. 20, Dr. Percy Stocks, medical officer to the Registrar-General's Office, described a morbidity survey of E.M.S. hospital patients. The hospital records were sampled and the main features of each of the 1 in 5 cases selected were transferred to punched cards. The populations exposed to risk could not be enumerated, but proportional rates based on the non-seasonal diseases gave some indication of the ebb and flow of serious illness, and some useful specific investigations were made on motor-cycle injuries and transfusion hepatitis. This experience will be valuable as a basis for a complete and accurate scheme of recording the clinical material in the National Health Service hospitals. A more novel kind of morbidity-sampling inquiry is being conducted by the governmental agency known as Social Survey. Here a statistically representative sample of the population numbering 2500 is selected each month. Each person is questioned about his health in the previous three months by a field worker. The refusal-rate is negligible, and Dr. Stocks was confident about the general accuracy of the results. When combined with the fuller notifications of infectious disease now in hand, the sample survey has much to commend it as an epidemiological tool for the M.O.H.

Mr. Louis Moss, director of Social Survey, said that the picture of the cross-section of the adult population given by the sample agrees with that obtained from the more usual national statistics, and the incidence of serious illness in the sample corresponds with estimates based on E.M.S. surveys. However, validation studies involving a clinical examination of a sample of those interviewed are under way. Later speakers, while appreciating the limitations and difficulties of morbidity surveys, agreed on their potential value to the M.O.H., when, freed by the new Act from other responsibilities, he can concentrate on the environmental aspects of sickness as well as death.

WHITE PENICILLIN

FROM the beginning of this year a "white" penicillin free from the impurities that gave the drug its yellow colour has been obtainable. White penicillin is sold at the price which yellow penicillin used to cost, while the less pure product is reduced to three-quarters of its original price—the lowest charge for penicillin anywhere in the world. The unitage of this white penicillin ranges from 1200 to over 1600 units per mg., but there can be no guarantee that brands of the same unitage will be equally effective therapeutically unless we know what proportions of the different penicillins the preparations contain. Thus white penicillin may contain from 10% to 30% of penicillin IV, which, from American evidence, is quickly inactivated by the human tissues and therefore of little therapeutic value. However, two of the principal producers claim that their products contain at least 90% of penicillin II, which is known to be active in vivo as well as in vitro against a wide range of bacteria. One of

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[2] Food Control and Nutrition Surveys in Malabar and S. Kanara. Inadequate Diets, Deaths and Diseases, and a Food Plan for Madras. Studies by members of the Servants of India Society. Madras: Servindia Kerala Relief Centre. Pp. 300 and 63. Rupees 4 and 1.

[3] Sargent, F., II, Lombard, O. M., Sargent, V. W. *Amer. J. Hyg.* January, 1947, p. 29.

[4] Wilson, E. B., Worcester, J. *Science*, 1944, 99, 468.

[5] Gafafer, W. M., Doull, J. A. *Amer. J. Hyg.* 1933, 18, 712.

[6] Commission on Acute Respiratory Diseases. *Amer. J. publ. Hlth*, 1946, 36, 439.

[7] Draper, G., Dupertuis, C. W. *J. clin. Invest.* 1939, 18, 87.

[8] Aycock, W. L. *Amer. J. publ. Hlth*, 1937, 27, 575.

[9] Webster, L. T. *Medicine, Baltimore*, 1946, 25, 77.

[10] *Spec. Rep. Ser. med. Res. Coun., Lond.* 1938, no. 227.

Annotations

MEDICAL STAFFING OF HOSPITALS

WHAT medical staff does a hospital need for full efficiency? Prof. G. E. Gask, F.R.C.S., tackles this question in a memorandum to the Oxford and District Joint Hospitals Board.[1] He begins by collating information on the present staffing standards of various types of general hospital. At one extreme is the old poor-law ratio of one doctor to nearly 170 beds; at the other is a surgical professorial unit where there is one clinician for every 10. On theoretical grounds a standard of one doctor to 25 beds would, he believes, be insufficient for first-class service in a 1000-bed hospital, especially on the surgical side. Examining the staff structure of two first-class county (municipal) hospitals he finds the following proportions of medical staff to beds:

	St. Helier (Surrey)	Central Middlesex
Medical	1 : 28	1 : 48
Surgical	1 : 23·2	1 : 24
Obstetrics and Gynæcology	1 : 19·4	1 : 27

Taking into account pathologists, physiotherapists, and registrars, St. Helier has one medical officer to 18·2 beds and the Central Middlesex one to 28, but the inadequacy of the latter figure is recognised, and a further 14 additional house-officers are to be appointed as soon as possible, bringing the ratio to one to 19. This contrasts favourably with a borough hospital which has only three doctors for 600 beds (410 chronic).

After considering Stark Murray's estimate of one doctor to 18 beds (work including outpatients and domiciliary visits) and Robb-Smith's estimate of one to 12 beds (admittedly too high for the immediate future) Professor Gask concludes that the minimum standard for the recognition of a hospital as first class should be the allowance of one medical officer to 20 beds, or fifty to a 1000-bed hospital; but he regards this figure as low, and until the aim of one to 15 beds can be attained the doctors should have all the aid an efficient clerical and record department can give them. Ancillary workers are provided in many departments, but clinicians are too often expected to write their notes in long-hand, keep their own records, and follow up their own cases.

> "The formation of a first-class hospital cannot rest on a mere formula of power-mathematics. The staff of a good hospital must be professionally and spiritually contented. They should not be so driven by stress of work that they have no time to think, to study and to visit and confer with their professional brethren, both at home and abroad. Good hospitals should become 'seedplots of wisdom,' germinating ideas for promoting the positive health of the people as well as for curing disease."

Professor Gask's estimate of the medical staff required to maintain a first-class general hospital will be widely accepted by those familiar with the running of such a hospital; and it is well, even in these times of shortage, that the need should be known. By general consent, some 5 acute hospital beds per 1000 of the population (or 200,000 for England and Wales) are needed. These are not all available, nor are those that are available all suitable for their purpose. If they were, their full use would demand the whole-time service of some 10,000 doctors. Though the chronic, infectious, tuberculosis, and mental beds, which are also necessary for a complete hospital service (and which will amount in sum to nearly double the acute beds), may not want a staff ratio of this magnitude, it is all too evident that the adequate medical staffing of our hospitals is a problem as great as it is fundamental.

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[1] Included in report of the Ad-hoc Planning Committee on the planning of hospital services in the board's area. Obtainable from the secretary at 16, King Edward Street, Oxford.

PARALDEHYDE ACCIDENTS

THE accidental deaths from paraldehyde poisoning, of which two more examples were reported in THE LANCET of Feb. 1 (p. 188), arise from two closely similar causes. In the latest cases there was confusion between pure paraldehyde and a dilute solution; in the case at Swindon in 1942, among others, there was confusion between the drachm and ounce signs. The second risk should be eliminated as the fluid drachm disappears from general use; the first has not yet received the attention it deserves. In many hospitals paraldehyde is stored in the wards or theatres both in the pure state (*B.P.* dose 60–120 minims) and in a dilute solution, termed "*haustus paraldehydi*" or "paraldehyde draught," the dose of which is usually 1 or 1½ fluid ounces, according to its strength. The draught is not an official preparation, and its use is one of the reasons for mistakes. The medical student (and hence the house-officer) and the nurse in training often fail to distinguish between a drug and a preparation of a drug. Thus many a young doctor or nurse would loosely call paraldehyde draught by the short name paraldehyde. And some never grow out of this habit. How many times has one heard the expression, "8 minims of morphine was given" when 8 minims of solution of morphine was meant? But here there is more excuse for muddles, because paraldehyde draught varies in different hospitals: in some it is a clear solution resembling paraldehyde itself; in others it has a layer of paraldehyde floating on a layer of water; while in yet others it contains liquid extract of liquorice and other ingredients which readily distinguish the draught by colour from the pure liquid. Surely if paraldehyde draught is required in the wards a uniform formula and a uniform and distinctive colouring should be adopted in all hospitals. It should be an invariable rule, too, that bottles containing either draught or pure substance must have the dose clearly stated on the label.

INDIA'S NECESSITY

Sir Frederick James[1] gives us an excellent popular exposition of the monumental report of the Bhore Committee, of which he was a member. Here in small compass are the essential facts about the health situation in India, written in language which everyone can understand.

Perhaps the most striking of these facts concern deficiencies in India's health personnel. Of the 47,400 doctors (one for every 6300 of the population) only 4000 are women, though only women doctors can hope to bring modern medicine to India's women and children. There are only 1000 qualified dental surgeons, 7000 trained nurses, and 75 pharmacists in the whole of British India. About half of the districts and three-quarters of the municipalities of British India have no qualified health officers. It is against the background of such deficiencies that the infant-mortality of 160 and the expectation of life of 27 years have to be considered. James does not, however, content himself with painting a grim picture; he also summarises the proposals which form the second volume of the Bhore report. These include the provision of a health centre for every 20,000 of the population, each 30 centres being grouped under a more specialised secondary unit, with a district headquarters for every 5 secondary units; 125 such headquarters, each serving a population of 3 million, would cover the whole of British India. The service planned would include public health and preventive medicine, and also home and hospital treatment. It is a surprise to read that the estimated cost of this scheme is only 3 rupees (4*s*. 6*d*.) per head per year for the first ten years.

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[1] The Battle for Health. By F. E. James. Bombay: Tata Studies in Current Affairs. Pp. 91. Rupee 1.

adequate level for *Staph. aureus* and some strains of *Strep. fæcalis*. A dose of 200,000 units six-hourly would probably be lethal to most gram-positive organisms and about 50% of gram-negative bacilli. There is, however, wide individual variation in the levels obtained, and further work is required on this subject.

Another field for inquiry is the use of penicillin in the prevention of urinary infections. If the drug will prevent urethritis and ascending infection due to the indwelling catheter, one of the urologist's main difficulties will be overcome. Preliminary reports are encouraging.

New advances bring new problems. Thus, in specialist surgical units, where there are many similar cases, there is a danger of a penicillin-resistant strain being spread round by cross-infection unless the strictest precautions are taken; this must be borne in mind in urological wards. Another danger is that the removal of staphylococci from an infected area may lead to an increase in gram-negative contaminants. This may not greatly matter in surface wounds, but a heavy infection with insensitive proteus or *Ps. pyocyanea* might be serious in the urinary tract. It must also be remembered that in many urinary infections relapse will be inevitable unless the mechanical efficiency of the tract is restored by surgery.

OF NOT SMOKING

THE cost of tobacco imports this year is estimated at £50 million—a full £15 million more than the total for consumer goods and only £10 million less than the anticipated expenditure on machinery and equipment. Much of this tobacco comes from the United States; and the Government are said to have decided that, to conserve our dollar resources, the amount must be reduced. American growers are so confident of this cut that they have already scaled down their production plans.

If the cut were made, it could be argued that, tobacco being non-essential, ordinary private trade might be left to take its course, with the demand constantly exceeding the supply. Again, the tax might be increased until the demand came down to the level of the supply; here the objection is that any further imposition might make of smoking a pastime only for the rich. Again, rationing could be introduced, as on the Continent—a solution that would at least have the merit of tending to provide equal shares for all. Finally, what was lost from America might be made good by purchases from "soft-currency" countries: and Greece is said to have been marked as the source best able to make good the deficit.

It is not easy to gauge the priority which tobacco may justifiably be given. With essentials, such as food, our requirements can be assessed within narrow limits; while the morale value of luxuries, such as films, can also be judged with fair accuracy. Unfortunately, there is no yardstick for the measurement of tobacco's virtues. Hitherto authority has pandered to the growing national taste for a smoke; all through the war the country had as much, or almost as much, as it demanded; and there is little doubt that any restriction now would be violently opposed. Tobacco is, in fact, commonly regarded as an essential comfort, though why it should occupy this place in our affections is not clear. Plainly, smoking has not, as some have supposed, simply a symbolic value; for the chewing of gum, though better than none, is a poor substitute. Nor is its effect wholly explained by its pharmacological action. It seems likely that the comfort it brings is derived, as with alcohol, from a complex of conditions which defy rational analysis. Empirically, there is no doubt of its capacity to allay anxiety: the enhanced demand during the war was probably related less to increased spending-power than to the troubled times. For a great many people smoking has become a means of keeping a mild psychiatric disability within bounds, and we must face the fact that any sudden or drastic reduction in supplies of tobacco would cause a sharp rise in the incidence of overt anxiety.

LIGUE INTERNATIONALE CONTRE LE RHUMATISME

THIS body has been reconstituted, under the presidency of Dr. Ralph Pemberton, of Philadelphia, and has been subdivided into a European Ligue and an American Ligue. A European congress will be held in Copenhagen next September and an international congress in the United States in 1949. The British branch of the Ligue is represented by the scientific advisory committee of the Empire Rheumatism Council, with Dr. W. S. C. Copeman as chairman and national representative, Dr. G. D. Kersley as treasurer, and Dr. Oswald Savage as secretary. New members will be welcome, and particulars may be had from the organising secretary, Empire Rheumatism Council, Tavistock House North, Tavistock Square, London, W.C.1.

SMALLPOX

IN the Grimsby outbreak, where infection occurred in a lodging-house for seamen and farm labourers, the number of cases up to March 11 was 15, and 6 of these patients have died. All secondary cases have occurred in the direct line of contact. At least 8 contacts in this outbreak are still at large and remain unidentified.

A case of semiconfluent smallpox has now been reported in a man of 66 years, a resident member of the staff of the Empire Memorial Hostel for Seamen, in Commercial Road, Stepney. No direct connexion with the Grimsby cases has been established. This man sickened on March 3, and was removed to Mile End Hospital (L.C.C.) on the 5th. He remained there until the 9th, when he was removed to a smallpox hospital. The Ministry of Health recommends that people who visited the seamen's hostel between March 2 and 6 should be under careful surveillance until March 20, and any person who has visited the hostel since Feb. 14 should be medically examined. The source of the infection in Stepney has not yet been identified, and it is assumed that an abortive or ambulant case—probably a woman—is still at large.

Several cases of smallpox have lately been reported in Paris, and the outbreak is expected to spread.

RELEASE OF DOCTORS FROM SERVICES

THE Central Medical War Committee have been informed that the release of medical officers in class A will be as follows:

Royal Navy.—April, group 60: May and June, group 61.

Army.—*General-duty Medical Officers*: April, group 57; May, group 58; June, group 59. *Specialists*: April 1–20, group 45; April 21–May 11, group 46; May 12–25, group 47; May 26–June 4, group 48; June 5–15, group 49; June 16–30, group 50.

Royal Air Force.—April, group 58.

WE regret to report that Dr. B. A. MCSWINEY, F.R.S., dean of the medical school and professor of physiology at St. Thomas's Hospital, died on March 8 at the age of 52.

WE have also to record the death of Dr. LOUIS COBBETT, a former professor of pathology in the University of Sheffield and lecturer in pathology in the University of Cambridge, who died on March 10. Since his retirement in 1929 Dr. Cobbett had continued his work on the bacteriology of tuberculosis. He was 85 years of age.

THE INDEX and title-page to Vol. II, 1946, which was completed with THE LANCET of Dec. 28, is published with our present issue. A copy will be sent gratis to subscribers on receipt of a postcard addressed to the Manager of THE LANCET, 7, Adam Street, Adelphi, W.C.2. Subscribers who have not already indicated their desire to receive indexes regularly as published should do so now.

these preparations is a crystalline sodium salt of penicillin which is said to withstand high temperatures for long periods without deterioration. In addition to their greater stability the purified penicillins should be less liable to cause painful or allergic reactions or to irritate delicate tissues like the meninges and the conjunctiva, while highly concentrated solutions of say a million units per c.cm. can be used for parenteral injection. The need now is for some amendment of the regulations under the *Therapeutic Substances Act* to ensure that these purified penicillins are as effective in the host's tissues as they are in the test-tube.

FEEDING THE LONELY ADULT

THE fact that there has been no obvious deterioration in the national health in the past seven difficult years has made most of us feel that our nutritional policy is basically sound. Even the rationing of bread—the most serious step which has been taken in determining the consumption of food—aroused no serious objections on nutritional grounds. In conformity with the Ministry's usual plan of adjusting the rations roughly in accordance with nutritional needs, manual workers and adolescents receive more than the standard adult ration of 9 oz. of bread daily, while children under five receive less. Children between five and eleven receive the same as a normal adult. Many children do not consume the whole of their ration—for example, the child of six does not usually consume as much as 9 oz. of bread in one day, nor a child of two as much as 5 oz. Thus, the adults in a family with children can often benefit from the children's ration of bread, as they also no doubt benefit from their ration of tea and to a lesser extent meat and cheese. On the other hand, the children probably receive more than their share of eggs, jam, and sugar. There is thus a redistribution of food within the family which is a great help in feeding its members. The study of Schulz [1] in Oxford suggests that the extent to which adults can practise "symbiosis" with their children may determine the total adequacy of their diet. In a series of papers published at six-month intervals, beginning in the spring of 1941, Schulz has devised low-cost diets obtainable by an Oxford family of two adults and three children. In the last two papers she has included a reasonable distribution of the food within the family to meet accepted dietary habits as well as nutritional needs. For example, the adults are allotted appreciably more than their ration of bread, bacon, and cheese. The striking fact which emerges from Schulz's last paper is that, with bread rationed, a distribution within the family which is to give sufficient calories for the adults must involve a diversion of rationed foods from the children. In the diets suggested by Schulz, this diversion is equivalent to some 9 points or bread units weekly to the two adults.

How do adults fare who are living alone and therefore denied the advantages of family distribution? It appears from Schulz's paper to be impossible, with bread rationed, for such people to obtain enough calories with reasonable ease and at reasonable cost. They must either consume unappetisingly large quantities of unrationed foods which supply a fair number of calories (for example, something like 4 lb. of potatoes daily for each adult) or they must take a meal out on most days of the week. Meals out are not always practicable and would raise the cost of the diet appreciably, though British Restaurants and works canteens have done much to overcome these obstacles. There remains a third possibility—the consumption of much more expensive unrationed foods, such as ready-cooked pies or sandwiches. But this would raise the cost still more and is not considered by Schulz, who is concerned only with low-cost diets. The difficulty of providing adequate adult diets at low cost, where neither meals out nor children's rations can be drawn on, did not arise so long as bread was unrationed. But that it now exists can be confirmed by anyone with a knowledge of present-day food-supplies, and the patience to spend tedious hours with a set of food tables and a slide-rule.

PENICILLIN IN URINARY INFECTIONS

WE have become accustomed to think that penicillin is of little value in infections of the urinary tract, since most of the common infectors are either gram-negative or belong to the less sensitive gram-positive groups. The value of penicillin in *Staph. aureus* perinephritis, and in association with surgery in renal abscess and stone, is well known. At the Royal Society of Medicine, section of urology, on Feb. 27 Mr. A. L. Peeney drew attention to the possibility of using the drug to control the other more common, but less sensitive, infections due to *Strep fæcalis*, *Proteus morgani* and *vulgaris*, *Bact. coli*, and *Ps. pyocyanea*. He finds, in common with Helmholz and Sung,[1] that many of these organisms are sensitive to high concentrations of penicillin. Of 199 strains isolated from urinary cultures (see table), 132 (66%) were killed by urinary concentrations below 200 units of penicillin per c.cm. Most strains of *Staph. pyogenes* are killed by a urinary concentration of 0·03 unit/c.cm., but other gram-positive organisms may require a concentration up to 10 units/c.cm., and the gram-negative bacilli up to 200 units/c.cm. *Ps. pyocyanea* is entirely insensitive up to this level.

MINIMUM BACTERIOSTATIC CONCENTRATIONS IN 199 STRAINS OBTAINED FROM URINARY CULTURES

Organism	Total strains	Penicillin units per c.cm. urine > 200	200–100	100–50	50–10	10–0·5	< 0·5
Staph. pyogenes	33	2	..	..	2	..	29
Strep viridans	8	..	..	..	..	..	8
Strep. fæcalis	22	..	..	..	..	22	..
Coliforms	81	32	20	21	7	1	..
Proteus morgani	24	16	1	..	6	1	..
Proteus vulgaris	18	4	2	1	5	6	..
Ps. pyocyanea	13	13	..	..	..	..	..

The courses of penicillin adopted in urinary infections have clearly been far too low in dosage and far too short. Routine estimations of the urinary concentration are usually not feasible, and it is therefore important to know what scale of dosage can be relied on to produce an effective concentration. Furthermore, since these dosages may have to be continued for a long time, and possibly for conditions which in themselves are not painful, the method of administration chosen should not be too unpleasant. The oral route, which could be used in outpatients, would be ideal. Unfortunately, however, Sir Howard Florey told the section of urology that when enteric-coated capsules are given by mouth only 8–23% of the penicillin administered is secreted in the urine, compared to 33% after beeswax and peanut-oil injection, and 65–80% after injection of saline solutions. Peeney, using salol-coated capsules, found that combination with a slow-release vehicle is no advantage. Using ordinary penicillin (90,000 units) in these capsules he obtained urinary concentrations of 40 units/c.cm., but these fell rapidly in spite of further three-hourly doses of 20,000 units and reached 10 units/c.cm. in twelve hours. After a single intramuscular injection of 100,000 units of penicillin in saline the urine (50 c.cm.) at one hour contained 680 units/c.cm.; bulked urine between three and four and a half hours after injection (608 c.cm.) contained 85 units/c.cm.; and at eight hours (132 c.cm.) still contained 2·6 units/c.cm. This is an power and the other resources proportionate to our national need, we are pursuing the opposite policy. We have devised an elaborate system of artificial restriction of the price of food partly compensated by subsidies to the producer. It would take us too far afield to discuss in detail the effect of subsidies on the amount of food produced, but it may be observed that subsidies do no more than partially make up to the producer with one hand what the State has taken away with the other—the opportunity to sell his produce at prices regulated by supply and demand. Imports are a national luxury when the means of paying for them no longer exist; yet not only do we accept them on credit, but we allow them directly or indirectly to dictate the level of food prices at home.

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[1] Schulz, T. *Bull. Oxfd Univ. Inst. Stat.* 1946, 8, 375.

[1] Helmholz, H. F., Sung, C *Amer. J. Dis. Child.* 1944, 68, 236.

A simple example will help to bring out the point. Let us take the case of a crop where effort is directly determined by price: that of potatoes grown in gardens and allotments. At the present controlled price at which the individual can buy potatoes (10*s.* a sack), it is not worth while either to employ one's own energies in the production of potatoes or to employ labour for the purpose. Were the price of food allowed to find its true economic level the price of potatoes would rise by a multiple of probably two to three times, and it would at once become advantageous to some millions of persons to grow their own potatoes. To suggest that such an action would be a waste of national energy, since potatoes can be purchased cheaply, is no answer in present circumstances, and is to drag in the assumptions of a world of free trade which no longer exists. The point on which attention should now be concentrated is that the country simply has not got the available exports with which to buy food of a kind which can be produced at home.

DEAR FOOD ?

The necessary long-term adjustment of the price-level of food relative to other goods does of course present difficulty. It involves abandoning conceptions which in the course of a century and a half have become fixed in our minds. There are, however, various ways by which the disturbances which such an adjustment would inevitably cause might be rendered bearable, and its dislocating effect upon the low-income groups be mitigated. What this article is meant to stress is the fact that the crisis which confronts us today can be remedied only by setting clearly before us the goal which a straight reading of our economic situation dictates—a major upward adjustment of the price-level of home produce in relation to the price-level of other commodities.

Frenzied efforts to capture an evanescent export market involve a further dislocation of our economy in precisely the wrong direction. Let us by all means export all we can; let us by all means take advantage of the "sellers' market" now open; but let us keep our eyes open and cease to obscure the fundamental tendencies to which we must in the long run conform. It is juggling with food subsidies, price-levels, and imports purchased on credit that is blinding us and leading us to real disaster.

A FALL IN THE STANDARD OF LIVING ?

It looks as though, sooner or later, we shall have to dispense with those imports, chiefly food, which we can produce at home if we devote to them a sufficient proportion of our productive resources. To adjust our economy in this way would involve a doubling—or perhaps even more—of the man-power and other resources allocated to agriculture and certain other allied occupations. It would involve too a sharp rise in the price of food, bread alone perhaps excepted. Prices of all other food may have to rise to something like twice their present proportion of the ordinary householder's budget.

Does this mean that we must face a fall in the real standard of living as compared with pre-war days? The present Government propaganda, backed by all the powerful industrial interests with a stake in the export market, asks us to believe that such a state of affairs is a dark abyss which we dare not contemplate. It is surely nothing of the kind. Let us look at the items of debit and credit in turn.

DEBIT AND CREDIT

The two chief debit items which must be faced are (1) the difficulty of adjusting the internal price-level for agricultural produce as contrasted with other consumer goods; and (2) the immediate check to industrial expansion in so far as it depends upon an expanded export market. Both of these effects, however, are transitory, and both would cease to be noticeable in a relatively brief period, perhaps 3–5 years. The effect of the check on the export industries should not be exaggerated, since by far the greater part of the excess exports of today over 1938 levels is of goods for which there is a home market already strained to the breaking-point by the divergence between demand and supply.

The items on the credit side of the account are surely of far greater consequence. Let us start with the simpler points.

First, by inviting an increased flow of man-power into agriculture we at once check and reverse many of the tendencies towards urbanisation which are themselves one of the great social problems of our time.

Second, we begin to release for the home market the productive capacity of our export industries. Do not let us forget that our present forced-exports policy can really promise little or nothing in this direction: we are told to wait till tomorrow or the next day, but there is no solid assurance that in 3 or 5 years' time the export balance will have been attained.

Third, by substituting a moderate export policy for a forced one we achieve a far greater degree of national independence; and, to the extent that we set employment at home free from the vagaries of political and other circumstances abroad, we improve our bargaining position. The state of the world is today such that nothing but the present panic about our export balance would blind us to the importance of this objective. It is linked with the fourth item on the credit side—the advantage the policy offers of enabling us to proceed without "direction" with our programme of social justice upon which all parties are at heart agreed.

EXPORT DRIVE AND DIRECTION OF LABOUR

This last point is of great significance and deserves to be closely considered. The present forced-exports policy carries with it the necessity for man-power for the export industries, but the need to sell abroad forbids any real elasticity in the wage-rates offered. This fact underlies the present "shortage of man-power"; what the outcry really means is that whereas it is notorious that many distributive and luxury trades can secure the man-power they require, the export trades, and certain other basic industries like coal-production whose costs affect the export market, are finding themselves gravely short of man-power. The Government are at present at the stage of trying moral suasion; but it is not surprising that we hear whispers of the necessity for direction. It is indeed the next step, and if the Government are driven to it our liberty will be gone, and socialism will have sold its birthright.

There is only one way of avoiding this impasse—by building our internal economy on foundations which permit of a free play of incentive and reward as between the various occupations. It must be possible for more man-power going into one industry to be compensated by less going into another, and in this vital respect we must return to the elasticity of the old economic system. Such an economy is not incompatible with socialism; but it is hopelessly incompatible with a policy of forced

Reconstruction

THE NATIONAL SITUATION

Exports and Agriculture

FROM A CORRESPONDENT

The Government are now so convinced of the doctrine "export or starve" that it seems almost disloyal to cast doubt on the economics on which it is based. Yet neither the Government spokesmen nor the economists have so far advanced any substantial arguments to justify their belief in the course on which we are embarked.

Clearly there is need for a major change in the basis of our national economy if we are to survive; but the first essential is to determine our goal in the broad context of our economic history. A slight knowledge of the past is sufficient to raise uncomfortable doubts whether we are now heading in the right direction.

As every schoolboy knows, the export trade of the 19th century was built up on the manufacturing capacity of Great Britain. We had led the way in the industrial revolution, and the rest of the world was glad of our products. With the proceeds and the help of our exports of coal we were able to buy our imports of food and raw materials. But as the years passed, and at a quickening tempo during the last few decades, the rest of the world has learned to manufacture for itself. Before the war it was widely understood that the market for our exports was steadily contracting, though the effects were often masked by the rapidity of technical advance and our ability to switch from one export to another. In 1938 the position was, in round figures, that our net retained imports amounted to £857 million, including £385 million for food, while our exports stood at £470 million. The balance we made good with the income from foreign investments, and with our invisible exports.

It is this balance which has largely disappeared, and on which so much emphasis is placed today. If exports could be doubled, all would be well; but there is surely no solid ground for supposing that once the pent-up demand created by the war has been exhausted the underlying tendency to contract will fail to reassert itself. The Government have assured us that there is no danger of over-production for a long time to come; and so far as this goes it is a comforting statement. But does it not conceal an element of wishful thinking? Of course the rest of the world whose economy is almost as badly shaken as our own would like to buy all sorts of things today; but others too are trying to set their houses in order, and before long we shall surely encounter the old desire to manufacture for themselves. In some industries this will come soon, in others it may be long delayed; but the principle stands. And if exports settle down again at our pre-war level we shall indeed be stranded.

The decision lies finally not with our workers or their output—though these are of course important factors—but with the politicians of the world at large; and the world will take our exports only to the extent that suits its convenience. Gradually a new world of freer trade may emerge, but not in the next two or three critical decades.

FOOD AND ITS PRICE

What then? Let us proceed for a moment on the assumption that the above diagnosis is correct. Shall we starve? *It is not enough to answer automatically Yes;* we must look more closely at the age-old mechanism of supply and demand and its monetary consequences.

What really happened under the régime of the 19th century was that Great Britain was enabled by her advantage in manufactures to devote a relatively small part of her energy to the production of food. In the old phraseology, our exports enabled us to buy food abroad at a price below that at which we could produce it at home. So long as free trade endured, the price of food was bound to remain low. But with the whittling away of free trade, and now with its virtual disappearance, a new situation has arisen of which too little account has been taken. We have not got the means to pay. The whole of the proceeds of our exports are needed for obtaining goods, chiefly raw materials, which we cannot in any circumstances produce at home. The position is obscured by the readiness of other countries to send us foodstuffs at prices lower than those at which we can produce them in sufficient quantities. Since, however, those countries are unwilling to admit freely our manufactured goods, and the other half of the free-trade equation has fallen away, the low price at which we can obtain imports from abroad has become meaningless, for the simple reason that we cannot get them save by running into debt.

The remedy is a great increase in the production of food at home, and our war-time experience shows that this is within the realm of practical politics. In the war years we achieved an increase of 35% in our food-production, and this with the very limited man-power of war-time. With peace-time facilities, our production could certainly go much higher still, and, with the exception of wheat, approximate to 100%. (The importance of the bill for imported wheat should not be over-emphasised: grain and flour cost us in 1938 only £55 million out of a total import bill of £857 million.) What prevents this increase of production? One thing alone, the price-level.

The corrective to the situation outlined above is a sharp rise in the price of food at home. Food should tend to occupy an increasingly important relative position in our home economy. Higher prices for agricultural products would mean higher wages and more man-power—in other words a greater call upon our national productive capacity. If this simply corrective mechanism of supply and demand were allowed to operate today, a significant and probably dramatic rise in our food-production would quickly follow. If this sounds too good to be true, it is because the idea that Great Britain is a country dependent on food from abroad—the industrial millions and the bread to sustain them from abroad—has become a fixed idea. It is an idea based on the assumption that we must continue for ever to fix the price of food at home at a level determined by imports from the food-exporting countries. Yet if we care to pay the price in terms of national energy, we can expect an increase in our food-production vastly greater than that of our war-time effort with its limited man-power. We might in fact come well within sight of the total which in 1938 we imported from abroad; and our old 1938 level of exports would suffice very roughly to pay for the balance of the necessary foodstuffs, raw materials for industry, and other essential imports.

It will be at once objected that a substantial rise in the price of food at home is out of the question, that it would mean a rise in the cost of living, and that this would in turn damage the export trade. But this little group of arguments is full of fallacies, and must be abandoned once we accept the full implications of the argument so far followed. *A rise in the cost of living?* If it means that a greater proportion of the household budget would have to be spent on food, it is true; but that is not the whole story, for the policy also holds out the prospect of an easing of the drive for exports with its pressure upon the supply of consumer goods for the home market. Thus higher prices for food would be balanced by a tendency towards lower prices for many other consumer goods. Damage to the export trade? To argue so is to put the cart before the horse. If the export trade is likely to run into heavy weather and lead us into an impasse, is it right to argue that the only possible corrective process must be abandoned because it would hamper the export trade?

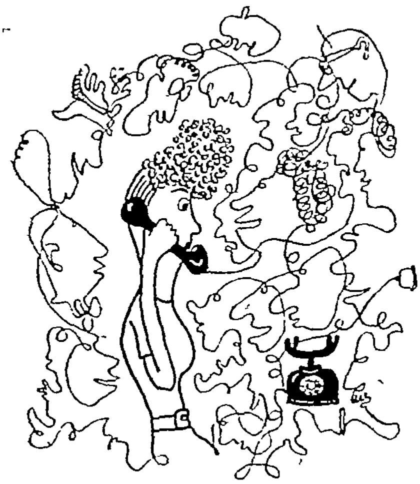
BUYING WHAT WE CAN PRODUCE

So far from allowing the internal level of the price of home-produced food to rise until it commands man-

In England Now

A Running Commentary by Peripatetic Correspondents

I HAVE often thought that a handbook for prospective wives of G.P.s would be worth publishing. Each chapter would deal with some aspect of the life, and at the end the candidate ought to be able to decide whether the game was worth the candle. I haven't time to write the book but I propose to dash off a few concise notes while the doctor is out on his rounds. They are not intended to be read by the minute percentage of doctors' wives-to-be who expect to spend the early years of marriage surrounded by nannies, maids, cooks, gardeners, chauffeurs, and secretaries, but by the austerity bride who will have to give up the dining-room in her villa for use as a consulting-room and strive to keep down expenses and maintain morale by looking after the children, the house, the meals, the garden, the patients, the telephone, the back door, the front door, and above all the doctor, practically single-handed.



Let us start with *The Telephone and How to Deal With It.*

One is warned as a bride of the dangers of living with relations, but the phone is a far more exacting companion than any mother-in-law—one can at least leave the good lady to look after the babies. The instrument is magnetic for children. I shall not forget trotting in from the garden one afternoon to answer it only to find my four-year-old standing on the chair and lisping into the mouthpiece: "My doctor will be back at ten-thirty." She replaced the receiver as I reached her. The call was urgent. Her daddy was asleep in a deck-chair.

If you have only one instrument put it in the kitchen near a comfortable chair by a table with a packet of digestive and alkali tablets thereon. (It is worth while finding out whether you have hyper- or hypo-acidity.) Have a line laid to every room with a plug and switch for connecting (and particularly disconnecting) the thing. If you can afford only one extension line have it laid to the w.c. At meal-times always go to the phone with your mouth full. It is more convincing. If your man hasn't a microphone manner like Stuart Hibberd it is better to answer the call yourself; better for the practice, I mean. Always gain the upper hand by asking more questions than the caller. This is more soothing for you both and transfers some of the responsibility to the caller. Get the facts. Truth is stranger than fiction and safer than friction. If caught cooking, turn off all gas and electricity before answering the call; an extra call after dinner is better than a burnt offering for a meal. If you hear nothing on lifting the receiver, shout loudly "Press button A!" Your voice must carry over the traffic. Then listen carefully. Country people do not willingly waste tuppence to tamper with infernal machines. Sweetening is vital when dealing with supervisors, but the men on at night are usually dears. When it's woman to woman you will know how to cope, sister. You will soon find that one of the most infuriating questions is "When will the doctor be here?" The correct answer is only learnt after hours of practice understudying B.B.C. actors. The answer comes with a light, broken laugh mixed in with this phrase: "Well—sometime——I hope."

How to deal with what you know to be an unwanted call: *You*, "I'm sorry, he's out." *Caller*, "When'll he be in?" *You*, "I don't know." *Caller*, "Can you . . . ?" *You*, "I'm going out." *Caller*, "I really wanted to speak to him personally. It's er . . ." *You*, "Can I take a message?" *Caller*, "Well, not really . . . I . . ." *You*, "Then will you ring at midnight? He'll be in then. There's a baby on the way." (There is one born every minute.) *Caller*, "I see, well, er . . ." *You*, "The milk's boiling over. Goodbye." A final word: don't use the blockage gambits such as "The doctor is just (having a bath, in a snowdrift, the lavatory, the chemist's, town, &c., &c.)." They won't work and he'll never remember the alibi anyway.

My finest hour was when the firstborn of the night supervisor at the local exchange was being delivered. Tied to his post of duty, he rang me up every so often to find out if the doctor was back, saying, "It's so nice to have someone to talk to at a time like this. . . ."

* * *

Our penchant for collecting lamps, antique and otherwise, from the ships in which we serve, ensured that we had two lamps in commission in our temporary house when the "Save-the-Transformers" cut followed close on the "Forbidden Period." A fine swinging model in our country kitchen suggested the roll of the ship and the creak of the timbers, and a table-lamp transformed the dining-room to a Nelson cabin. The problem was candles for stairways and bedrooms. The graceful Nell Gwynns, like the dressing-table candlesticks, were still not unpacked; but we had been using Gurr's embedding paraffin wax (remaining from my pre-war laboratory) to coax morning fires, so at least we had the raw material, and the wax melted quickly in a jam-jar on the hearth. Two tumblers in a basin of cold water, with a string wick hanging centrally from covering pieces of cardboard, were the first moulds. The next refinement was a wick of cut taper, inserted during cooling *au moment critique*; but a corkscrew wick was the reward of the tiro. The result at the end of an hour was : candles, 3 ; tumblers, 1. The final products had but a faint resemblance to the ecclesiastical species.

Did you know that there is a subtle relationship between the number of wick fibres and the diameter of the periparaffinium? This proportion was not quite right in my giant night-lights—so to the manufactory once more, this time to attempt a carriage-candle. I can now produce a carriage-candle such as they turn out tailor-made from a mould. I use a quarto sheet of paper, rolled to a tube and closed at one end, filled with melted wax and then cooled in water in a quart milk-bottle, and William Tell has nothing on my central placing of the taper. I might even consider accepting honorary membership of the candlemakers' union.

* * *

All this talk about dangerous drugs being stolen from doctors' cars conjures up painful pictures in the layman's mind of small boys chewing phenobarbitone tablets by mistake for acid-drops. The actual risk of any harm being done is very small indeed—so far as I know there has never been a death from this cause—but the average member of the public doesn't see it that way. When he hears one of the periodical announcements on the wireless his immediate reaction is one of righteous indignation. "Why the blazes can't these doctors look after their darned drugs? They're always leaving their stuff about. They ought to be prosecuted . . ." and so on, and so forth. There is only one certain protection: never to leave any case, parcel, bag, or other package containing dangerous drugs in one's car unattended. It is a beastly nuisance having to remember such details when one is busy with more important matters. But all this gets the profession a bad name. If a doctor likes to take a chance with his rugs or even his instruments, that is his affair. But when it comes to dangerous drugs I'm afraid it is a public duty to be careful. While there are sneak-thieves about we shall have to carry as few drugs about as possible, and either carry them in a pocket case or lug our bag into every patient's house. There seems to be no alternative.

* * *

It was good to receive my *Lancet* again; to tear off the wrapper, and throw it in its accustomed ball to the cat; and to go back with a click to the pleasant routine of early February. Thank you, Mr. Shinwell!

exports, where wage-rates become fixed by the necessity to sell goods abroad. Socialism as understood in this country implies an economy in which man-power is distributed among the different occupations according to the free choice of the individual, and not according to the will of an authoritarian State; and that means that each industry must be free to expand or contract in accordance with the demand for its products or services measured in terms of a price-level free to move up or down.

Need we then refuse to face the implications of the policy here advocated on the ground of its effects upon our standard of living? The answer is surely No: it offers the only course which will not carry us straight towards both the dictator State and an economic disaster.

SOCIAL OBJECTIVES

A word must be added in regard to the new meaning of the phrase "standard of living."

It happens that the economic crisis due to the loss of our foreign assets has coincided with the first serious attempt in this country to control the economic machine, and to put social objectives above purely economic objectives. The country has decided to put steady employment above private profit; to put a fair share of the necessities of life for all above the unrestricted distribution of the days of laissez-faire; and so on. It has in fact decided—and we are not likely to go back in this—to make a great change in the conception of "standard of living." It is not practical politics to embark on a programme of social justice and to judge the results by the purely material formula devised by the economists of a generation since. The sooner this is recognised the better; and our Government today, by accepting the view that failure to achieve a pre-war "standard of living" would amount to disaster, are doing themselves less than justice.

Medicine and the Law

"Wilful Refusal" to Consummate Marriage

HOWEVER simply a parliamentary draftsman may frame an enactment, some difficulty may be expected in its application. What could be clearer than these words in section 7 of the Matrimonial Causes Act, 1937 (for which Sir Alan Herbert, that master of the written word, had some responsibility)—"A marriage shall be voidable on the ground that the marriage has not been consummated owing to the wilful refusal of the respondent to consummate the marriage"? What is consummation? What is wilful refusal? One question was answered in 1945 in Cowen *v.* Cowen. The other is answered, subject to the final opinion of the House of Lords, in the recent case of Baxter *v.* Baxter.

In the Cowen case (*Lancet*, 1945, ii, 183) the parties agreed, as their married life began in the Persian Gulf where hospitals were not yet air-conditioned and where, as they believed, childbearing would be dangerous for a European woman, to practise contraception. The husband used a rubber sheath; later he practised coitus interruptus. Subsequently, when the element of danger to the wife from childbirth no longer existed, he continued to insist upon contraceptive methods. She begged him to lead a normal married life and allow her the chance of motherhood. He refused to change his course and he left her. She petitioned for annulment of the marriage under section 7. Mr. Justice Pilcher felt obliged to hold that complete penetration must amount to consummation. His decision was reversed.

"We are of opinion," said the Court of Appeal, "that sexual intercourse cannot be said to be complete when a husband deliberately discontinues the act of intercourse before it has reached its natural termination or when he artificially prevents that natural termination, which is the passage of the male seed into the body of the woman. To hold otherwise would be to affirm that a marriage is consummated by an act so performed that one of the principal ends, if not the principal end, of marriage is intentionally frustrated."

The court held that the husband had wilfully refused consummation; the wife was awarded her decree of nullity. Baxter *v.* Baxter was, in a sense, the converse case. The wife firmly refused to have a child, and her parents supported her in that determination. Throughout their married life she declined to allow her husband to have intercourse with her unless he took the precaution of using a contraceptive. According to the Cowen decision she had wilfully refused consummation. The husband, however, had to establish that the non-consummation was due to her wilful refusal. This he failed to do. The trial judge found that the non-consummation was due rather to the husband's own action in acceding to his wife's "request"; he had not made an attempt to have intercourse without contraceptives. Whether it was the request or the demand or the insistence of the wife, the husband was not entitled to the annulment of the marriage if he had acquiesced in the wife's requirements. In such a case, said the Court of Appeal, the husband would not be entitled to say that the wife had been guilty of wilful refusal within the meaning of section 7 until at least he had unsuccessfully brought to bear "such tact, persuasion and encouragement as an ordinary husband would use in the circumstances." The husband had acquiesced, though no doubt reluctantly, in the conditions imposed by his wife. "A reluctant acquiescence is nevertheless an acquiescence."

The Baxter petition, like the Cowen petition, was undefended. The King's Proctor was asked by the court, in view of the importance of the questions involved, to instruct counsel to argue in support of the trial judge's decision. The Court of Appeal upheld that decision and dismissed the husband's appeal, though leave was granted for the case to be taken to the House of Lords. It will be of interest to see how far the supreme appellate tribunal can discourage an impression that the "weaker sex" has the less difficulty in rebutting the allegation of acquiescence. In the Cowen case counsel who addressed the Court of Appeal as *amicus curiæ* suggested that the wife's conduct, if it amounted to acquiescence, might bar her from judicial relief. The judges, however, accepted the explanation of the origin of her consent to her husband's refusal of free intercourse and took into account her subsequent attempts to change his mind. In both cases the Court of Appeal declared that judicial decision must depend on the facts proved.

Public Health

Infectious Disease in England and Wales

WEEK ENDED MARCH 1

Notifications.—Smallpox, 5; scarlet fever, 1167; whooping-cough, 2290; diphtheria, 186; paratyphoid, 0; typhoid, 5; measles (excluding rubella), 13,337; pneumonia (primary or influenzal), 981; cerebrospinal fever, 71; poliomyelitis, 8; polioencephalitis, 2; encephalitis lethargica, 2; dysentery, 92; puerperal pyrexia, 109; ophthalmia neonatorum, 67. No case of cholera, plague, or typhus was notified during the week.

The 5 cases of smallpox were notified at Grimsby (see p. 339).

Deaths.—In 126 great towns there were no deaths from enteric fever, 2 (0) from scarlet fever, 5 (1) from diphtheria, 25 (0) from measles, 15 (0) from whooping-cough, 83 (12) from diarrhœa and enteritis under two years, and 121 (32) from influenza. *The figures in parentheses are those for London itself.*

The number of stillbirths notified during the week was 300 (corresponding to a rate of 28 per thousand total births), including 42 in London.

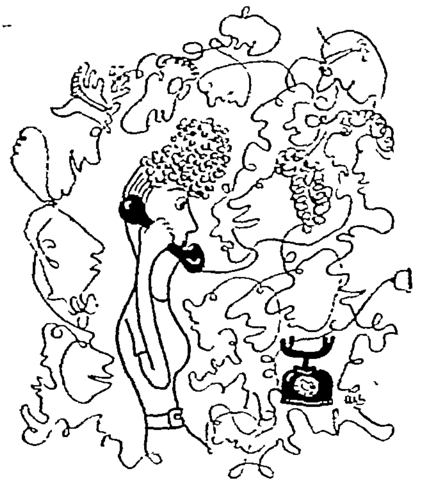
Winter in Scotland

During the long cold spell Scotland seems to have had less sickness than usual for the time of year. This view was given to a press conference on Feb. 28 by Sir Andrew Davidson, chief medical officer of the Department of Health, who added that three or four weeks previously children's ailments had threatened to be heavy but then died down as the weather became colder. Practitioners, he said, described the people as "miserable, but not ill."

In England Now

A Running Commentary by Peripatetic Correspondents

I HAVE often thought that a handbook for prospective wives of G.P.s would be worth publishing. Each chapter would deal with some aspect of the life, and at the end the candidate ought to be able to decide whether the game was worth the candle. I haven't time to write the book but I propose to dash off a few concise notes while the doctor is out on his rounds. They are not intended to be read by the minute percentage of doctors' wives-to-be who expect to spend the early years of marriage surrounded by nannies, maids, cooks, gardeners, chauffeurs, and secretaries, but by the austerity bride who will have to give up the dining-room in her villa for use as a consulting-room and strive to keep down expenses and maintain morale by looking after the children, the house, the meals, the garden, the patients, the telephone, the back door, the front door, and above all the doctor, practically single-handed.



Let us start with *The Telephone and How to Deal With It.*

One is warned as a bride of the dangers of living with relations, but the phone is a far more exacting companion than any mother-in-law—one can at least leave the good lady to look after the babies. The instrument is magnetic for children. I shall not forget trotting in from the garden one afternoon to answer it only to find my four-year-old standing on the chair and lisping into the mouthpiece: "My doctor will be back at ten-thirty." She replaced the receiver as I reached her. The call was urgent. Her daddy was asleep in a deck-chair.

If you have only one instrument put it in the kitchen near a comfortable chair by a table with a packet of digestive and alkali tablets thereon. (It is worth while finding out whether you have hyper- or hypo-acidity.) Have a line laid to every room with a plug and switch for connecting (and particularly disconnecting) the thing. If you can afford only one extension line have it laid to the w.c. At meal-times always go to the phone with your mouth full. It is more convincing. If your man hasn't a microphone manner like Stuart Hibberd it is better to answer the call yourself; better for the practice, I mean. Always gain the upper hand by asking more questions than the caller. This is more soothing for you both and transfers some of the responsibility to the caller. Get the facts. Truth is stranger than fiction and safer than friction. If caught cooking, turn off all gas and electricity before answering the call; an extra call after dinner is better than a burnt offering for a meal. If you hear nothing on lifting the receiver, shout loudly "Press button A!" Your voice must carry over the traffic. Then listen carefully. Country people do not willingly waste tuppence to tamper with infernal machines. Sweetening is vital when dealing with supervisors, but the men on at night are usually dears. When it's woman to woman you will know how to cope, sister. You will soon find that one of the most infuriating questions is "When will the doctor be here?" The correct answer is only learnt after hours of practice understudying B.B.C. actors. The answer comes with a light, broken laugh mixed in with this phrase: "Well—sometime——I hope."

How to deal with what you know to be an unwanted call: *You,* "I'm sorry, he's out." *Caller,* "When'll he be in?" *You,* "I don't know." *Caller,* "Can you . . . ?" *You,* "I'm going out." *Caller,* "I really wanted to speak to him personally. It's er . . ." *You,* "Can I take a message?" *Caller,* "Well, not really . . . I . . ." *You,* "Then will you ring at midnight? He'll be in then. There's a baby on the way." (There is one born every minute.) *Caller,* "I see, well, er . . ." *You,* "The milk's boiling over. Goodbye." A final word: don't use the blockage gambits such as "The doctor is just (having a bath, in a snowdrift, the lavatory, the chemist's, town, &c., &c.)." They won't work and he'll never remember the alibi anyway.

My finest hour was when the firstborn of the night supervisor at the local exchange was being delivered. Tied to his post of duty, he rang me up every so often to find out if the doctor was back, saying, "It's so nice to have someone to talk to at a time like this. . . ."

* * *

Our penchant for collecting lamps, antique and otherwise, from the ships in which we serve, ensured that we had two lamps in commission in our temporary house when the "Save-the-Transformers" cut followed close on the "Forbidden Period." A fine swinging model in our country kitchen suggested the roll of the ship and the creak of the timbers, and a table-lamp transformed the dining-room to a Nelson cabin. The problem was candles for stairways and bedrooms. The graceful Nell Gwynns, like the dressing-table candlesticks, were still not unpacked; but we had been using Gurr's embedding paraffin wax (remaining from my pre-war laboratory) to coax morning fires, so at least we had the raw material, and the wax melted quickly in a jam-jar on the hearth. Two tumblers in a basin of cold water, with a string wick hanging centrally from covering pieces of cardboard, were the first moulds. The next refinement was a wick of cut taper, inserted during cooling *au moment critique*; but a corkscrew wick was the reward of the tiro. The result at the end of an hour was: candles, 3; tumblers, 1. The final products had but a faint resemblance to the ecclesiastical species.

Did you know that there is a subtle relationship between the number of wick fibres and the diameter of the periparaffinium? This proportion was not quite right in my giant night-lights—so to the manufactory once more, this time to attempt a carriage-candle. I can now produce a carriage-candle such as they turn out tailor-made from a mould. I use a quarto sheet of paper, rolled to a tube and closed at one end, filled with melted wax and then cooled in water in a quart milk-bottle, and William Tell has nothing on my central placing of the taper. I might even consider accepting honorary membership of the candlemakers' union.

* * *

All this talk about dangerous drugs being stolen from doctors' cars conjures up painful pictures in the layman's mind of small boys chewing phenobarbitone tablets by mistake for acid-drops. The actual risk of any harm being done is very small indeed—so far as I know there has never been a death from this cause—but the average member of the public doesn't see it that way. When he hears one of the periodical announcements on the wireless his immediate reaction is one of righteous indignation. "Why the blazes can't these doctors look after their darned drugs? They're always leaving their stuff about. They ought to be prosecuted . . ." and so on, and so forth. There is only one certain protection: never to leave any case, parcel, bag, or other package containing dangerous drugs in one's car unattended. It is a beastly nuisance having to remember such details when one is busy with more important matters. But all this gets the profession a bad name. If a doctor likes to take a chance with his rugs or even his instruments, that is his affair. But when it comes to dangerous drugs I'm afraid it is a public duty to be careful. While there are sneak-thieves about we shall have to carry as few drugs about as possible, and either carry them in a pocket case or lug our bag into every patient's house. There seems to be no alternative.

* * *

It was good to receive my *Lancet* again; to tear off the wrapper, and throw it in its accustomed ball to the cat; and to go back with a click to the pleasant routine of early February. Thank you, Mr. Shinwell!

Letters to the Editor

THE INTRAVENOUS DRIP

SIR,—There is a present tendency to regard an intravenous drip—whether of saline, plasma, or blood—as a necessary concomitant to any major surgical procedure.

No-one with experience of what blood-transfusion has contributed to the surgery of injury will question its value. No-one with wide experience of abdominal surgery can deny the extreme importance of intravenous fluids in certain conditions. It is the abuse of the method that I would be glad to see restrained.

It is an abuse to set up an intravenous saline drip as a routine for a major surgical operation, not because the fluid is needed but in anticipation of trouble. An intravenous drip has obvious dangers. It may cause thrombosis, and in the debilitated it increases the likelihood of bronchopneumonia. Because, for instance, once in a hundred times a surgeon may have difficulty with the left gastric artery, must *a hundred patients for gastrectomy* suffer the liabilities of an intravenous drip? If the patient is well prepared for operation and the operative technique is impeccable, most cases of gastrectomy recover with uniform smoothness. A drip is rarely needed. The blunderbuss use of intravenous *fluid therapy* does not improve the results, and does cause trouble.

Other and more able writers have written to the same effect in the last few years; yet, returning to abdominal surgery after some years away, I find myself encompassed by this barrage of bottles, this dangle of drips. The intravenous drip is an exact method of treatment, with precise indications for its use. We need to teach our registrars and house-surgeons what these indications are. We should, I think, make it equally clear that an intravenous drip will not assist a failing myocardium, or take the place of fluids given by mouth into an alimentary canal capable of absorbing them, or compensate for defects in surgical and anæsthetic technique. Such uncontrolled use increases the liabilities of the method.

I trust that this attitude will not be looked upon as reactionary. It is an old adage that there is reason in all things. F. H. BENTLEY.

Department of Surgery, Newcastle-upon-Tyne.

DEATH FROM X-RAY APPARATUS

SIR,—One hesitates to stimulate public alarm by further comment in the case of the radiographer who lost his life in the performance of his duties at the Derby Borough Health Department's chest centre last November (*Lancet*, Jan. 25, p. 156). But I fully endorse the coroner's reported observations to the effect that the corporation had failed in its duty to staff and public in permitting the use of obsolete non-shock-free X-ray apparatus. It is nonsense to say that shock-free equipment is very difficult to obtain.

During the past 16 years, as consultant technical adviser to the Central Bureau of Hospital Information (British Hospitals Association), I have had ample opportunity to observe the reactions of local hospital committees to the suggestion that apparatus which still appears to function adequately should be scrapped. I have found that the situation is governed, not by recommendations from official bodies, consultants, or engineers, but by financial considerations. A qualified radiographer would be upheld in refusing to use unsafe equipment, but familiarity and reluctance to quarrel with the employing authority would make his refusal less likely.

Advice on the subject has always been available through the British Hospitals Association; but, unless there is another accident, nothing short of a general census and survey throughout the country will bring to light the highly dangerous working conditions you describe.

The radiologist is a medical man whose time is fully occupied in the diagnosis and the treatment of medical and surgical conditions revealed within this scientific branch of medicine, and the number of radiologists is greatly exceeded by the number of X-ray sets in existence. In the National Health Service experienced X-ray engineers at regional level, working in consultation with area radiologists responsible to a senior consultant at the Ministry of Health, might be the solution.

Any person can purchase and operate X-ray apparatus, obsolete or new. Legislation is obviously required within the new health services if patient and operator are to be protected against repetition of the distressing occurrence at Derby.

London, S.W.1. H. T. FERRIER.

AMPHETAMINE IN SURGERY

SIR,—Since reading Dr. Houghton's article of Dec. 14 on the effect of amphetamine in pulmonary tuberculosis I have had an opportunity of putting this drug into use.

Six weeks ago a man, aged 54, suffering from chronic suppurative pneumonitis of the right lung which was breaking down into two abscesses and producing about 15 oz. of fœtid sputum a day, was operated upon more or less as an emergency, owing to increasing toxæmia and hæmoptysis. His general condition was poor and the disease was spreading rapidly. Right pneumonectomy was performed and the patient, profoundly toxic, took two days to regain consciousness. When he woke he was extremely depressed and exhausted and had lost any hope of recovering. When, twenty-four hours later, he began to receive two tablets of 'Benzedrine' twice a day his spirits rose quickly. He suddenly started coöperating in the postoperative treatment and, though still extremely weak, responded to the efforts of the physiotherapist to make him cough, move about, and believe in his recovery. He has since completely recovered.

Patients occasionally die, when seriously ill, from resignation and loss of hope. I am convinced that the raising of his spirits by amphetamine was the main factor in his survival.

Hillingdon County Hospital,
Uxbridge, Middlesex. L. FATTI.

TREATMENT OF TUBERCULOSIS

SIR,—The *well-run modern sanatorium* is completely successful within its limits; these are at both ends of residential treatment and are defined without its opinion or consent. The medical superintendent does not choose to admit 80% of his patients in stages II and III; nor does he have any power to implement his advice to them on discharge. He knows quite well that 60% of the B II and 90% of the B III cases will be dead in five years if all he can do for them is to increase their resistance by graduated rest in hygienic conditions; he knows also that his patients can maintain that resistance only as long as they enjoy the sheltered conditions demanded by their lessened function. It is not his fault that sanatorium treatment is "all middle and no ends."

It is twenty-eight years since Bardswell demonstrated that mortality after sanatorium treatment is dependent upon the extent of disease on admission. Every survey since his report has supported him, and several have added to our knowledge the fact that the average length of life from the first appearance of tuberculous cavitation is five years. One conclusion he drew was that something more than passive residential treatment was necessary.

At the admission end we are now trying to find our patients *at an earlier stage of disease* and *at a time* before their resistance is broken. One method is mass miniature radiography. By this method we also help to disclose unsuspected sources of massive infection that are producing adolescent primary phthisis and post-primary adult-type phthisis in children; *for these* sources of massive infection will operate *with or without* the conditions of overcrowding and bad hygiene which prevail amongst large sections of our community.

In the middle we have added collapse therapy. Since its introduction the prognosis of patients at Midhurst Sanatorium in stage B I has improved steadily; for those admitted in the years 1933–35 the five-year survival-rate was 93%. In spite of this everyone will agree that a surgical unit which brings only mental anguish is better shut down. An operation that has not been explained to the patient in its function, preparation, and aftercare as only a modification of the basic principles of rest, and has not the full coöperation of the patient is as useless to him as it is to his physician and surgeon. In 1946 175 major operations were performed in the surgical unit at Papworth ; the only tension observed was in the overworked nursing staff who carried on with magnificent spirit in spite of their depleted numbers since the withdrawal of the Essential Works Order. Many of them have known the benefits of collapse therapy in pneumothorax and thoracoplasty.

At the end of discharge the average patient has a bleak outlook. To maintain his resistance he needs economic security for the leisure outlined for him by the sanatorium superintendent. Any treatment that is not followed by a full pay-packet so that the patient can get sufficient food is a mere mockery. Lessened function and ostracism soon undo the benefits of the sanatorium. We are all anxious to see the rules of health carried out in airy homes and workshops, a high standard of living with the maintenance of real wages, and a happy atmosphere of work. These are the conditions which could rapidly reduce the incidence of phthisis. That we cannot see them in our day is no reason why we should not do more now to provide them for our ex-patients in new village settlements.

Let us keep our sense of balance. Why blame the sanatorium?

R. R. TRAIL
Medical Director, Papworth and Enham-Alamein Village Settlements.
London, S.W.1.

FŒTAL DEATH AND ECLAMPSIA

SIR,—Dr. Zondek in his article of Feb. 1 clarifies some anomalies when he says: "Death of the fœtus may be either primary—i.e., independent of the placenta—or secondary, due to death of the placenta."

Browne[1] states in connexion with eclampsia: "If fœtal death occurs the patient always improves." The following case-history provides an exception:

A woman, aged 42, was admitted in the 26th week of her second pregnancy, after having had an eclamptic fit. Fœtal movements had suddenly stopped 4 days previously; and all signs and symptoms of toxæmia had developed thereafter. She had massive generalised œdema, severe headaches, and epigastric pain on the day of admission. There is no doubt that the fœtus had died as long as 4 days before admission, for it was in an advanced state of maceration when delivered.

In this case it seems that fœtal death occurred independently of the placenta, which when delivered showed only small areas of old infarction.

It appears to be generally accepted that viable placental tissue must be present for pre-eclamptic toxæmia to develop. It is therefore important to realise that the placenta may survive after fœtal death and that, as in the above case, pre-eclamptic toxæmia and eclampsia do not subside, and may even develop. One must guard against complacency when fœtal death has occurred in a case of pre-eclamptic toxæmia or eclampsia.

General Hospital, Nuneaton.
W. P. HIRSCH.

DOCTORS' SALARIES

SIR,—The advertisements in your columns of vacant medical appointments leave me anxious about the sufficiency of salaries offered to medical men for responsible posts, especially for those requiring residence in or about London.

Many salaries are in the region of £800–£1000 a year. I wonder if it is generally realised that it is extremely difficult for a man and his wife, even without children, to live in London on such amounts. The following is the approximate position:

	£
Rent, rates, and garage	200– 250
Food and laundry	208– 260
Electricity, gas, light, coal	25– 35
Holidays and fares	35– 50
Clothes and furniture renewals	100– 150
Insurance, sickness, &c.	50– 100
Telephone	10– 20
Presents and entertainment	10– 25
Car	50– 100
Income-tax	175– 300
	£863–1290

To this must be added the cost of recreation and sport, fees and clothing for children (if any), domestic help, subscriptions to medical societies, doctor's and dentist's accounts, and out-of-pocket petty cash.

Many of today's salaries are instituted on the advice of senior medical men; and what we offer ourselves is the "yardstick" which the Ministry of Health and Treasury officers will use in determining salaries to be paid to doctors by the State.

London, W.1.
HAROLD DODD.

PENICILLIN IN GENERAL PRACTICE

SIR,—In general practice I have found that moderately and very ill patients can often be treated satisfactorily with penicillin by the following method. For a moderately ill patient suffering from a complaint considered clinically suitable for penicillin therapy 100,000 units in distilled water, together with 300,000 units in oil, are given intramuscularly at the earliest opportunity. Daily injections of 300,000 units in oil are repeated thereafter until the patient is out of danger.

The initial dose of penicillin in distilled water seems to produce a rapid rise of penicillin-level in the blood which is lethal to sensitive organisms; meantime the slowly absorbed penicillin in oil gradually takes over and when repeated daily provides an effective and fairly constant level. Ambulatory patients can be given penicillin in oil into the upper arm for several days. The application of cold compresses and immobilisation of the injected arm might be worth trying as an aid to slow absorption.

Louth, Lincs.
ANDREW S. HUNTER.

⁂ The method suggested has considerable advantages, but a daily dosage of 300,000 units will not ensure blood-levels high enough to deal with all strains of staphylococci. The dosage required depends not so much on the severity of the illness as on the resistance of the organism and how well it is entrenched in avascular or necrotic tissue. Thus impetigo may require a higher dosage than cavernous sinus thrombosis. If necessary 600,000 units in beeswax-oil can be given at a dose without causing overmuch local swelling, and this dose can be continued daily for at least 8 days. It should however be noted that beeswax and peanut-oil mixtures are more liable than aqueous solutions to produce hypersensitive reactions.—ED. L.

TOXICITY OF THIAMINE

SIR,—Your timely annotation of Feb. 8 is, I think, the only contribution to this question published in England, apart from my own paper[1] in 1943. I would therefore like to make some comments.

You say, Sir, that Jolliffe[2] did not observe any toxic effects in over 3000 patients and that Borsook administered 100 mg. of thiamine daily to 70 patients intravenously for three years without untoward reactions. All Jolliffe's patients, however, and very probably Borsook's patients, had clinically manifest deficiency disease, but most of the published cases of untoward manifestations after vitamin-B administration did not have manifest symptoms of deficiency at the time of the incident. Moreover, some of these patients had frequent and regular injections of thiamine without any side-effects for a long time, and unpleasant reactions occurred only when the course was interrupted or the interval between injections was prolonged sufficiently to produce hypersensitivity. There is certainly need for further investigation into the frequency and severity of these reactions, especially into the immunological response in the hypersensitive state, and, as you suggest, into the stability of commercial thiamine preparations. This is the more important because the scope for thiamine therapy appears to be widening rapidly—e.g., in Russia large-scale investigations have recently been made of its use for the acceleration of labour and reduction of pain during parturition.

It is likely that most cases with an allergic reaction would have been found to have a well-marked eosinophilia after thiamine administration, as in my case 1.

Your annotation attributes to me the suggestion that the thyrotoxic reaction observed in some cases after thiamine therapy is due to overdosage, and you say: "overdosage in therapy is so common that it must be supposed that supersaturation, with or without faulty excretion, causes the thyrotoxic symptoms and not simply an overdose." The word overdosage was used by me in a quite different sense, and I certainly did not state that the thyrotoxic reaction was due to thiamine overdosage. Furthermore, it is questionable whether simple supersaturation could cause it, since the storage of thiamine in thyrotoxicosis seems to be reduced,[3] and the excretion of thiamine in sweat is more or less proportionally increased with the increased perspiration of the thyrotoxic patient.[4] It is evident that the thyrotoxic reaction in the cases observed was due to the administration of thiamine, but it appears to be caused neither by simple overdosage nor by supersaturation with thiamine. Recent work on the inter-relationship between the various members of the vitamin-B group [5] suggests that disturbance of the balance between the members of the vitamin-B group after administration of comparatively large doses of thiamine may precipitate the thyrotoxic symptoms.

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[1] Browne, F. J. Antenatal and Postnatal Care, London, 1942, p. 380.

[1] Leitner, Z. A. *Lancet*, 1943, ii, 474.
[2] Jolliffe, N. *J. Amer. med. Ass.* 1941, 117, 1496.

Lastly, you say in your annotation that "the anaphylactic phenomena have been shown to be due to thiamine and not to the usual preservative chlorobutanol" and quote Mills [6] and Haley and Flesher.[7] But the latter carried out a series of experiments on rabbits and concluded that "anaphylaxis plays no part in thiamine hydrochloride toxicity as seen in rabbits. However, injections of a sensitising dose apparently increase the resistance of the animal to toxic injections of thiamine hydrochloride."

London, W.1. Z. A. LEITNER.

LUCKY LUTON

SIR,—Your annotation on Some Luton Families should lead many of us to read Mr. C. G. Tomlinson's book *Families in Trouble.* Luton is so fortunate in its social and economic structure that its "submerged tenth" is reduced to a submerged hundredth. In such happy circumstances the submerged family stands out in striking contrast with its social surroundings and is all the more easily studied.

Amongst the factors causing submergence the first mentioned is "subnormal mental capacity"—a finding with which all who have studied this problem will agree. Your annotation then proceeds: "Moreover, most of the families exhibiting mental deficiency are not problem families; so that to be subnormal mentally is by no means a necessary first step towards becoming a social problem." How can these statements be reconciled?

R. P. GARROW
Hornsey, London, N.8. Medical Officer of Health

*** We intended to suggest that mental subnormality in a family does not necessarily mean that it will become a social problem.—ED. L.

PSYCHOSOMATIC APPROACH TO ORTHOPÆDIC SURGERY

SIR,—Mr. Le Vay in his enlightened essay (Jan. 25) emphasises the relation between the emotional state and recovery in orthopædic conditions. He pays a graceful tribute to the orthopædic service of the Royal Air Force; but he makes a statement that might be misunderstood. He says: "The magnificent results in the Royal Air Force were achieved with such first-class material that it was possible to separate the sheep from the goats without being wasteful, and for a specific end." Royal Air Force orthopædic rehabilitation centres catered not only for aircrew but for ordinary ground tradesmen who represented a normal cross-section of labour available for industry. The final results after rehabilitation in the two groups—aircrew and ground personnel—were comparable.

Orthopædic rehabilitation was organised on an injury-group basis. The personalities of men undergoing rehabilitation were, as the result of six years' experience, classified as follows: (1) first-class personnel who would get better by their own efforts; (2) the average type who could be greatly improved by the organisation; (3) the passive non-coöperators whose morale could be improved by the group they were working in; and (4) the active non-coöperators who were treated as individuals, being removed from their injury group because of their bad influence but still retained at the centre. The only "goats" not retained and treated by the organisation were the basically abnormal or psychotic personalities. We confirmed that every case of physical trauma has some psychological trauma whose degree is conditioned by the basic personality.

The problem of returning aircrew to the air was similar to that of returning the miner to the pit: both go back to the environment which gave them their injury. Sir Reginald Watson-Jones has organised rehabilitation centres for miners in England, Scotland, and Wales, using the proven methods of the Royal Air Force, and these centres have in the past three years had results similar to those at the R.A.F. centres.

R.A.F. MEDICAL OFFICER.

THE FAMILY

SIR,—Prof. J. C. Spence's lecture summarised in your issue of Jan. 11 is another welcome sign of increasing interest in the wider implications of health. If, as would seem probable, the family is the normal environment of the human person, in which, especially during childhood, he can most readily attain wholeness of being, this provides a useful yardstick for assessment of every new or old ideology, law, or fashion. If its effect is to strengthen the family institution, it is good; otherwise it is bad.

The test may be demonstrated in a seemingly small matter in my own sphere of work, public health and school medicine. Midday meals at school for all children: is the principle good or bad? While a convincing case can be made for meals at school for some children in some circumstances, their effect if taken by all children as a normal part of school life would be to loosen home ties and so weaken the family.

By this test a great deal of what has rather uncritically been accepted as evidence of progress is found to be of dubious value. Professor Spence has condemned the industrial revolution for its effect upon neighbourliness. (It stands equally condemned for destruction of joy in craftsmanship, for the divorce from the land, and for mechanical, passive means of recreation.) The lapsing of the mass of the population from positive religious belief might be shown, I believe, to have been equally disastrous for human wholeness and happiness. And while he would be bold who, in England today, assailed the notions of equality and liberty, to which we all pay lip-service, it may be well to consider carefully what we mean by these terms, how far we are in fact equal or free, and how much good the current conceptions are to us.

To come from theory to practical suggestion. While we continually talk about the importance of the family, there is scope for study of the family in fact. Some excellent work has, of course, been done in this respect by the workers at the Peckham Health Centre, and contributions are made from time to time to the medical press by medical officers of health and others on particular family problems and on problem families. But the field still awaits exploration, and for those whose whole-time duty it is to study and advance the public health it seems as important as ever was epidemiology in a past generation.

B.A.O.R. J. V. WALKER.

RUBELLA AND CONGENITAL DEFECTS

SIR,—I have heard of two recent cases of rubella early in pregnancy. In one case the mother had rubella in the first 3 weeks of pregnancy. It was a mild attack with no sore throat or enlarged glands, and she was in bed for only 2 days with slight fever and a rash. The child, born in 1946, has bilateral cataract and is also deaf. In the second case the mother had a similar attack of rubella at 8–11 weeks of pregnancy. The risk of congenital defects was recognised in this case because the mother had heard Professor Haldane's reference to it on the wireless, so the child has been carefully observed. The child is now 3 months old, and no defects have appeared. There is certainly no cataract or heart lesion, and no severe deafness; it is of course too early to say that hearing is normal.

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[6] Mills, C. A. *J. Amer. med. Ass.* 1941, **117**, 1501.
[7] Haley, T. J., Flesher, A. M. *Science*, 1946, **104**, 567.

It seems particularly important in the present state of our knowledge that cases should be recorded where the mother has rubella early in pregnancy and the child is born without any malformations.

Galton Laboratory, University College, London. JULIA BELL.

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Surely, that was an example of the Lubarsch-Pick syndrome. I do not know if it was described later at greater length.

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Department of Pathology, Royal Infirmary, Preston. F. B. SMITH R. T. COOKE.

PREVENTION OF EPIDEMIC NEONATAL DIARRHŒA

SIR,—In his article of Jan. 11 Mr. Stern suggests that "infection may be spread by the heavy and increasing contamination of the film which forms in feeding-bottles in constant use." Is it not time that the narrow-necked bottle was discarded altogether and the 'Hygeia' type of wide-necked, straight-sided bottle, with large rubber teat, substituted? I believe these bottles are widely used in Canada and the U.S.A., and feel sure they could be produced in England too. The hygeia bottle is readily cleaned with hot water, to which washing soda has been added, and a stiff brush; and all parts of the bottle are easily accessible to the brush, which is patently not so with the narrow-necked bottle. The formation of film is thus easily prevented, and the bottles must of course be boiled for each feed.

With regard to the suggestion that sterilisation by boiling destroys rubber teats, I have been using the same teat for my own baby for over 4 months now. It has been boiled daily for at least 5 minutes and shows no sign of perishing yet; and this is not an isolated experience.

Johannesburg, South Africa. ELIZABETH LUND.

RECRUITMENT OF STUDENT NURSES

SIR,—Speaking from personal experience, based on the entry of a daughter into general nursing training, I strongly support the need for revision of the pay of student nurses along the lines suggested by your correspondent of Feb. 8. The position is worsened by the fact that the Commissioners of Inland Revenue have decided that no allowance is given for any child who earns more than £50 per annum (except for scholarships). This decision at once excludes any tax relief for parents paying higher rates of tax who have been public-spirited enough either to agree to, or to stimulate, the entry of their daughters into nursing.

It is obvious, of course, that if the pay of student nurses is increased similar increases must be granted to all the more senior grades. Increases beyond those proposed in the Rushcliffe scales are needed, in my opinion, if conditions in the nursing profession are to compete with those of industry and commerce.

Public Health Department, Walthamstow. A. T. W. POWELL.

THYROID AND COLD SENSITIVITY

SIR,—Dr. S. L. Simpson makes the interesting suggestion (March 8) that thyroid should be given to healthy volunteers in order to investigate its capacity to increase resistance to cold and induce well-being. A word of warning is needed, however, should such an experiment be undertaken.

S. W. Patterson[1] has warned that thyroid may cause addiction. It acts as a tonic by increasing energy, improving the appetite, and enhancing mental alertness; and neurotics are apt to take to it. The widespread administration of thyroid to otherwise healthy obese patients and to those with assumed "slight glandular underfunction" has created quite a few cases of moderate addiction. Happily, the metabolic effects are often not too harmful, possibly because the present diet is poor in simply an overdose." The word overdosage was used by me in a quite different sense, and I certainly did not state that the thyrotoxic reaction was due to thiamine overdosage. Furthermore, it is questionable whether simple supersaturation could cause it, since the storage of thiamine in thyrotoxicosis seems to be reduced,[3] and the excretion of thiamine in sweat is more or less proportionally increased with the increased perspiration of the thyrotoxic patient.[4] It is evident that the thyrotoxic reaction in the cases observed was due to the administration of thiamine, but it appears to be caused neither by simple overdosage nor by supersaturation with thiamine. Recent work on the inter-relationship between the various members of the vitamin-B group [5] suggests that disturbance of the balance between the members of the vitamin-B group after administration of comparatively large doses of thiamine may precipitate the thyrotoxic symptoms.

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[1] *Quart. J. Med.* 1937, 6, 181.
[2] *J. Path. Bact.* 1938, 47, 311.
[3] *Arch. Derm. Syph., N.Y.* 1937, 35, 540.
[4] Edwards, J. L. *J. Path. Bact.* 1945, 57, 283.

[1] *Brit. med. J.* 1934, ii, 6.

Lastly, you say in your annotation that "the anaphylactic phenomena have been shown to be due to thiamine and not to the usual preservative chlorobutanol" and quote Mills [6] and Haley and Flesher.[7] But the latter carried out a series of experiments on rabbits and concluded that "anaphylaxis plays no part in thiamine hydrochloride toxicity as seen in rabbits. However, injections of a sensitising dose apparently increase the resistance of the animal to toxic injections of thiamine hydrochloride."

London, W.1. Z. A. LEITNER.

LUCKY LUTON

SIR,—Your annotation on Some Luton Families should lead many of us to read Mr. C. G. Tomlinson's book *Families in Trouble*. Luton is so fortunate in its social and economic structure that its "submerged tenth" is reduced to a submerged hundredth. In such happy circumstances the submerged family stands out in striking contrast with its social surroundings and is all the more easily studied.

Amongst the factors causing submergence the first mentioned is "subnormal mental capacity"—a finding with which all who have studied this problem will agree. Your annotation then proceeds: "Moreover, most of the families exhibiting mental deficiency are not problem families; so that to be subnormal mentally is by no means a necessary first step towards becoming a social problem." How can these statements be reconciled?

R. P. GARROW
Hornsey, London, N.8. Medical Officer of Health

⁂ We intended to suggest that mental subnormality in a family does not necessarily mean that it will become a social problem.—ED. L.

PSYCHOSOMATIC APPROACH TO ORTHOPÆDIC SURGERY

SIR,—Mr. Le Vay in his enlightened essay (Jan. 25) emphasises the relation between the emotional state and recovery in orthopædic conditions. He pays a graceful tribute to the orthopædic service of the Royal Air Force; but he makes a statement that might be misunderstood. He says: "The magnificent results in the Royal Air Force were achieved with such first-class material that it was possible to separate the sheep from the goats without being wasteful, and for a specific end."

Royal Air Force orthopædic rehabilitation centres catered not only for aircrew but for ordinary ground tradesmen who represented a normal cross-section of labour available for industry. The final results after rehabilitation in the two groups—aircrew and ground personnel—were comparable.

Orthopædic rehabilitation was organised on an injury-group basis. The personalities of men undergoing rehabilitation were, as the result of six years' experience, classified as follows: (1) first-class personnel who would get better by their own efforts; (2) the average type who could be greatly improved by the organisation; (3) the passive non-coöperators whose morale could be improved by the group they were working in; and (4) the active non-coöperators who were treated as individuals, being removed from their injury group because of their bad influence but still retained at the centre. The only "goats" not retained and treated by the organisation were the basically abnormal or psychotic personalities. We confirmed that every case of physical trauma has some psychological trauma whose degree is conditioned by the basic personality.

The problem of returning aircrew to the air was similar to that of returning the miner to the pit: both go back to the environment which gave them their injury. Sir Reginald Watson-Jones has organised rehabilitation centres for miners in England, Scotland, and Wales, using the proven methods of the Royal Air Force, and these centres have in the past three years had results similar to those at the R.A.F. centres.

R.A.F. MEDICAL OFFICER.

THE FAMILY

SIR,—Prof. J. C. Spence's lecture summarised in your issue of Jan. 11 is another welcome sign of increasing interest in the wider implications of health. If, as would seem probable, the family is the normal environment of the human person, in which, especially during childhood, he can most readily attain wholeness of being, this provides a useful yardstick for assessment of every new or old ideology, law, or fashion. If its effect is to streng then the family institution, it is good; otherwise it is bad.

The test may be demonstrated in a seemingly small matter in my own sphere of work, public health and school medicine. Midday meals at school for all children: is the principle good or bad? While a convincing case can be made for meals at school for some children in some circumstances, their effect if taken by all children as a normal part of school life would be to loosen home ties and so weaken the family.

By this test a great deal of what has rather uncritically been accepted as evidence of progress is found to be of dubious value. Professor Spence has condemned the industrial revolution for its effect upon neighbourliness. (It stands equally condemned for destruction of joy in craftsmanship, for the divorce from the land, and for mechanical, passive means of recreation.) The lapsing of the mass of the population from positive religious belief might be shown, I believe, to have been equally disastrous for human wholeness and happiness. And while he would be bold who, in England today, assailed the notions of equality and liberty, to which we all pay lip-service, it may be well to consider carefully what we mean by these terms, how far we are in fact equal or free, and how much good the current conceptions are to us.

To come from theory to practical suggestion. While we continually talk about the importance of the family, there is scope for study of the family in fact. Some excellent work has, of course, been done in this respect by the workers at the Peckham Health Centre, and contributions are made from time to time to the medical press by medical officers of health and others on particular family problems and on problem families. But the field still awaits exploration, and for those whose whole-time duty it is to study and advance the public health it seems as important as ever was epidemiology in a past generation.

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4. Edwards, J. L. *J. Path. Bact.* 1945, 57, 283.

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1. *Brit. med. J.* 1934, ii, 6.

proteins, and perhaps also because of the formation of antihormones. I saw such a patient quite recently who had taken 15 grains of thyroid daily for eighteen months and had remained well, except for a tachycardia of 106–120. It took more than six months to reduce the dose to 1½–2 grains daily.

London, S.W.3. V. C. MEDVEI.

STAMMERING

SIR,—Speech therapists should be indebted to Dr. Chrysanthis (Feb. 15) for his data on the incidence of stammering in the Greek elementary schools of Nicosia, Cyprus. A number of factors mentioned in this connexion—such as anthropological peculiarities, intelligence, handedness, and sex—are still so controversial that they cannot be discussed briefly. I must, however, challenge the statement that "according to many investigators, stammering is unknown among the Chinese, whose language consists of monosyllables."

This opinion can be traced back to Colombat d'Isères (*Traité de tous les vices de la parole et en particulier du Begaiement*, Paris, 1840). He mentions that a boy born of a Chinese mother and a French father was able to speak Chinese perfectly but stammered when speaking French. With reference to Colombat's opinion, James Hunt, in his book on stammering (London, 1865), explicitly says that "the assertion which has been made on various occasions, on very slender grounds, that there are no stutterers in China is refuted by the fact that the Chinese language possesses a term for impediments of speech." Kussmaul (*Pathologie der Sprache*, 1877) again gives it out to be an established fact that there are no stammerers in China. He attributes stammering to a lesion of a hypothetical centre of syllable coördination, and it is therefore probable that he adduced Colombat's statement concerning the absence of stammering in people speaking a monosyllabic language in support of his theory. Kussmaul was a great expert on the pathology of speech, and it is therefore not surprising that, on his authority, other authors took the statement for granted. Chinese physicians whom Gutzmann (*Sprachheilkunde*, 1912) asked about the truth of Colombat's statement were greatly astonished and declared that stammering was just as common in China as in Europe. They also informed him that the Chinese term was *kchi-ko*.

For the sake of historical accuracy I should be grateful if you would publish these lines, particularly as the erroneous statement has since then been quoted in the daily press.

Tavistock Clinic, London, W.1. LEOPOLD STEIN.

BENIGN LYMPHOCYTIC MENINGITIS AND GLANDULAR FEVER

SIR,—I was interested in Sir Henry Tidy's article of Dec. 7, particularly because by chance I recently discovered another study of this relationship from America. Coogan and colleagues[1] concluded that "a suggestion is contained here that at least some cases of lymphocytic meningitis are really cases of infectious mononucleosis with meningismus." They quote Huber,[2] who reported 3 cases of glandular fever exhibiting meningismus, 2 of which showed a lymphocytosis in the spinal fluid.

C.R.S., Brancepeth, Co. Durham. R. N. JOHNSTON.

TRAUMATIC PARAPLEGIA

SIR,—In your account of the recent discussion on traumatic paraplegia at the Royal Society of Medicine (Jan. 4, p. 23) you misquote my instructions for the introduction *of a suprapubic catheter. It should be* inserted at the highest point of bladder dullness, or midway between the umbilicus and the symphysis—whichever is the *lower*. There is no advantage, and some possible danger, in a tube put in higher than the midpoint.

Your leading article of Feb. 15 (p. 258) seems to infer that I advocate permanent suprapubic drainage for these cases. This is far from being the case, and I have pointed out that one of the advantages of the small high suprapubic fistula is the readiness with which it closes when the tube is removed. The majority of our cases at Stoke Mandeville have their bladders closed, and much of my time there is spent in closing surgically the bladders of those who have been unfortunate enough to be given a low fistula. The use of the suprapubic catheter is to provide adequate drainage during the period before the development of automatic bladder activity or the return of voluntary micturition, while at the same time preventing serious or ascending infection. In my experience it does this more safely and certainly than the urethral catheter, even with tidal drainage.

London, W.1. E. W. *RICHES.*

THE PERIODICALS

SIR,—The suspension of the periodicals, and the manner in which it was effected, raise considerations whose importance has not, I submit, been fully appreciated. Two explanations of the suspension, conflicting with one another and with the facts, were given in the two Houses of Parliament, but in both Houses all pretence of any statutory sanction was immediately abandoned. On Feb. 25 in the Commons, the Prime Minister, challenged at question time for the statutory authority upon which suspension had been made, declared, twice over, that it was "done by agreement" between the Periodical Proprietors Association (P.P.A.) and the Government. Lord Chorley, replying for the Government in the Lords (Feb. 27), repudiated the "agreement" argument. "Suspension of publication was secured," he said, "by an instruction issued after consultation with bodies representing major interests in the newspaper and periodical press." Speaking with all the authority of a professor of law in the University of London, he declared categorically that "instruction is the word which I think most accurately describes" the procedure adopted. The ascertained facts are that Mr. Shinwell had issued the "instruction" *three days before any consultation with the P.P.A. was attempted.* The "instruction" had, and was intended to have, all the appearance of an imperial rescript. The P.P.A. taking that view of it, and confronted with an accomplished fact, had no alternative but to "agree."

House of Commons. E. GRAHAM-LITTLE.

⁂ Like the *Economist*, we felt that "some latitude of authority should be conceded to His Majesty's Government, if they are acting in good faith in an undoubted national emergency," but we trust that "instructions" of this kind will never be issued again. The P.P.A. agreed with the Ministry that, in order to equalise sacrifices, duplicated issues should not be published; and our membership of the P.P.A. therefore prevented production of the token issues by which we had hoped to maintain continuity of publication.—ED. L.

WELFARE OF DEAF CHILDREN

SIR,—My attention has been drawn to the letter of Miss Edwardes, secretary of the Deaf Children's Society, in your issue of Dec. 21 (p. 923). There is much to be commended in this letter but it raises some points which call for a reply.

Deaf children have suffered too long from lack of proper facilities and from the fact that their parents have been given incomplete or inaccurate advice. There is not sufficient accommodation at the moment for all deaf children to be admitted to schools immediately their affliction is diagnosed, but it is essential that practitioners, and the parents of deaf children, should be made aware of the best and only satisfactory method of providing for their education.

Your correspondent says that the young deaf child need not be instructed by a fully qualified teacher. But the whole foundation of the deaf child's education and his whole outlook on life depend on the training in his early years. Only the qualified teacher can meet the needs of the young deaf child. It is to be hoped that the efforts of parents and such societies as that represented by your correspondent will be directed to ensuring increased facilities for young deaf children under fully qualified teachers.

A further point is the advisability of young deaf children attending a residential school. There are comparatively few deaf children whose homes are so situated that it is convenient or suitable for them to attend day schools even when they have reached normal school age let alone nursery-school age. Even in the large cities the travelling involved would often be much more than a young child could be expected to undertake, and

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1. Coogan, T. J., Martinson, D. L., Mathews, W. H. *Illinois med. J.* 1945, 87, 296.
2. Huber, W. *Schweiz. med. Wschr.* 1938, 68, 892.

it would probably be out of the question for the mother to escort her child a long distance twice daily. It must be our purpose to ensure that special education is provided for *every* deaf child at the earliest possible age. Only residential schools can meet this need. The system will not fulfil the requirements of the Education Act if it caters only for the few who can attend day schools. The underlying principle of all residential schools for young deaf children is to approximate as nearly as possible to home conditions, with a staff of people specially qualified to care for, and deeply interested in, the welfare of the young deaf child.

A. W. KETTLEWELL
Royal School for the Deaf, Exeter. Hon. Secretary.

EMPLOYMENT OF EPILEPTICS

SIR,—Many of your readers are interested in one aspect or another of the difficult problem of the epileptic. These unfortunate people often find it hard to secure a place in industry even with the assistance of the D.R.O.'s at the employment exchanges. A considerable number are known to be drifting about in the community in need of medical advice or of help with their social problems.

In an endeavour to meet this situation a clinic has been established by the London County Council at St. John's Hospital, St. John's Hill, Battersea, on Wednesday afternoons, at 2.30. The medical officer in charge is a senior officer seconded from St. Ebba's Hospital, and an experienced psychiatric social worker is in attendance. The clinic works in close association with the employment exchanges and with the colonies for epileptics, and it is understood that excellent results are being obtained. Doctors in private practice or on hospital or clinic staffs who wish for advice on epileptic patients living in London should apply to the psychiatric social worker at the hospital.

ALLEN DALEY
County Hall, London, S.E.1. Medical Officer of Health.

Parliament

ON THE FLOOR OF THE HOUSE

MORE heat in the Commons again last week. Monday's announcement of martial law in Palestine was received grimly. Then there was a flaming row over some Africans convicted of murder on the Gold Coast who were due for execution next day. The royal prerogative, the governor's power to exercise it, and the Colonial Secretary's power to influence the governor got all mixed up, and members raising points of order were sprinkled over the benches like firecrackers. A dubious case was used, very warmly, as a method of attack on a Minister. The House is "hetting up" because opponents of the Government do not like the speed with which they are carrying out their election programme. A long-drawn struggle followed on their decision to fix a definite time-table for the discussion and passage of the Transport Bill and the Town and Country Planning Bill. This time-table was the answer to the Opposition's refusal to come to an arrangement "through the usual channels" which would have enabled business to proceed at a reasonable pace. For it seems probable that now there will be all-out warfare all the time, and that means long sittings—all-night sittings—calling in the forces of physical exhaustion to upset the programme. On Tuesday there was comparative calm, but even then there were some heated exchanges about Polish resettlement, and the Bill was not read a third time and passed until 3 A.M.

On Wednesday the House turned to a two days' debate on India, opened by Sir Stafford Cripps and concluded on Thursday by the Prime Minister in a speech which was probably the best he has made in Parliament and was cheered by his supporters for some two minutes. The Opposition, led by Mr. Churchill, did not dissent from the objective of the Government—the bringing of India to self-government—but objected to their fixing a date next year after which Britain will not continue to carry the responsibility of the administration of India. On the other hand, the Labour view is that the Opposition plan would involve us in another twenty years in India, which is out of the question. India will have the opportunity of either remaining in or going outside the British Commonwealth, but we may hope that in either case our relations with her will be good. Dealing with the criticism that we are not discharging our duties to the minorities, Mr. Attlee described his visit to a village of the scheduled castes in Madras. "There was not even a road that was allowed to be laid in the village." And this was after a hundred years of British rule. The existence and position of the scheduled castes is part of the whole Hindu social system, and we, the British, cannot change the Hindu social system: the responsibility rests on the Indians themselves. Mr. Attlee also said a word on our obligations in India: "of course His Majesty's Government will carry out all their proper obligations to members of the Services, who can be assured that they will not be let down." That statement will take a load off the minds of the Civil Service and the I.M.S.

On Friday the estimates of the Ministry of Food were subjected to a grilling examination but were not fully challenged. Prices are going up; the wholesale prices in the U.S.A. have risen by more than 30%, and that is giving a lead to prices elsewhere. We shall have to produce even more than we have been doing of foods for our own consumption.

MEDICUS, M.P.

QUESTION TIME

Rationed Foods and Nutrition

Mr. W. ELLIOT asked the Minister of Food whether the intake of rationed food of the average British rationed person was at present of the order of 1400 calories per day; and what respective supplement in calories the average person in a household and the single person living alone was reckoned by him to obtain from a normal expenditure of points.—Dr. EDITH SUMMERSKILL replied: The figure of 1400 calories for rationed foods is reached by strict reference to the amount of such foods allowed to the ordinary consumer, whereas the average of 2900 calories covering all commodities is obtained by dividing the calorie value of the total foods moving into civilian consumption by the number of the civilian population. The two cannot therefore be readily compared. The dispersion around the average of 2900 calories must be very wide, as it includes at one end of the scale such consumers as children, whose intake is considerably less than the average, and at the other end heavy workers, who receive considerably more. Between these extremes there are many gradations. The average of 2900 calories over the whole community is greater than the weighted average requirement of the population.

Calorie Value of Meat Rations

Sir GIFFORD FOX asked the Minister of Food if he would state the calorie value of the meat ration issued to civilians, prisoners-of-war, and the Armed Forces, respectively, in this country; and how it compared with this time last year.—Mr. J. STRACHEY replied: The approximate daily calorie value of the meat ration is 160 for civilians, 150 for prisoners-of-war, and 340 for the Armed Forces at the present time. In January, 1946, the figures were about 150, 150, and 380, respectively.

Rations in British Zone

Mr. T. C. SKEFFINGTON-LODGE asked the Chancellor of the Duchy of Lancaster if he would list those foodstuffs in the British zone, the distribution of which had so far fallen below the 1550 calories ration-scale agreed on in the Anglo-U.S. bi-zonal food programme.—Mr. J. HYND replied: In January the only material deficiency was in processed cereal foodstuffs, representing an average loss of about 80 calories a day. In February there were additional shortages of cheese, skimmed milk, and, in Niedersachsen only, of fish; these increased the daily loss to about 100 calories. The deficiency in cereals for both months will be made good as soon as possible; the other items cannot be replaced. Meat was also short in February, although extra distributions of sugar prevented any loss of calories.

Sanatorium Beds

Mr. JOHN MORRISON asked the Minister of Health what was the total number of cases suffering from pulmonary tuberculosis who had applied, or been recommended, for admission to a sanatorium and who had not yet been found accommodation and what steps he proposed taking to expedite this matter.—Mr. JOHN EDWARDS replied: In England and Wales, at Dec. 31, 1946, the number who had been on waiting-lists for institutional treatment for longer than ten days was about 7000. The chief difficulty is shortage of staff, and the utmost efforts are being made to remedy this.

Obituary

MARK BATES

O.B.E., B.M. OXFD, F.R.C.S.

THE death of Mark Bates on Jan. 25 ends 68 years of family service to Worcester and its hospitals. His father, Tom Bates, was appointed surgeon to the Royal Infirmary in 1879, and his brother, another Tom Bates, was still on the staff of the hospital when he died in 1943.

Mark Bates was born at Worcester in 1881 and educated at the Cathedral King's School. With a scholarship he went to St. John's College, Oxford, in 1899, and later to St. Bartholomew's Hospital. After graduating B.M. in 1908 he held house-appointments at St. Bartholomew's Hospital and at the Royal Infirmary, Worcester, before settling in practice in his native town. In 1913 he took his F.R.C.S. and the following year he was appointed anæsthetist to the Royal Infirmary, but almost at once on the outbreak of war he joined the R.A.M.C. and left Worcester to become surgical specialist to no. 15 General Hospital at Alexandria, and later senior medical officer in the Haifa area. Twice mentioned in despatches, he was appointed O.B.E. in 1919. On demobilisation he returned to Worcester and was appointed surgical pathologist to the infirmary and in 1922 full surgeon, an appointment which he held till in 1932 he decided to specialise in venereal diseases and took charge of the clinic at the infirmary.

"Mark Bates was a proud son of Oxford," writes W. H. McM., "and his greatest joy was to revisit the quadrangles and gardens of his undergraduate days; then sauntering out hatless from the Golden Cross he would browse at the bookshops and libraries. Once for a wager he walked from Oxford to Worcester in 24 hours. Setting off up the Woodstock Road soon after noon on a fine day in June with an escort of supporters to encourage him for the first few miles, he reached Chipping Norton in time for an evening meal, had a rest on the top of Bourton Hill, and entered Broadway village at dawn. The sight of the clear water in the village horse-trough tempted him to refresh his weary limbs. Not a soul was abroad, so he undressed and bathed in preparation for the third stage of the 58-mile journey. He reached his father's home in the Foregate Street just as the bells of St. Nicholas Church struck noon.

"Mark and his elder brother Tom, though dissimilar in many ways, both resembled their father in possessing a restful personality, a cultured mind, and a love of tradition. Medical newcomers to Worcester will recall the welcome and hospitality invariably extended within the first week by each of the Bates brothers. Although modest and retiring by nature, Mark could, on occasions, arouse himself to fine oratory, and his recent spirited diatribe against English cooking will long be remembered amongst his fellow members of the Vigornian Clinical Society.

"Clean-shaven, with straight white hair and blue eyes, he was to be seen almost daily, in a camel-hair coat, his hands clasped behind his back, strolling towards the post office, while ruminating on the clues in the *Times* crossword puzzle."

JOHN BROOK HENDERSON HOLROYD

M.R.C.S., D.A.

Dr. John Holroyd, anæsthetist to the Sheffield Royal Infirmary, died on Feb. 8 at the age of 68. After a short period in business he entered the Sheffield medical school in 1905 and qualified in 1910. He held house-appointments at the Royal Hospital, Sheffield, before he went to the Birmingham Midland Eye Hospital as senior house-surgeon. But he decided not to specialise in ophthalmology and he returned to Sheffield to spend a year as a medical officer at the City General Hospital, later settling in practice in the Pitsmoor district of the city. During the 1914–18 war he served in India and elsewhere with the R.A.M.C.

Holroyd had always been attracted to anæsthetics, and early in his career he became one of the visiting anæsthetists to the Royal Hospital in Sheffield and later to the Royal Infirmary. One of the original members of the council of the Society of Anæsthetists, in 1935 he was awarded the diploma in anæsthetics. In 1942 he gave up his general practice to devote himself to his specialty. During the recent war he gave valuable service as an anæsthetist in the E.M.S., and as temporary lecturer in anæsthesia in the university. He insisted that every new resident at the Royal Sheffield Infirmary and Hospital had to give anæsthetics under the supervision of one of the honorary anæsthetists before being allowed to take a case on his own responsibility. For many years he had offered a gold medal to the student who did best in a competitive examination on the theory and practice of anæsthesia, and it is hoped that the faculty of medicine will perpetuate the Holroyd medal in memory of its founder who did much for his students and for anæsthesia.

"With Jack Holroyd in charge of the anæsthetic," writes the surgeon with whom he worked for 25 years, "the surgeon's anxiety on that score was eliminated. He always gave due warning as to what might be attempted with safety and always carried on quietly and efficiently, starting all anti-shock therapy without bothering to wait until it was suggested to him. He took perhaps a long time in the opinion of some in the induction stage, but this is no fault, and when once the patient was under there was never any impatience shown, nothing mattered to him but the well-being of the patient. Our relationship was most happy, for each had the confidence of the other, and the fortunate result from what often appeared to be a desperate surgical interlude was due in no small measure to the skill, care, patience, and personality of the anæsthetist."

FERGUS LESLIE HENDERSON

M.B. GLASG.

Dr. F. L. Henderson, radiologist to the Glasgow public-health department, died on Feb. 28 at the age of 54. A son of the manse, he was educated at Glasgow Academy and in 1914 graduated M.B. at the University of Glasgow. After a short period in general practice and in the city hospitals his interest in radiology was stimulated by the late Dr. James Riddell, one of Glasgow's pioneers in the use of X rays, and with Sir Alexander Macgregor and the late Dr. John Wilson he correlated the appearances which he saw in the film with the findings of the clinician and established the place of the radiogram in diagnosis. When the corporation opened its first radiological diagnostic station at Ruchill, Dr. Henderson was therefore their natural choice as consultant, and as the tuberculosis service expanded he became the final arbiter on the chest radiography carried out by the public-health department. When, in 1923, the McAlpin Home introduced radiological equipment he became consultant there, and this work brought him into intimate contact with a wide circle of medical colleagues, who as the years passed came to value his opinion more and more. He was also radiological consultant in the West of Scotland to the Ministry of Pensions, and for many years he was in charge of radiotherapy in the Cancer Hospital.

Important as his medical work became, two other interests were the crown of his life. A man of sincere religious beliefs, he formed an association with Ruchill Church in 1914 when he became an officer in the 60th company of the Boys' Brigade. Two years later he assumed charge of the company, and during the last thirty years built it up to become one of the largest and most effective in the city. A pioneer in his realisation of the need for proper recreational opportunities among working-class boys, he set in train schemes which led to the purchase for the company of an athletic ground at Maryhill which might have been the envy of any wealthy public school. His constant interest in the lives of members and ex-members made "the Doc," as he was called, a guiding influence for a host of boys in Maryhill, and his holidays were all spent with them at a large camp which he organised at Crianlarich. His other enthusiasm was music, and the 60th's annual Gilbert and Sullivan productions were excellent. A life-long supporter of the Scottish Orchestra, he was a valued member of the committee of management for many years. His circle of close friends was small, for his natural modesty and shyness kept him somewhat aloof, but a wide circle respected him as a man of real integrity whose sense of responsibility was great and whose opinion was always fearless and forthright. W. W. G.

ALFRED CLARK

F.R.C.S.E.

Dr. Alfred Clark died in Auckland, New Zealand, on Feb. 1, as the result of X-ray injuries received some forty years ago. Though his disability was severe—he twice had amputations of his right arm—he faced it with courage, discussed it with detachment, and did not allow it to interfere with the important research in tropical nutrition which he undertook after the 1914–18 war.

Born at Cerne Abbas, he was educated at Dorset County School and at University College, London. He continued his medical studies at the Middlesex Hospital, taking the Scottish Conjoint qualification in 1892. Six years later he obtained the Edinburgh fellowship. After a period of general practice in this country he emigrated to New Zealand, where he worked among the Maoris and served as radiologist to the Auckland Hospital. Later he was appointed school medical officer to that city. During the 1914–18 war he served with the N.Z.M.C. in Egypt, France, and Germany.

In 1928 he began his nutritional work for the Colonial Office in Trinidad, and in 1932 in the *Transactions of the Royal Society of Tropical Medicine and Hygiene* he discussed the relationship of diet to nephritis in the tropics. The following year, for the Medical Research Council, he investigated in Nigeria the syndrome of epithelial and nervous lesions. He observed that cyanogenic foodstuffs, such as maize, millet, and sugar-cane, were common in the diets of all people suffering from pellagra and allied nutritional diseases, which he therefore concluded were due to slow prussic-acid poisoning (*J. trop. Med. Hyg.* 1939). During the late war Dr. Clark continued his nutritional research in Ceylon, though latterly he was much handicapped by ill health.

Births, Marriages, and Deaths

BIRTHS

Arthur.—On March 4, at Northampton, the wife of Dr. W. D. Arthur—a son.

Barendt.—On March 4, the wife of Dr. G. H. Barendt, Southampton—a son.

Down.—On Feb. 21, at Exeter, the wife of Dr. A. H. G. Down—a son.

Gask.—On March 6, at Oxford, the wife of Dr. John Gask—a son.

Grant.—On March 2, at Woolwich, the wife of Dr. W. R. Grant—a son.

Harley.—On March 7, at Reading, the wife of Dr. H. C. Harley—a daughter.

Harper.—On March 1, at Maidstone, the wife of Mr. Ernest Harper, F.R.C.S.—a daughter.

Laing.—On March 3, at Southampton, the wife of Mr. J. E. Laing, F.R.C.S.E.—a daughter.

Newnham.—On Feb. 28, at Beaconsfield, the wife of Dr. Claude Newnham—a son.

O'Sullivan.—On March 5, in Manchester, the wife of Dr. J. G. O'Sullivan—a son.

Warren.—On Feb. 26, in London, the wife of Dr. A. J. Warren—a daughter.

Wylie.—On March 3, at Oxford, the wife of Dr. J. A. H. Wylie—a son.

MARRIAGES

Langford—Potter.—On March 1, at Bramley, Surrey, Richard Crawford Langford, M.R.C.S., lieut.-colonel R.A.M.C., to Lois Potter.

DEATHS

Ballinger.—On March 1, at Malvern, Owen David Ballinger, B.M. Oxfd, aged 48.

Dewar.—On March 5, at Arbroath, William Johnston Dewar, M.D. Aberd.

Frame.—On March 2, at Worthing, David Frame, M.D. Glasg., aged 86.

Hartley.—On Feb. 27, John Whittam Hartley, M.B. Vict., late of the West African Medical Service, aged 65.

Hubert.—On March 5, at Chelsea, William Henry de Bargue Hubert, B.A. Camb., M.R.C.P.

Ingram.—On March 4, at Devonport, John Ingram, M.B.E., M.B. Aberd.

Molyneux.—On March 2, at Kew, John Francis Molyneux, M.D. Brux., M.R.C.S., aged 90.

Newmarch.—On March 1, at Worthing, John Henry Newmarch, M.B. Camb., M.R.C.P.

Olver.—On March 7, Richard Sobey Olver, M.R.C.S.

Stewart.—On March 6, Walter Grahame Stewart, M.B.E., M.B. Lond.

Thorp.—On March 7, at Harrogate, Henry Carter Thorp, M.B. Camb., aged 74.

Todd.—On March 6, Aldred Bertram Slingsby Todd, M.B. Leeds.

Appointments

Calvey, E. M., M.R.C.S.: asst. tuberculosis officer, and Coventry Joint Committee for Tuberculosis.

Elliott, O. C., D.S.C., M.D. Birm.: asst. school M.O., County Council.

Evans, G. C. D., M.B. Wales, B.SC., D.M.R.: chief radiothe. South Wales and Monmouthshire Joint Cancer Committee.

Grimaldi, P. R. B., M.R.C.S., D.L.O.: surgeon i/c ear, nose, and throat department, Royal Isle of Wight County Hospital.

Hendtlass, R. F., M.R.C.S., D.M.R.T.: asst. radiotherapist, Royal Northern Hospital and Prince of Wales Hospital joint radiotherapy centre.

Keall, J. H. H., M.D., B.PHARM. Lond.: pathologist, Bromley and District Hospital, Kent.

Landon, J. J., M.B. Camb.: asst. school M.O., City of Birmingham education department.

Marshall, T. S., M.R.C.S.: regional blood-transfusion officer, Leeds.

O'Donnell, R. F., M.B., B.SC. N.U.I.: pathologist, Royal Victoria and West Hants Hospital, Bournemouth.

Pierse, D. J., M.CH. N.U.I., D.O.M.S.: ophthalmic surgeon, South Eastern Hospital for Children, Sydenham.

Prior, A. P., M.B. Sydney: county pathologist, Warwickshire.

Proctor, S. S., M.D. Aberd.: M.O.H. and asst. school M.O., Salisbury, Wilts.

Rees, Harland, B.M. Oxfd, F.R.C.S.: surgeon to outpatients, Hampstead and North-West London Hospital.

Rose, Doris, M.R.C.S., D.O.M.S.: asst. ophthalmic surgeon, Princess Alice Memorial Hospital, Eastbourne.

Steed, G. R., M.D. Lond., M.R.C.P.: physician, City General Hospital, Plymouth.

Sturtridge, G. S., M.B. Melb., M.R.C.O.G.: consultant asst. obstetrician and gynæcologist, General Hospital, Northampton.

Thomas, A. J., M.B., B.SC. Wales, M.R.C.P., D.P.H.: resident consultant physician, Llandough Hospital, Cardiff.

Thompson, N. J. W., M.B. Belf., D.P.H.: asst. M.O., St. Helens.

The Middlesex Hospital, London:

Hart, E. W., M.B.E., M.D. Camb., M.R.C.P., D.C.H.: physician i/c children's department.

Kelham, Geoffrey, M.B. Camb., D.M.R.E.: jun. asst. radiologist (diagnostic).

West London Hospital, Hammersmith:

Burge, H. W., M.B.E., M.B. Lond, F.R.C.S.: general surgeon.

Hindenach, J. C. R., M.D. N.Z., F.R.C.S.: orthopædic surgeon.

The Queen Elizabeth Hospital for Children, Hackney Road, London:

Cowan, H. A., F.R.C.S.E., D.L.O.: ear, nose, and throat surgeon.

Hodson, C. J. C. G., M.B. Lond., D.M.R.E.: radiologist.

Howarth, Elizabeth, M.R.C.S., D.M.R.E.: radiologist.

St. John's Hospital, Lewisham:

Barlow, D. S. M., M.S. Lond., F.R.C.S.: consultant in thoracic surgery.

Eckhoff, N. L., M.S. Lond., F.R.C.S.: consultant in plastic surgery.

Howkins, John, M.D., M.S. Lond., F.R.C.S., M.R.C.O.G.: gynæcologist.

Hughes, K. E. A., M.R.C.S.: pathologist.

Wass, S. H., M.S. Lond., F.R.C.S.: surgeon.

Willesden Corporation:

Beeston, John, G.M., M.B., D.P.H.: deputy M.O.H.

Dunsby, Cissie, M.B. N.U.I.: asst. M.O.

Jones, Esther, M.R.C.S.: asst. M.O.

Lycett, O. D. L., M.B. Lond., D.P.H.: asst. M.O.

Snow, Angèle, M.B. Lond.: asst. M.O.

London County Council:

Second Asst. M.O.s in Mental Health Services:

de Bastarrechea, M.B. Lpool, D.P.M.: Friern Hospital.

Blair, R. A., M.B. Lond., D.P.M.: Banstead Hospital.

Bridger, W. E. W., M.D. Lond., D.P.M.: Bexley Hospital.

Coffey, Bridget, M.B. N.U.I., D.P.M.: Tooting Bec Hospital.

Edwards, A. M., M.B. Lond., D.P.M.: St. Bernard's Hospital.

Rae, G. E., L.M.S.S.A.: Bexley Hospital.

Rollin, H. R., M.B. Leeds, D.P.M.: Cane Hill Hospital.

Sanders, Marjorie, M.B. Edin., D.P.M.: St. Francis' Mental Observation Unit.

Middlesex County Council:

Bigby, Mary, M.D. Lond., M.R.C.O.G.: obstetrician and gynæcologist, Central Middlesex County Hospital.

Patrick, H. F., M.R.C.S., D.A.: anæsthetist, Chase Farm Hospital.

Porter, R. J., M.B. Camb., M.R.C.P.: physician, Central Middlesex County Hospital.

Talbot, R. J. F. L., F.R.C.S.E., D.PHYS.M.: director, department of physical medicine, Hillingdon County Hospital.

Kent County Public Health Department:

Sharvelle, Doris, M.R.C.S., D.P.H.: asst. county M.O.H.

Wallace, G. P., M.B. Aberd.: asst. county M.O.H.

Cumberland Infirmary, Carlisle:

Hill, R. M., M.D. Edin., F.R.C.S.E.: surgeon.

Neill, A. G. C., M.B. Edin., F.R.C.S.E.: asst. surgeon.

Royal Salop Infirmary, Shrewsbury:

Grant, G. H., B.M., B.SC. Oxfd: pathologist.

Jones, A. C., M.B. Lond.: bacteriologist.

St. James's Hospital, Leeds:

Feather, D. B., M.B. Leeds: surgeon.

Jackson, E. W., M.D. Leeds: physician.

Stockton and Thornaby Hospital, Stockton-on-Tees:

Dickson, D. C., M.B. St. And., F.R.C.S.E.: senior surgeon.

Hunter, N. M., M.B. Edin.: senior surgeon.

Marshall, R. M., M.B. Edin., F.R.C.S.E.: asst. ear, nose, and throat surgeon.

Parker, Gilbert, M.B. Aberd., F.R.C.S.E.: asst. surgeon.

Travers, E. H., M.B. Edin., F.R.C.S.: asst. surgeon.

Notes and News

EXPENSES OF ILLNESS IN DOCTORS' FAMILIES

THE London Association for Hospital Services Ltd., which is sponsored by King Edward's Hospital Fund, has issued a leaflet presenting to doctors its "hospital service plan" providing against charges for medical and surgical treatment in hospitals or nursing-homes anywhere in Great Britain or abroad. For one person the annual standard subscription is £2 12s. and the maximum is £5 4s.: a subscriber with one adult and three or more child dependants would pay a standard subscription of £5 5s. or a maximum subscription of £10 10s. The standard benefits include weekly maintenance charges (up to six weeks' annually) of £6 6s. while the maximum benefit is £12 12s. a week. Other benefits include physicians' fees, operation fees, and payments for radiodiagnostic, pathological, and bacteriological investigations and radiotherapy, but certain forms of illness (e.g., pulmonary tuberculosis) are specifically excluded, and benefits are not obtainable till six months after joining. Subscribers must be under 60 years of age, but enrolments may continue after that age. When doctor-members or their dependants are patients, the benefits allowed for medical and surgical fees may be paid direct to the surgeons and physicians who have given the treatment, not as a fee but as a gift, and the association finds that this procedure is often a satisfactory solution to the problem of acknowledging the help of professional colleagues.

In relation to the benefits offered the rates of subscription are low, and this is possible because no profit is to be made. The plan is open to all members of the medical profession, wherever they reside, and it will make a strong appeal to many of us. Further information may be had from the secretary of the association, 10, Old Jewry, E.C.2.

AMBULANCES FOR ALL

AFTER the 1914–18 war the British Red Cross Society and the Order of St. John set up the Home Ambulance Service which has done such good work ever since. During the 1939–45 war new editions of the register of ambulance stations could not be printed, but the 1946 edition has now appeared, giving addresses and telephone numbers of the many stations, housing some 1000 ambulances among them, in England, Wales, Northern Ireland, the Channel Isles, and the Isle of Man. Under the National Health Service Act ambulance transport arrangements are permitted between local authorities and voluntary organisations; so the service is likely not only to continue but to develop. The ambulances are bought by the Order and the Society, and the responsibility of running, housing, and maintaining them is undertaken by voluntary workers. Maintenance costs are covered in various ways. In most cases a charge is made for the use of the ambulance, but where the patient cannot afford to pay he is carried free. The usual charge is therefore calculated to cover the cost of running the ambulance with a margin sufficient to allow for such remissions to needy cases, and for a small sinking fund to meet replacements. The aim has been to put an ambulance within reach of anyone who may need it, and a glance at the register shows that this must have been largely achieved. In 1923 a mobile X-ray unit was added to the service, and during the recent war a fleet of such units was put at the disposal of the Emergency Medical Service. In 1945 the ambulances carried 364,048 patients, and by December of that year nearly 4 million patients had been carried since the service was set up. Doctors and hospitals alike will welcome this new copy of the register.

SOCIAL STRUCTURE AND DISEASE

SPEAKING in Edinburgh on Feb. 27, Prof. F. A. E. Crew, F.R.S., suggested that, in countries like this, most ill health originates in social institutions which man himself has invented.[1] The society he has brought into being is in many ways out of harmony with his biological needs. An adverse psychological communal environment is associated with an increase in chronic sickness; and even the best-organised health service might not affect the morbidity-rates so long as this adverse environment exists. One of the major tasks of the immediate present is to create a social environment that will cripple and confine nobody.

There is no doubt, said Professor Crew, that the institution of marriage is crumbling and the family grouping is breaking down; nothing is more important for the maintenance advancement of society than that the causes of marital harmony should be known and removed. The mor rates reveal the imperfections of our social structure flaws in our social policies. It is coming to be recognised disease usually springs not from a single cause but from *constellation of causes. Medicine has too long been conce* with the issuing of certificates saying that men are not fit work. All too often the work, the home, the group life, *whole way of life has not been fit for men.*

STAFFING FEVER HOSPITALS

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[3] Voncken, J. *Bull. int. Services Santé Armées*, 1946, no. 11.

iversity of Oxford

On March 1 the following degrees were conferred:

D.M.—W. E. Gibb.
B.M.—Elizabeth M. C. Dyke.

niversity of Cambridge

On Feb. 15 and March 1 the following degrees were nferred:

M.D.—John Aspin, D. M. Baker, G. F. Barran, E. D. H. Cowen, . P. Dick, F. S. A. Doran, M. A. Rugg-Gunn, J. F. Stokes, C. C. homas, J. C. Waterlow, P. H. Willcox, G. H. Wooler.

M.B., B.Chir.—* A. P. Baker, * G. T. F. Braddock, * J. A. S. orman, * Robert Marshall, * R. H. B. Mills, A. G. Norman, Donough O'Brien, * T. C. L. Parry, * Arnold Pines, * D. J. Watt, M. E. E. White.

* By proxy.

On March 15 a grace will be submitted to the senate that ie honorary degree of doctor of science be conferred upon ir Edward Mellanby, F.R.S., secretary of the Medical Research ouncil.

Dr. Joseph Marks and Dr. E. D. H. Cowen have been ppointed to Elmore medical research studentships.

Prof. T. R. Elliott, F.R.S., has been elected an honorary llow of Trinity College.

Jniversity of Leeds

Dr. F. S. Fowweather has been appointed to the new chair f chemical pathology, with effect from Oct. 1, 1946.

Dr. Fowweather originally trained at Liverpool as a chemist, raduating B.SC., with first-class honours in chemistry, in 1914, nd M.SC. in 1915. In 1917 he became an associate, and in 1922 a ellow, of the Royal Institute of Chemistry. After some time in ndustrial and analytical chemistry he took up the study of medicine, nd qualified at Liverpool in 1922. For two years he was in general nedical practice until, in 1924, he was appointed lecturer in chemical athology at the university, and chemical pathologist to the General nfirmary, Leeds. He obtained the D.P.H. in 1924, and graduated .D. in 1925. In 1930 he was promoted to a readership. He became .R.C.P. in 1934, and F.R.C.P. in 1943. His chief interest, apart from hemical pathology, is in industrial medicine; he is chairman of he medical committee of the Leeds Joint Council on Industrial edicine. He is the author of a *Handbook of Clinical Chemical athology* and of numerous papers, including some on silicosis.

Royal College of Surgeons of England

A course of lectures on anæsthesia will be held at the ollege on weekdays at 6.15 P.M. from April 14 to 25, and at 5 P.M. on April 28 and 29. Further particulars may be had from he assistant secretary of the college, Lincoln's Inn Fields, ondon, W.C.2.

Royal College of Surgeons in Ireland

A postgraduate course in surgery will be held at the college from April 14 to June 6. Further information may be had from the registrar of the college, St. Stephen's Green, Dublin.

University College Hospital

Mr. A. W. McKenny Hughes, D.I.C., a member of the staff of the natural history section of the British Museum, has been appointed hon. entomologist to the hospital. During the war Mr. McKenny Hughes lectured at the Army School of Hygiene.

Scholarships for Nurses

The Hospital Saving Association will this year devote over £5000 to postgraduate scholarships for nurses training as nursing administrators, nursing dietitians, sister-tutors, superintendent health visitors, tutors to health visitors, health visitors, industrial nurses, or midwife teachers. They are open to nurses registered in the general part of the State register who have graduated in a hospital within the area of King Edward's Hospital Fund for London, and they will be awarded on the results of a competitive examination. Particulars may be had from the director in the education department, Royal College of Nursing, 1A, Henrietta Place, London, W.1.

Planning Under 1939 Cancer Act

The period for submission of plans under this Act has been extended to March 31, 1948. A Ministry of Health circular recalls that until the National Health Service Act comes into operation local authorities have a statutory obligation to make and submit for approval suitable arrangements for the treatment of cancer. The Minister, while recognising the undesirability of setting up joint boards at this stage, emphasises the importance of efficient interim arrangements, which should be suitable for merging into the new hospital services; and it is suggested that plans already approved or proposed should be reviewed to see whether modification is needed to fit them in with these future services.

Harveian Society of London

The Buckston Browne prize for 1946 has been awar Dr. Michael Kelly, of the University of Melbourne, for essay on the Pathology and Treatment of Fibrositis.

Royal Appointment

Major-General William Foot, M.C., late R.A.M.C., has been appointed honorary physician to the King in succession to Brigadier J. S. K. Boyd, who has retired.

Association of Industrial Medical Officers

On March 28, at 2.30 P.M., in the orthopædic department of the Western Infirmary, Glasgow, Mr. Roland Barnes will give a talk on Back Injuries in Industry, followed by a clinical demonstration.

Postgraduate Lectures at Leeds

The University of Leeds postgraduate committee is holding a fortnight's refresher course for general practitioners, to begin on May 5. It has also arranged a series of clinical meetings at Leeds General Infirmary on Tuesdays at 3.15 P.M., from April 15 to July 15. Further particulars will be found in our advertisement columns.

Survey of Child Health

The Berks, Bucks, and Oxon Regional Hospitals Council is to carry out a survey of the child-health services in its area. On this survey will be based proposals for the development of these services in the new region to be established under the National Health Service Act, which is considerably larger than the council's present territory. Prof. Alan Moncrieff has been appointed chairman of the committee which will make the survey.

World Federation of Scientific Workers

Mr. J. G. Crowther, D.SC., has been appointed secretary-general designate of the federation, which was founded last year at a conference convened by the British Association of Scientific Workers. The president of the federation is Prof. F. Joliot-Curie, the high commissioner for atomic energy in France. The federation is preparing a charter of the rights and duties of scientists to serve as a guide to scientists in all countries.

New York Academy of Medicine

The centenary celebration of the academy opened with a dinner on March 6, when Prof. J. A. Ryle was the principal speaker; his subject was Social Pathology and the New Era in Medicine. In connexion with the centenary, meetings have been arranged by the sections of the academy and by a number of affiliated organisations; and five "institutes" are being held—on library methods and problems, social medicine, public health, medical education, and hospitals.

Health in U.S. Zone of Germany

A black picture of health conditions in the United States zone of Germany is painted in the latest monthly report of General McNarney, the military governor. The report, says B.U.P., speaks of increasing danger of the spread of infectious diseases, owing to the shortage of hospital beds; of the 113,461 known cases of tuberculosis in the zone, nearly 100,000 are walking the streets. It adds that rationing is beginning to affect children in the zone: "children between 8 and 15 years of age show serious weight deficiencies and some retardation of growth as evidence of the long-standing inadequacy of their food consumption."

Health Education in Northern Ireland

The activities of the Central Council for Health Education in Northern Ireland were officially launched in December when Mr. William Grant, the minister of health and local government, presided over a gathering in Belfast of delegates representing local authorities, professional groups, and voluntary organisations. The minister said he was as much concerned with the prevention as with the treatment of ill health. It was the duty of every man and woman in the country to do all they could to look after their own health as well as that of their dependants. The chairman of the central council, Mr. Henry Lesser, and the council's medical adviser and secretary, Dr. Robert Sutherland, spoke of the encouragement received from the ministry, and of the part education could play in improving the community's health. Personal contact through responsible people—parents, teachers, doctors, nurses, youth leaders, and welfare officers—was the key to success.

Notes and News

EXPENSES OF ILLNESS IN DOCTORS' FAMILIES

THE London Association for Hospital Services Ltd., which is sponsored by King Edward's Hospital Fund, has issued a leaflet presenting to doctors its "hospital service plan" providing against charges for medical and surgical treatment in hospitals or nursing-homes anywhere in Great Britain or abroad. For one person the annual standard subscription is £2 12*s*. and the maximum is £5 4*s*.: a subscriber with one adult and three or more child dependants would pay a standard subscription of £5 5*s*. or a maximum subscription of £10 10*s*. The standard benefits include weekly maintenance charges (up to six weeks' annually) of £6 6*s*. while the maximum benefit is £12 12*s*. a week. Other benefits include physicians' fees, operation fees, and payments for radiodiagnostic, pathological, and bacteriological investigations and radiotherapy, but certain forms of illness (e.g., pulmonary tuberculosis) are specifically excluded, and benefits are not obtainable till six months after joining. Subscribers must be under 60 years of age, but enrolments may continue after that age. When doctor-members or their dependants are patients, the benefits allowed for medical and surgical fees may be paid direct to the surgeons and physicians who have given the treatment, not as a fee but as a gift, and the association finds that this procedure is often a satisfactory solution to the problem of acknowledging the help of professional colleagues.

In relation to the benefits offered the rates of subscription are low, and this is possible because no profit is to be made. The plan is open to all members of the medical profession, wherever they reside, and it will make a strong appeal to many of us. Further information may be had from the secretary of the association, 10, Old Jewry, E.C.2.

AMBULANCES FOR ALL

AFTER the 1914–18 war the British Red Cross Society and the Order of St. John set up the Home Ambulance Service which has done such good work ever since. During the 1939–45 war new editions of the register of ambulance stations could not be printed, but the 1946 edition has now appeared, giving addresses and telephone numbers of the many stations, housing some 1000 ambulances, among them, in England, Wales, Northern Ireland, the Channel Isles, and the Isle of Man. Under the National Health Service Act ambulance transport arrangements are permitted between local authorities and voluntary organisations; so the service is likely not only to continue but to develop. The ambulances are bought by the Order and the Society, and the responsibility of running, housing, and maintaining them is undertaken by voluntary workers. Maintenance costs are covered in various ways. In most cases a charge is made for the use of the ambulance, but where the patient cannot afford to pay he is carried free. The usual charge is therefore calculated to cover the cost of running the ambulance with a margin sufficient to allow for such remissions to needy cases, and for a small sinking fund to meet replacements. The aim has been to put an ambulance within reach of anyone who may need it, and a glance at the register shows that this must have been largely achieved. In 1923 a mobile X-ray unit was added to the service, and during the recent war a fleet of such units was put at the disposal of the Emergency Medical Service. In 1945 the ambulances carried 364,048 patients, and by December of that year nearly 4 million patients had been carried since the service was set up. Doctors and hospitals alike will welcome this new copy of the register.

SOCIAL STRUCTURE AND DISEASE

SPEAKING in Edinburgh on Feb. 27, Prof. F. A. E. Crew, F.R.S., suggested that, in countries like this, most ill health originates in social institutions which man himself has invented.[1] The society he has brought into being is in many ways out of harmony with his biological needs. An adverse psychological communal environment is associated with an increase in chronic sickness; and even the best-organised health service might not affect the morbidity-rates so long as this adverse environment exists. One of the major tasks of the immediate present is to create a social environment that will cripple and confine nobody.

There is no doubt, said Professor Crew, that the institution of marriage is crumbling and the family grouping is breaking down; nothing is more important for the maintenance advancement of society than that the causes of marital harmony should be known and removed. The morbi rates reveal the imperfections of our social structure flaws in our social policies. It is coming to be recognised disease usually springs not from a single cause but from constellation of causes. Medicine has too long been concerned with the issuing of certificates saying that men are not fit to work. All too often the work, the home, the group life, the whole way of life has not been fit for men.

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THE CHRONIC SICK IN HOSPITAL

A PSYCHIATRIC APPROACH

JAMES WHIGHAM AFFLECK
M.B. Glasg., F.R.F.P.S., D.P.M.
DEPUTY MEDICAL SUPERINTENDENT, OUTER GROUP OF MUNICIPAL GENERAL HOSPITALS, CITY OF LEEDS

A SURVEY of 788 chronic-sick patients was undertaken to ascertain what types are found in the wards allotted to this group. It was hoped to make suggestions to better the lot of these patients by further classification, amendment of routine, and improvement of equipment. As the great majority had been examined in the wards of an acute hospital before admission, it was assumed that the diagnosis and prognosis would generally be correct. It was felt that in wards where improvement and recovery are the exception rather than the rule, one of the chief items in life would be the mental state and attitude of the persons in the adjoining beds. Special attention was therefore given to the mentality of the patients and to arrangements for bringing special types together.

Patients were examined in five hospitals. Three admitted chronic sick only; another had also a large modern maternity unit: and the fifth had some wards for treating tuberculosis. The hospitals had 56, 100, 316, 102, and 251 chronic beds—a total of 825—and in them 788 cases were examined. In each case some facts regarding the social status and background of the individual were noted, and the physical and mental conditions assessed. The case-record from the acute hospital was generally available and gave the diagnosis on admission. Physical examination was limited to confirming this diagnosis and to determining the present state of the disease and of the patients' functional capacity—i.e., sight, speech, hearing, walking, &c. A nurse who knew the patients was always present to give information about habits, abilities, and behaviour. Since most of the mental abnormalities were organic reaction types, the psychiatric interview tended to be limited to assessing their degree; but, where other symptoms were present, it was appropriately expanded.

Social Aspects

Women outnumbered men by almost 2¹/₂ to 1 (552 to 236, or 70·1% to 29·9%). The youngest patients were aged 15, and the oldest was 101. Almost 80% were over 65, and of the remainder more than a third were over 60. The age- and sex-incidence are shown in table I:

TABLE I—AGE AND SEX

	No. of cases	Male	Female
All age groups ..	788	236	552
65 years and over ..	628 (*79·7%*)	183 (*77·6%*)	445 (*80·6%*)
60 years and over ..	688 (*87·3%*)	204 (*86·5%*)	484 (*87·6%*)
Under 65 years ..	160 (*20·3%*)	53 (*22·4%*)	107 (*19·4%*)
Under 60 years ..	100 (*12·7%*)	32 (*13·5%*)	68 (*12·4%*)

A quarter of the patients had been in hospital less than a year—which might indicate that many were admitted to pass their last days there. Indeed the weak state on admission was often only too obvious. On the other hand, an eighth of the patients had been in hospital more than 5 years, and one woman more than 43.

Most patients came from working-class homes and had led active lives, but a section of the men, who had been taken from an old workhouse infirmary, contained a number of uncompromising ne'er-do-wells whose habits and language made accommodation among ordinary people difficult.

Most cases obviously required constant nursing of a type unobtainable at home. Several had been looked after at home until some war circumstance—e.g., a daughter taking up war work—made it impossible. Many so settled in hospital will not return home; housing is more difficult, and many families are not inclined to resume the burden of an invalid. Some families may be taking an unnecessary and unfair advantage of the public facilities; on the other hand relief has been granted to many deserving it. Mental and psychosomatic disorders in unmarried women who have given many years (consciously willing but unconsciously rebelling) to the nursing of a parent are commonly seen in psychiatric practice, and the physical effects on the young wife who tries to run both her own and her sick parent's home may be equally unfortunate. The patient in many cases does not understand the family's point of view, with unhappy results for all concerned, though many independent invalids adjust themselves philosophically to hospital. Special visiting facilities, including the admission of children, are appreciated by chronic hospital invalids, old and young, and may help to prevent the invalid from assuming that he is unwanted.

It is interesting to compare the marital status of this group with the group of old people on poor relief though not in hospital studied by Curran et al. (1946). In the present study, as in theirs, a large proportion of both sexes were widowed, but in this group there was a much larger proportion of single people (table II). The presence of a high proportion of widowed and single people in hospital compared with those married is not surprising, but it may also help to explain the continued presence of some persons who were not really ill though unable to look after themselves in their own homes.

TABLE II—MARITAL STATUS

	Curran et al. (1946)	Present study
Widowed women ..	507 of 728 (*69·6%*)	273 of 400 (*59·3%*)
Widowers	95 of 273 (*38·4%*)	79 of 200 (*34·5%*)
Single women ..	68 of 728 (*9·3%*)	105 of 400 (*26·3%*)
Single men	35 of 273 (*12·8%*)	69 of 200 (*29·3%*)
Married women ..	153 of 728 (*21·2%*)	58 of 400 (*14·5%*)
Married men ..	143 of 273 (*63·4%*)	52 of 200 (*26·0%*)

The occupation of chronic-sick beds by recovered patients and by infirm old people who could be in their own homes if help was available has been commented on elsewhere (Amulree and Sturdee 1946), and was noted in the present survey to the extent of about 12% of the total cases (5·4% of the females and 6·7% of the males). Those who are in the category of infirm were able to be up for half a day and could attend to their toilet. Many were admitted to hospital in acute illness and had not recovered enough strength to look after themselves completely. Hostels and home-helps are required for such cases, but are not available for all. Meanwhile the presence of the recovered and infirm cases in hospital lengthens the waiting-list for chronic beds but to some extent relieves the burden of the nurses.

Physical Disorders

Table III summarises the types of disorder responsible for the retention of the patients in hospital.

TABLE III—PHYSICAL DISORDERS

	236 Males	552 Females
Senile weakness	47 (*19·9%*)	80 (*14·0%*)
Cardiovascular disorders	22 (*8·5%*)	62 (*10·2%*)
Central nervous disorders	78 (*33·0%*)	169 (*30·6%*)
Respiratory disorders	24 (*9·6%*)	33 (*5·9%*)
Alimentary disorders	9 (*3·6%*)	8 (*1·4%*)
Genito-urinary disorders	2 (*0·8%*)	4 (*0·7%*)
Locomotor disorders	24 (*9·6%*)	107 (*19·4%*)
Skin diseases	6 (*2·4%*)	6 (*1·1%*)
Metabolic disorders	4 (*1·6%*)	11 (*1·9%*)
All carcinoma cases	13 (*5·5%*)	24 (*4·2%*)
Recovered cases	16 (*6·7%*)	31 (*5·6%*)
Mental illness alone	8 (*3·4%*)	21 (*3·8%*)

Many geriatric cases were recorded as senile weakness where cardiovascular degeneration or myocardial weak-

London College of Osteopathy

A nine-month course in osteopathy is to be held at this college, beginning in October. Only qualified medical men and women will be accepted. Further information may be had from the secretary, 25, Dorset Square, N.W.1.

End of the Scarce Substances Orders

The last remaining Scarce Substances Order, under which alternatives could be dispensed when the liquid extract or tincture of ipecacuanha was prescribed, was revoked on March 1.

Great Ormond Street Dining Club

The 19th annual dinner will be held at the Savoy Hotel, on Friday, April 11, at 7 P.M., when Dr. Harold Sington will be in the chair. Members who wish to attend are asked to communicate with the honorary secretary, at the Hospital for Sick Children, Great Ormond Street, London, W.C.1.

American Research into Diseases of the Aged

The National Institute of Health's programme of research into diseases of the aged is now being resumed. One unit, under Dr. Nathan Shock, is starting work on kidney diseases in Baltimore City Hospital. Another group, B.U.P. reports, is to study the processes of ageing; a thousand or more healthy adults, aged from 30 to 90, will undergo tests at intervals of one, two, or five years.

Australian Medical Honours

The King has made the following appointments to the Royal Victorian Order:

M.V.O.

ASHLEIGH O. DAVY, M.B. Sydney, F.R.A.C.S.
LORIMER F. DODS, M.D. Sydney, F.R.A.C.P.
Prof. B. T. MAYES, M.B. Sydney, F.R.A.C.S., F.R.C.O.G.
Group-Captain H. R. G. POATE, M.B. Sydney, F.R.C.S., F.R.A.C.S., R.A.A.F.

Return to Practice

The Central Medical War Committee announces that Mr. Harold Burge, M.B.E., F.R.C.S., has resumed civilian practice at 14, Upper Harley Street, London, N.W.1 (Welbeck 4824).

Medical Society of London

At the 167th annual dinner, on March 6, Lord Oaksey, who as Lord Justice Lawrence presided over the Nuremberg trials, spoke of these trials as a vindication of international law. Without laws between the nations, which necessarily limited their sovereignty, what was to become of the world? Since the 14th century at least there had been rules of war, and Germany had been one of the 63 nations party to the Kellogg Pact which renounced war as an instrument of policy. The charter of 1945 represented a great step forward in the progress of international law. Thanks to the seizure of vast numbers of documents, the prosecution's case against the Nazi leaders had been based almost entirely on what they themselves had said, and it would now be difficult to deny their guilt. To say that soldiers and officials could not be held responsible for what they did under orders was itself a denial of international law.

Sir Philip Manson-Bahr, the president, spoke of Lettsom's injunction to the society to continue in amity and good fellowship—an injunction applicable today to the whole profession. It was right that we should consider and debate the place of medicine in the world, but it was wrong to introduce pure politics into our professional life, setting one man against another. Mr. Dickson Wright, who proposed The Guests, recalled that Lettsom was the last and only surviving member of a family consisting of seven sets of twins. He compared the presidents of the three Royal Colleges, in their new-found unity, to the three bears who said "who's been at *our* porridge?" or even "who's been at the Minister's porridge?" Lord Moran, in reply, said that the society's great past was associated with individual effort. The change which most disturbed him in recent times was the dread of responsibility and the dread of public opinion which had invaded every department of life.

B.C.G. is to be used in New York State; the programme, according to B.U.P., is to be established by Dr. Konrad Birkhaug, the Norwegian authority.

CORRIGENDUM: *Thyroid and Cold Sensitivity.*—In Dr. S. L. Simpson's letter last week the reference was to M. L. Turner (not Tanner).

Diary of the Week

MARCH 16 TO 22

Monday, 17th

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
3.45 P.M. Prof. F. Wood Jones, F.R.S.: Visceral Outlet of Hind End.
5 P.M. Mrs. E. K. Dawson, M.D.: Genesis and Spread Mammary Cancer.

HUNTERIAN SOCIETY
7.15 P.M. (Pimm's, 3, Poultry, E.C.2.) Sir Reginald Watson-Jones, Dr. J. B. Mennell: Sprains and Strains.

Tuesday, 18th

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.1
5 P.M. Dr. F. Avery Jones: Hæmatemesis and Melæna. (Goulstonian lecture.)

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Mrs. Dawson: Diagnosis and Prognosis of Mammary Cancer.
5 P.M. Prof. H. A. Harris: Clinical Anatomy of the Chest.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5.30 P.M. General meeting of fellows.
8.15 P.M. *Pathology.* Prof. A. W. Downie, Dr. J. A. Dudgeon, Prof. S. P. Bedson, F.R.S., Dr. F. O. MacCallum: The Laboratory Diagnosis of Virus Infections.

CHADWICK LECTURE
5.30 P.M. (Westminster Hospital medical school, 17, Horseferry Road, S.W.1.) Prof. W. M. Frazer: A Medical Pioneer in Sanitation.

ROYAL PHOTOGRAPHIC SOCIETY, 16, Princes Gate, S.W.7
6.30 P.M. *Medical Group.* Dr. R. G. W. Ollerenshaw: Production of the Surgical Teaching Film.

EUGENICS SOCIETY
5.30 P.M. (Burlington House, Piccadilly, W.1.) Mr. E. B. Ford: Recent Advances in Genetics.

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle Street, W.C.2
5 P.M. Dr. Henry MacCormac: Principles of Treatment.

Wednesday, 19th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Prof. C. L. Oakley: Toxins of *Clostridium welchii* and *Cl. œdematiens.*
5 P.M. Professor Harris: Clinical Anatomy of the Abdomen.

ROYAL SOCIETY OF MEDICINE
5 P.M. *Comparative Medicine.* Sir Edward Salisbury, F.R.S., Mr. Ian Galloway, D.SC., Mr. John Hammond, F.R.S.: The Span of Life.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
3.30 P.M. Dr. Noel Harris: The Health of the Mind.

Thursday, 20th

ROYAL COLLEGE OF PHYSICIANS
5 P.M. Dr. Avery Jones: Hæmatemesis and Melæna. (Goulstonian lecture.)

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Professor Oakley: Toxins of *Cl. welchii* and *Cl. œdematiens.*
5 P.M. Professor Harris: Clinical Anatomy of the Abdomen.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE
8 P.M. (Royal Army Medical College, Millbank, S.W.1.) Laboratory meeting.

MEDICO-CHIRURGICAL SOCIETY OF EDINBURGH
8 P.M. Joint discussion at Glasgow with the Royal Medico-Chirurgical Society of Glasgow: that the Nation is tending to become Disease-conscious rather than Health-conscious.

Friday, 21st

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Dr. Cuthbert Dukes: Tumours of the Rectum and Colon.
5 P.M. Prof. John Kirk: Anterior Abdominal Wall.

ROYAL SOCIETY OF MEDICINE
8 P.M. *Obstetrics and Gynæcology.* Mr. Rufus Thomas, Mr. J. H. Peel, Mr. C. MacIntosh Marshall, Miss Katharine Lloyd-Williams, Dr. C. J. Massey Dawkins, Dr. J. N. Cave: Anæsthesia for Cæsarean Section.
8 P.M. *Radiology.* Dr. J. F. Brailsford: Bone Tumours.

FACULTY OF RADIOLOGISTS
2.30 P.M. Diagnosis Section Meeting (Royal College of Surgeons). Dr. S. Cochrane Shanks: Hiatus Hernia.

BRITISH INSTITUTE OF RADIOLOGY
5 P.M. (French Institute, Queensberry Place, S.W.7.) Dr. F. Baclesse: Cancer of the Larynx.

Saturday, 22nd

BRITISH INSTITUTE OF RADIOLOGY
10.15 A.M. Prof. D. W. Smithers: presidential address.
11.20 A.M. Papers on carcinoma of the cervix.

Dr. W. S. Flowers has left England to join Sir Clutha Mackenzie on a St. Dunstan's mission to advise the Chinese government on the training of blinded soldiers and civilians. Dr. Flowers has been chief medical representative on the Red Cross China Commission, and Sir Clutha has been in charge of the St. Dunstan's training centre at Dehra Dun, for blinded Indian and Gurkha soldiers, since he established it in 1943.

Table VI shows the different types of mental disorders. Among the clinical types of senile dementia found in these wards the apathetic one described above predominated. The confused and restless conditions associated by Howell (1945) with progressive cerebral ischæmia were observed and nursed when possible in cot beds. The more obvious results of cerebral arteriosclerosis, such as hemiplegia and aphasia, were observed in some cases of both types.

TABLE VI—TYPES OF MENTAL DISORDERS

	92 Males	*202 Females*	*Total 294*
Senile dementia ..	44 (*47·8%*)	123 (*60·9%*)	167 (*56·5%*)
Presenile dementia*.	14 (*15·2%*)	27 (*13·4%*)	41 (*13·9%*)
Taboparesis	4 (*4·3%*)	—	4 (*1·4%*)
Paranoid states ..	10 (*10·9%*)	13 (*6·4%*)	23 (*7·8%*)
Depression	3 (*3·3%*)	15 (*7·4%*)	18 (*6·1%*)
Neuroses	5 (*5·5%*)	8 (*3·9%*)	13 (*4·4%*)
Congenital mental defect	12 (*12·9%*)	16 (*7·9%*)	28 (*9·6%*)

* Including cases with arteriosclerosis-like symptoms, disseminated sclerosis, myxœdema, cerebral tumour, and epilepsy.

Mental disorders in the younger chronic-sick patients were also often the effect of organic brain disease. Among those between 50 and 65 years of age the dementia which may accompany arteriosclerotic hemiplegia and other hypertensive manifestations was fairly common.

That some functional states were discovered might be surprising, though the anxiety states were mostly associated with hypertension and heart disease. One outstanding case of hysterical paraplegia responded well to treatment.

Chronic delusional states with some systematisation (paranoid states) were found, especially among the deaf and the older people. These patients were often quarrelsome and regarded their attendants as accomplices in a plot to deprive them of their rights or to injure them. Some were hallucinated and others quietly grandiose.

Long periods in hospital tend to produce depression and apathy, especially among the older patients and others who have difficulty in establishing new interests to help in their adaptation to hospital life. Besides these reactions a few cases of abnormal depression were encountered, nearly all of which had originated before admission. Most had some severe environmental strain besides their chronic illness. The physical disabilities in most cases made suicidal attempts unlikely, but one cannot avoid the impression that the possibility of this event in depressed states is not sufficiently recognised.

The mentally defective group included patients with *Little's* disease and congenital syphilis and several of the patients admitted for epilepsy—which in these cases was a complication of their mental deficiency. Mental defectives and epileptics in the community who are not suitable for occupation or training present a problem which is nearly insoluble owing to the great scarcity of institutional beds. At present they must live as a burden to their families, and it is not surprising or particularly inappropriate that they are fairly numerous in the institutions for chronic sick.

TABLE VII—SENILE DEMENTIA

	Male	*Female*	*Total*
Total senile dementia	44	123	167
Of all patients ..	$\frac{44}{236}$ (*18·5%*)	$\frac{123}{552}$ (*22·3%*)	$\frac{167}{788}$ (*21·2%*)
Of mentally disordered	$\frac{44}{92}$ (*47·8%*)	$\frac{123}{202}$ (*60·9%*)	$\frac{167}{294}$ (*57·5%*)
Of organic dementias	$\frac{44}{65}$ (*67·6%*)	$\frac{123}{167}$ (*77·2%*)	$\frac{167}{232}$ (*71·6%*)

Though some psychotic patients were transferred to mental hospitals for treatment or safety, the fact that the remainder are nursed near their homes and in general hospitals is usually appreciated by their relations and friends. Their removal elsewhere could not in most cases be justified, but the existence of such a large psychiatric population in some of our general hospitals is not generally appreciated, though there is a general impression that cases of senile dementia are so accommodated. Table VII shows the distribution of senile dementia.

If the psychiatric disorders are surveyed from the prognostic angle, the same mixture of recovery, long-term improvement, and incurability is found as among the physical disorders. The proportion of potential recoveries is much less, but nevertheless they do exist.

Classification

Many of the regional survey commissioners commented on and deplored the absence of classification in the arrangements for these patients (see Nuffield Provincial Hospitals Trust 1946). The ideal would be to have separate accommodation for cases of each type of prognosis and for the aged group, thus:

(1) Long-term cases (recovery anticipated) in special rehabilitation hospitals.
(2) Incurable cases in best present accommodation for chronic sick.
(3) The aged sick in the geriatric hospital department, with acute departments.
(4) The infirm in hostels or "eventide homes."

Meanwhile, however, the pressure on acute beds is so great that a patient whose illness is going to be lengthy must be accommodated elsewhere whenever this seems reasonably possible. The result is that the patient sometimes passes from one doctor and hospital to another and even in some cases completes his recovery in a chronic-sick ward. In the attempt to contend with this situation a system of classification has been applied (table VIII). The fundamental clinical subdivision is the segregation of those with major disorders of the mind. After this, the younger patients are nursed separately from the aged, and special arrangements are made for the types with social defects (incontinence, epilepsy, &c.). These arrangements are often made by the ward sisters, but to be effective they must be planned and supervised by someone with wider authority. When the general scheme has been developed, rearrangement of patients must be expected and be regarded as part of the right of the chronic sick. Potential recoveries have not yet been separated, but physiotherapy is available.

TABLE VIII—CLASSIFICATION

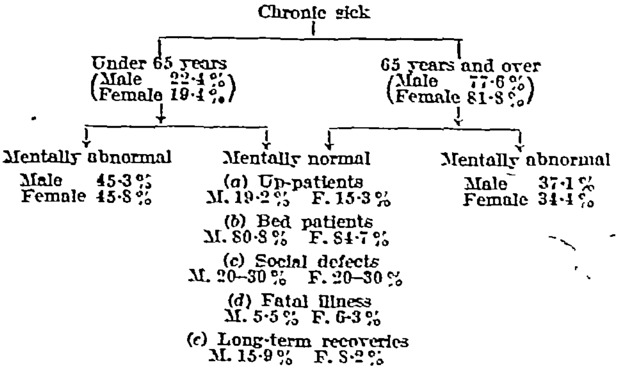

Table VIII indicates the relative distribution of some of the classes for whom special arrangements may be needed.

Management

ACCOMMODATION

Size of Units.—The number of beds in a chronic medical unit is unimportant if there are enough subdivisions in the accommodation to allow proper classification of the ness might have been equally appropriate; some of them had senile dementia, with presumably a degeneration of the cerebral cortex which would also be a factor in the weak muscular state. Nearly a third of all cases had a lesion of the central nervous system. As might be anticipated, the degenerations and cardiovascular accidents associated with old age were very much in evidence: 15% of the patients had hemiplegia. Osteoarthritis occurred in 11% of the female cases and in 5% of the men, whereas rheumatoid arthritis (3·9%) was almost limited to females. Chronic bronchitis and its complications were seen in nearly 10% of the patients. Other conditions occurring in more than 4% of cases were carcinoma, epilepsy, and fractures of the femur. Among the younger patients cases of relatively rare diseases of the central nervous system presenting interesting symptoms and signs were found, tucked away far from the path of even the most enthusiastic student. The familial and hereditary nature of some of these diseases was made obvious by the presence of brothers and sisters with the same conditions in the same hospital. Unusual conditions, such as diaphragmatic hernia and hermaphroditism, were present incidentally.

The academic classification given above, however, is less important from the point of view of routine hospital work than the functional disabilities (table IV). Blindness, feeding difficulties, incontinence, &c., are the matters of immediate import to the chronic-sick patient and his nurse.

TABLE IV—FUNCTIONAL DISABILITIES

	Males	*Females*
Sight:		
Blindness	19 (8·1%)	25 (4·5%)
Poor sight..	19 (8·1%)	16 (2·9%)
Hearing:		
Deafness	17 (7·2%)	41 (7·8%)
Poor hearing	19 (8·1%)	31 (5·6%)
Speech (aphasia and dysarthria) ..	35 (14·8%)	48 (8·7%)
Inability to feed self	32 (13·6%)	38 (6·8%)
Walking:		
Incapable of walking	80 (33·9%)	230 (41·7%)
Requiring help	108 (45·8%)	247 (44·7%)
Incontinence:		
Of urine	20 (8·5%)	58 (10·5%)
Double incontinence	26 (10·6%)	63 (11·4%)
Occasional incontinence ..	9 (3·8%)	12 (2·2%)
Fits	9 (3·8%)	27 (4·4%)

An examination of the disorders found, from the point of view of prognosis, reveals that the following types of patient can be admitted:

(1) Incurable.
(2) Long-term cases—e.g., some cardiac, chronic bronchitis, hemiplegia, genito-urinary and skin patients—in whom recovery is possible but uncertain.
(3) Recoveries.

Included in these types are patients with diseases due to old age who may recover or become infirm or incurable.

Mental Disorders

Though patients were not admitted primarily for mental symptoms, the incidence of mental disorders was high (table V).

TABLE V—INCIDENCE OF MENTAL DISORDERS

	Total	*Male*	*Female*
All patients ..	$\frac{294}{788}$ (37·3%)	$\frac{92}{236}$ (38·9%)	$\frac{202}{552}$ (36·6%)
Aged 65 and over..	$\frac{221}{628}$ (35·2%)	$\frac{68}{188}$ (37·1%)	$\frac{153}{445}$ (34·4%)
Aged under 65 ..	$\frac{73}{160}$ (45·6%)	$\frac{24}{53}$ (45 3%)	$\frac{49}{107}$ (45·8%)

Of the 788 patients 294 (37·3%) showed obvious mental symptoms. The sexes were equally affected. Among those aged 65 and over, 35% showed symptoms. It is perhaps more surprising to record that 45% of the younger group displayed serious disorders. In 80% of cases the condition was apparently due to organic change in the brain. The remaining 20% (60 patients) included 28 mental defectives and 32 others whose psychosis or neurosis was of a more functional type. The disorders were mild in the sense that they did not lead to gross abnormality of behaviour or thought, but the patients affected usually could not carry on a normal conversation and join or enjoy communal activities or interests. The following cases illustrate the types of mental disorders found:

CASE 1.—Apathetic senile dementia. A widow, aged 85, had been in hospital for six years. She had been admitted to the acute hospital for senile weakness and chronic ulceration of the right leg, which was epitheliomatous. She had average sight but poor hearing. She could feed herself but could not walk. She had double incontinence and had to be "changed" regularly. Mentally she was quiet. She was sometimes restless at night and dirty in her habits. Her speech was normal but her talk confused. She never spoke unless addressed. She was apathetic, showed no interest in her surroundings, and appeared to eat automatically. She was completely disoriented and appeared to be unable to remember anything but her name.

CASE 2.—Restless senile dementia. A widow, aged 79, had been in hospital three months. She had been admitted from the acute hospital as a case of cerebral thrombosis. She had average sight and hearing. She could walk but needed help to avoid falling. She was often incontinent. She was restless and would often come out of bed and proceed along the ward holding on to the other beds. She required assistance with her meals, as she ate spasmodically and would play with the food. At night she would talk and sometimes wished to walk. She was confused in her ideas but was keen to converse and could give her name and address and age fairly accurately, though not every time she was asked. Memory for recent events was poor.

CASE 3.—Presenile dementia following hemiplegia. A labourer, a widower aged 59, had been admitted with hyperpiesia and right hemiplegia of three years' duration. Sight, hearing, and speech were normal. He could feed himself but was doubly incontinent. He was quiet, spoke only when addressed, and was completely apathetic. His memory was very poor, and he was disoriented for time and place.

CASE 4.—Presenile dementia due to disseminated sclerosis. A married man, aged 44, a sheet-metal worker, had been admitted three years ago with disseminated sclerosis, giving paraplegia and incontinence. His sight and hearing were normal but there was some difficulty in speech. He could feed himself. He was quiet and ready to converse but this was difficult and slow because the speech was dysarthric, and there was some difficulty in thinking. His mood was amiable and tended to euphoria. His memory was poor, and he could not give the day or month. His thoughts were rather simple and facile and sometimes confused.

Forgetfulness of variable degree is normal in senescence. If a man lives long enough he will become forgetful. It is of the same nature as the stiffening of aged joints and the weakening of aged muscles. Some difficulty in recalling recent events was observed in patients between 65 and 70, whereas apparent complete lucidity was observed in one or two over 90. Forgetfulness by itself was not regarded as senile dementia, nor was the state of apathy with loss of interest in time and in day-to-day events which was often present in those old people in hospital. This distinction, however, is artificial, in the sense that it separates only two stages of the same pathological process. It might have been more accurate to have labelled these cases "simple senile deterioration" and added them to the total of mental disorders. Cases of this type progress to dementia when the patients become disoriented for time and place and person, show complete apathy to their surroundings (though usually retaining some interest in meals), and become incontinent. There were 86 patients (37 males and 49 females) in the forgetful category.

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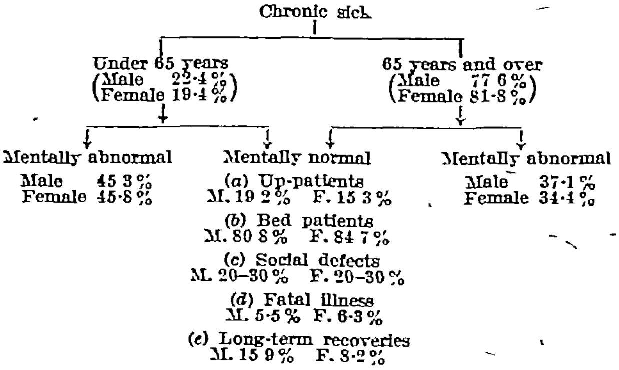

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Management

ACCOMMODATION

Size of Units.—The number of beds in a chronic medical unit is unimportant if there are enough subdivisions in the accommodation to allow proper classification of the patients. Thus a 150-bed unit composed of 25-bed wards usually leads to the mixture of types of cases which it is desirable to separate. This has been demonstrated in our own hospitals—as a result of staff shortage which necessitated the closure of wards allocated to special types of patients. Of the patients in this survey 70% were in wards of 3–15 beds.

Admission System.—All patients should be admitted first to a hospital for acute cases and be thoroughly examined. During this time the mental state should be assessed and arrangements made to transfer the patient to the chronic ward which is suitable to his capacity, interests, and age-group. If patients are admitted directly from their homes, an admission ward or bed is required in the chronic unit so as to avoid the system whereby a new patient is placed in any available bed, irrespective of the type of ward.

Buildings.—None of our buildings were built for the purpose, but most have undergone structural adaptation and alteration to house the chronic sick. One hospital was very favourably commended in the regional survey (Eason et al. 1945) as an example of good chronic-sick accommodation. Cheerful decoration and provision of a light for each bed are two features which we insist on having in our own homes but which appear in the past to have been regarded as an unnecessary extravagance. Perhaps the most valuable item which is lacking is adequate single-room accommodation for the dying, those who have constant pain and need quiet, and those whose disease gives rise to offensive odour or unsightliness. Three single rooms for each 100 beds are the minimum required for medical reasons only. Extensive single-room units in these days of shortages of nurses and domestics are a doubtful asset.

Up-patients require day-rooms, and many who have difficulty in walking or can move about in a chair are found accommodation on the ground floor, so that they have every opportunity of getting outside. A daily change of view means a great deal to a person who is always in bed, and the use of a veranda or balcony is much appreciated.

MEDICAL STAFF

Local general practitioners or medical officers who have other duties are the usual physicians to these wards, for which they can spare too little time. It is essential that the medical officer should have access to the consultants and facilities of the acute hospital. At the same time the status, efficiency, and morale of these hospitals could be raised immediately if a visiting physician, orthopædic surgeon, and perhaps ophthalmologist of consultant rank were appointed to visit the wards regularly, though not necessarily often.

MEDICAL AUXILIARIES

Physiotherapy.—The physiotherapy generally indicated in these wards is satisfactorily given under the supervision of the trained nurses. Passive movements of limbs and the use of simple lamps can be prescribed; but, where more expert service is required, the patient is transferred to the acute hospital or to the chronic one within the same grounds.

Occupational Therapy.—The absence of activity between meals in the male wards is most noticeable in comparison with the female side, where most patients who have the use of their hands and minds are doing knitting or crochet. In spite of this, only about 20% of the female patients can engage in this activity. The mental benefits of diversional activities are so important that a special effort must be made to ensure that all who can be employed, including the men, are employed. The part-time services of an occupational therapist are desirable, so that the maximal variety of activities with expert teaching can be provided; but failing this an enthusiastic ward sister can give the necessary stimulus.

Blind Welfare.—Workers trained in this subject do good work, with the result that blind patients often receive more outside attention and corresponding benefits than those unafflicted.

Almoners are helpful and popular. It may be hoped that, when almoners are freed from financial duties by the National Health Service Act, the patients will benefit by the expansion of their social services, which might suitably include the further coordination of voluntary services with the official workers.

NURSING STAFF

Table IV summarises to some extent the special nursing duties in connexion with chronic-sick work, but there must be added to them the disorders of behaviour and lack of coöperation which accompany some of the mental states described.

The nursing of the chronic sick is perhaps the least attractive of all nursing. There is little reason why staff should be attracted to chronic work while shortage exists elsewhere. Even assistant nurses are being made welcome now in acute hospitals and in industry, with the result that many chronic hospitals have to rely more and more on their ward orderlies. Thus the domestic worker finds herself assisting the nurse in ways which make both parties wonder where the distinction lies. When the non-resident orderly does not come to work, the acute situation is heroically handled and remains unrecorded. It seems inevitable that, for some time to come, most chronic patients in hospital will need to be attended by inadequate numbers of assistant nurses aided by ward orderlies, and that those hospitals which have a satisfactory proportion of fully trained staff will be regarded as extremely fortunate. The cure for such conditions is outside the scope of any single authority, but provision of training for assistant nurses at all suitable hospitals, with allocation of teaching duties to ward sisters, should to some extent arouse interests at present absent. Lectures on simple medical and nursing psychology and demonstrations of occupational therapy should be included in the training of assistant nurses. In work for the chronic sick the usual objections to the three-shift system for nurses do not apply; so where this is desired by the staff (and the staff are available) it should be in operation.

SOCIAL DEFECTS

Blindness.—Patients are often greatly assisted by being placed beside others who are willing to act as eyes by reading to them and by commenting on the events of the day. Such virtue is not without reward, and the team-work is of value to the ward morale.

Deafness.—In the absence of an effective hearing-aid this is perhaps the most awkward problem. Its serious effect on mental health is illustrated by the fact that of the paranoid personalities a third were deaf.

Incontinence.—It is customary to nurse these cases together in so-called "changing" wards, where regular attention is given with the minimum disturbance to other patients. Since such incontinence is accompanied by, or the result of, dementia, this arrangement is usually acceptable; but it is essential to see that here also the mental state of the patient justifies inclusion in a special ward.

Postencephalitic Disabilities.—The unsightliness and dysarthria associated with many of these conditions justify some segregation. Total segregation, however, leads to injustice, as the conversational powers of so many are so limited that the less severely affected are unduly penalised. The feeding process is so slow that the nursing time-table in such wards is difficult to maintain.

Epileptics are often so quarrelsome and self-righteous that some separate accommodation is required with a separate day-room. Exceptions will be made when fits are infrequent and personality traits acceptable. Dietetic and medicinal therapeutic measures are facilitated by segregation of the group.

FATAL ILLNESSES

The admission of a cancer patient does not demand any special procedure, as many such patients for many months or even years enjoy the company of other patients. The presence of pain or any other unrelieved symptoms, however, deserves the provision of separate and quiet accommodation.

VOLUNTARY HELP

Here above all is a field relatively little explored wherein the voluntary worker can find inexhaustible outlet for energy with satisfying reward. The Red Cross Library workers are greatly appreciated. Concert parties who visit the wards of immobile patients in small groups are popular. (The voluntary society at one of our hospitals has provided a portable stage for the day-room and supplies monthly concert parties which are attended by up- and-chair-patients and relayed round the wards through the loudspeakers.) Film shows are also practicable and welcomed. Such services as letter-writing and reading can be provided for some patients, as shortage of staff makes it difficult for nurses to perform this service, which they cheerfully do in better circumstances. The patients' own relations and friends are usually loyal helpers, and they should be admitted to the wards as much as possible.

REHABILITATION, CHRONIC SICKNESS, AND THE FUTURE

Rehabilitation means essentially the prevention of chronic sickness, though it is not generally thought of in association with the type of invalid found in these hospitals. An examination of the physical conditions responsible for the presence of these patients in hospital does not suggest that many of their ultimate states could have been prevented under present conditions. When admission to a chronic-sick ward is granted, the aims of rehabilitation must be modified. Patients without gross lesions can, with help and encouragement, be prevented from becoming bedridden, and their mental faculties can be stimulated and maintained by talking, reading, radio, occupational diversions, concerts, and visitors. In these cases the aim is not always recovery but to make the patient fit to live outside hospital, either at home with some domestic help or in a hostel or home for similar people. Younger incurable patients are often more handicapped physically than older ones—e.g., some of the disseminated sclerosis and post-encephalitis groups—but a few remain who may regain connexion with the outer world by the use of some simple crafts which may bring them some remuneration.

The chronic rheumatic conditions and the effects of chronic bronchitis are two groups which might be reduced to some extent. Methods of attack on the chronic rheumatic diseases are suggested by the Medical Advisory Committee (Scotland) (1945) which recommends that there should be more hospital beds for articular rheumatism, with peripheral clinics at which specialist personnel would advise and supervise treatment. Such a scheme would ensure that admission to a chronic-sick bed was not the result of inaccessibility of expert advice and supervision.

Chronic bronchitis and its complications are at least theoretically preventable and might be largely reduced by proper rehabilitation after recovery from acute chest infections. Rehabilitation might be described as "supervised convalescence in suitable surroundings," an item which the average man is denied. For most of those about to leave hospital it is very hard even to find a place in a convalescent home. Hence the convalescence is spent in the unsatisfactory environment of the patient's home and street, and he often returns to work before health is regained. The provision of convalescent and rehabilitation accommodation within reasonable distance of the town is a necessity for each acute unit—medical or surgical. It would help to reduce the incidence of subclinical ill health which allows chronic catarrhal states to develop.

If the present chronic sick were subdivided into long-term cases and incurable, and separate accommodation were provided for the two groups, we could concentrate our knowledge and services for the benefit of those whose outlook may be doubtful.

Services such as those described above would fulfil the needs of the incurable group. The long-term cases require to be amalgamated with the ordinary convalescents and provided with a greatly extended rehabilitation service, which might include vocational training for those who need a new rôle in life. A subcommittee of the medical faculty of Leeds General Infirmary have suggested the provision of a rehabilitation village where long-term cases of all the specialties could be housed. Educational services for children, workshops for adults, occupational and physiotherapy departments, community social centres, houses, flats, and hostels for staff, and administrative offices would all be required, besides the hospital and hostel for patients. Such a scheme illustrates the extent of our needs if chronic illness is to be reduced to a minimum.

The study of diseases of the aged would be greatly assisted if, as suggested by Warren (1946), the "geriatric specialty" was developed in this country to the same extent as the pædiatric, to which it is analogous. There is already in our chronic-sick wards and hospitals a large nucleus which, if organised with appropriate acute and outpatients' departments added, might develop into one of the most important services of the future.

Summary

A survey was made of 788 cases in the chronic-sick wards of five hospitals.

The outstanding social aspects were the advanced age of most of the patients, the high proportion of widowed and single people, and the presence of many recovered cases.

Physically, lesions of the central nervous system, senile weakness, arthritis, and chronic bronchitis were the most numerous conditions.

Mental disorder was found in 294 (37·3%). In the great majority of cases this was the result of organic brain disease, though most of the common mental disorders were found.

The classification of chronic-sick patients is discussed, and some problems of medical administration connected with the accommodation of these patients in hospital are mentioned. Suggestions are made about the possibility of preventing some of the conditions, and the reorganisation required to this end.

I have to thank Prof. J. Johnstone Jervis, medical officer of health, City of Leeds, for helpful advice and criticism and permission to publish this paper; and Dr. Wm. McIntosh, medical director of hospitals, City of Leeds, for enabling me to study the cases under his care.

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TREATMENT OF ANURIA FOLLOWING INTRAVASCULAR HÆMOLYSIS

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LATE LIEUT.-COLONEL R.A.M.C.

ANURIA following extensive post-transfusion hæmolysis has a mortality greater than 50%. Treatment in the past has for the most part been empirical. Administration of alkalis, to prevent the blocking of tubules with acid hæmatin, has not proved of great value in preventing the onset of anuria, and decapsulation of one or both kidneys has not been generally accepted as a rational alternative to conservative treatment.

The case described here* is that of a soldier who appeared to be dying of extreme oliguria and uræmia following a massive hæmolysis after transfusion. Peters (1945) considered this condition to be the result of raised intrarenal tension, and summed up the position by stating that "both kidneys should be decapsulated as soon as the syndrome can be established by the presence of oliguria or anuria and azotæmia." Under the influence of this dogmatic statement one kidney was decapsulated —the other being left owing to the unique operative difficulties—and an immediate diuresis ensued with the eventual recovery of the patient. Urinary and blood findings were followed during the period of recovery.

A healthy, obese, thickset English soldier fell from a window in November, 1945, and sustained a fractured femur. After some ten weeks he was transferred to the orthopædic unit of a general hospital.

The femur was plated by Lieut.-Colonel W. Parke on the afternoon of Jan. 26. There was considerable hæmorrhage and 2 pints of group-O citrated blood, followed by glucose saline, was transfused while the patient was still under anæsthesia. His condition on return to the ward was poor; he vomited several times, was restless, and the pulse was rapid and of poor volume.

Early next morning he was shivering and febrile, and later conjunctival icterus was observed. Before midday he passed some 20 oz. of reddish urine containing blood pigment and some red cells. No further urine was passed on that day or the next, but, though fever continued, his general condition improved. Hæmolysis and anuria following transfusion was diagnosed. The hæmoglobin was 63% on the fourth day after operation, and differential agglutination revealed that more than 90% of transfused red cells had been hæmolysed. Both donors were regrouped and found to be group O, and direct matching with the recipient's serum showed no evidence of incompatibility. There had been no previous transfusions, and the only explanation of the hæmolysis seemed to be that the blood had been stored two weeks in a citrate anticoagulant solution not containing glucose.

Until decapsulation six days later there was almost complete anuria and a rising blood-urea level. On the second day no urine was obtained, and subsequently about 3 oz. was removed daily by catheterisation. The urine was at first faintly red and contained red cells; it gradually changed to brown and contained free bile, and later became amber. There was constantly a fairly heavy cloud of albumin, but no casts were seen.

Associated with anuria there was evidence of transient liver damage; the liver became enlarged and tender, jaundice developed, and the serum van den Bergh reaction was direct immediate positive. This appeared to have subsided by the sixth day.

The blood-urea level was already 225 mg. per 100 c.cm. on the third day after transfusion and thereafter continued to rise steeply. Fundal changes were absent and the blood-pressure was 150 mm. Hg systolic and 110–115 diastolic, remaining constant throughout his illness. The patient's general condition remained good; he felt comparatively well, his tongue was moist, and he was alert and talkative; there were no gastro-intestinal symptoms other than constipation, and his appetite remained excellent.

Medical treatment to induce diuresis was instituted as soon as hæmolysis was diagnosed. The daily fluid intake from all sources was restricted to about 1½ litres, and glucose saline with added alkalis and sodium sulphate was infused; these measures were without effect on the urine output.

On the sixth day, though there was little deterioration in the general condition, catheterisation again yielded barely 3 oz. of urine, and the blood-urea level had risen to 380 mg. per 100 c.cm. (see table I and figure). Decapsulation of the right kidney was performed under spinal anæsthesia by Lieut.-Colonel W. Parke.

The patient's physique and obesity and a waist-high spica plaster made delivery of the kidney almost impossible. It appeared normal in size but was dull purple, and on incision the capsule gaped, exposing the cortex, which was also dark purple and congested. Reflection of the capsule was easy, and each half was stripped over the upper and lower poles and pushed round to the hilum without being excised. The wound was closed, and, as oozing from muscles was free and difficult to control, a rubber drain was left in situ.

During the operation the patient appeared fairly comfortable. There was a fall in blood-pressure to 95/55 mm. Hg, presumably in part due to spinal anæsthesia, but pulse and general condition gave no cause for anxiety. He spent a fairly comfortable night, and next morning, though in some pain, appeared little affected by his operation.

Some fourteen hours after the patient's return from the theatre he passed urine voluntarily for the first time, and by the end of the first twenty-four hours 13½ oz. had been

TABLE I—FINDINGS IN BLOOD AND URINE

Date	Fluid intake (oz.)	Urine					Blood		
		Output (oz.)	Sp. gr.	Albumin	Deposit	Urea (mg./100 c.cm.)	Urea (mg./100 c.cm.)	Hb (%)	Blood-pressure (mm. Hg)
Jan. 27	18	20	..	..	..	..	..	..	..
„ 28	24	0	..	+++	Few red cells	..	..	64	..
„ 29	42	1	..	..	..	..	225	..	..
„ 30	24	3½	..	..	..	..	260	63	150/115
„ 31	38	3	..	..	Red cells; no casts	..	305	..	160/112
Feb. 1	22	3	..	+++	..	..	380	..	155/105
„ 2	30	13½	1·010	..	Red cells, few casts	..	400	..	..
„ 3	38	17½	..	..	..	510	405	..	..
„ 4	35	28	1·010	..	..	..	430	..	..
„ 5	39	21	..	..	Few red cells	850	..	..	160/110
„ 6	29	34	1·012	++	..	..	510	..	..
„ 7	46	68	..	..	..	1000	530	..	..
„ 8	75	47	1·012	++	..	1200	..	30	..
„ 9	91	72	..	+	..	..	..	22	170/108
„ 10	102	102	..	..	..	1450	..	..	..
„ 11	54	74	..	..	..	..	..	40	..
„ 12	43	48	..	..	..	1700	320	62	180/115
„ 15	70	65	..	..	..	1600	126	..	..
„ 16	65	54	1·020	..	Few red cells	..	..	..	..
„ 17	78	56	..	..	..	1250	72	..	160/112
„ 22	..	..	..	..	..	..	50	..	..

Transfusion hæmolysis took place on Jan. 26.
Decapsulation was performed on Feb. 1.
Transfusions were given on Feb. 10 and 11.

TABLE II—SPONTANEOUS DIURESIS THIRTEEN DAYS AFTER HÆMOLYSIS

Day after transfusion	Urine		Blood-urea (mg./100 c.cm.)
	Output (oz.)	Urea (mg./100 c.cm.)	
10	1½	..	..
12	0	..	..
13	13½	..	340
14	44	730	360
15	59	640	380
16	101	850	368
17	106	1060	360
18	96	1200	385
19	31	..	400
20	38	..	360
21	48	1460	380
25	48	1740	310
29	..	..	232
53	..	..	40

High spinal anæsthesia given on evening of 15th day.
Fibrillation and heart-failure on evening of 18th day.

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* The case was reported by Lieut.-Colonel W. Parke in a letter in THE LANCET, 1946, ii, 847.

passed. Diuresis was thereafter satisfactory and reached a maximum of 102 oz. in twenty-four hours on the ninth day, after which it gradually subsided.

The patient's general condition was not, however, immediately improved by the operation. Specific gravity of the urine remained at 1·010 for many days, and during the first four days after decapsulation the concentration of urea in the urine remained very little higher than that in the blood. The blood-urea level, though it ceased to increase so rapidly, continued to rise daily, and six days later 530 mg. per 100 c.cm. was recorded.

At this stage and for the next few days the clinical picture was complicated by an increasing anæmia as a result of oozing from the renal wound. A week after decapsulation, with sighing respiration, hiccough, a thickly coated tongue, and a return of conjunctival icterus, he was more seriously ill than at any time previously.

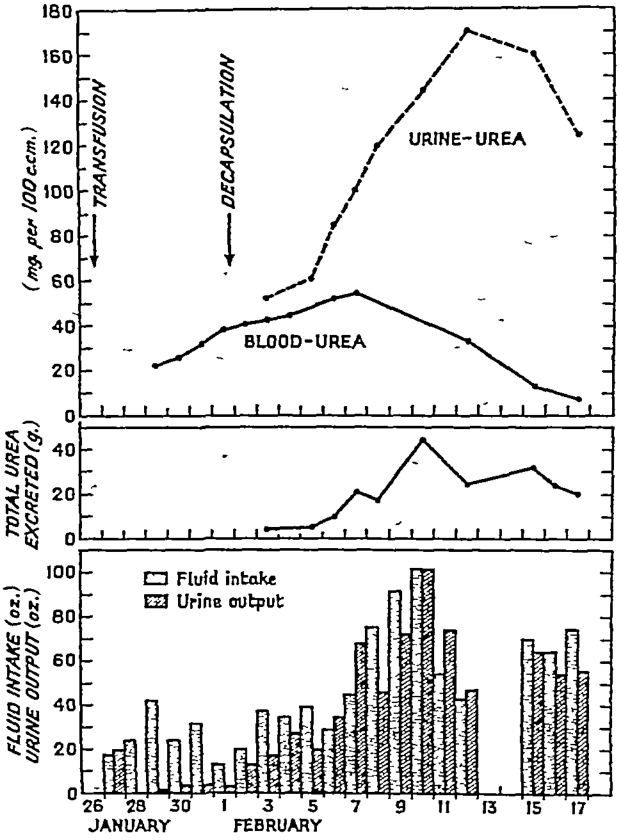
With a large urinary output, however, and as urine-urea concentration rose, the blood-urea level began to fall, and eventually did so as rapidly as it had risen. After a large transfusion with freshly drawn matched blood there was a further big improvement, and from this time on the patient made an uninterrupted recovery.

Ten days after decapsulation the blood-urea level had fallen to 320 mg. per 100 c.cm., and a week later to 70 mg. per 100 c.cm. On the twenty-third day after the initial operation, and seventeen days after decapsulation, he was repatriated to the U.K., thus making a final check on renal efficiency impossible.

The various findings during these twenty-three days, and including the fluid intake, urinary output, and urine-urea and blood-urea levels are shown in table I and the accompanying figure.

DISCUSSION

The patient had a severe intravascular hæmolysis following transfusion. Hæmolysis was followed by an almost complete anuria, and its usual sequel of progressive nitrogen retention but normal blood-pressure. Decapsulation of one kidney under spinal anæsthesia was followed by an immediate diuresis, which reached a maximum in ten days, and by a more gradual return to normal of urine and blood-urea level and by eventual recovery of the patient.



Fluid intake and output and urea findings.

TABLE III—RESULTS OF DECAPSULATION

Authors	Days after transfusion	Amount of urine before decapsulation (oz. daily)	Unilateral or bilateral	Amount of urine after decapsulation	Result
Bancroft (1925)	9	1–6	Bilateral	$9\frac{1}{2}$ oz. on 1st day, increasing daily to 50 oz. on 5th day	Good
Younge (1936)	5	2–3	Unilateral	8 oz. on 1st day; big excretion from wound for 5 days *	,,
Ravich (1941)	7	0–3	,,	12, 47, and 166 oz. in first 3 days	,,
Talbott (1942)	4	Anuria	,,	Flow established from both kidneys within 24 hours	,,
Flo and Cummings (1943)	9	2–3	,,	7, 20, and 10 oz. in first 3 days; incontinent 3rd day	,,
Lyons and Raines (1945)	3	2–3	,,	3, 12, and 71 oz. in first 3 days	,,
Beraud (cited by Bancroft 1925)	6	Complete anuria	,,	Flow established in 12 hours	Died 2nd day
Present case	6	$0–3\frac{1}{2}$	,,	13, $17\frac{1}{2}$, and 28 oz. in first 3 days	Good

* This patient lost large quantities (about 1000 c.cm.) of fluid, "almost indistinguishable from urine," from the renal wound for five days after decapsulation.

The efficacy and the mode of action of decapsulation will be discussed later. If, for the moment, it is assumed that diuresis and recovery were not fortuitous but the results of the operation, the important issue is immediately raised of how soon after the establishment of anuria should operation be performed. Table I and the figure show that, though a satisfactory diuresis followed immediately, there was neither an immediate return of renal function, as shown by the urine-urea concentration, nor a rapid improvement in the uræmia, as judged by the clinical condition and the blood-urea level. The urine-urea level was, for several days, little higher than the blood-urea level, which rose from 380 to 530 mg. per 100 c.cm. by the sixth day after operation.

These findings in blood and urine were closely paralleled in a second case in which, after post-transfusion hæmolysis, twelve days' almost complete anuria terminated in spontaneous diuresis. The relevant data, summarised in table II, show that, four days after diuresis set in, the urine-urea concentration was still only 850 mg. per 100 c.cm., whereas the blood-urea level remained at 360–370 mg. per 100 c.cm., a concentration of only just over double, instead of about 50 to 100 times. This patient developed a toxic fibrillation and heart-failure, which led to a temporary check in the flow of urine, but, significantly, did not prevent a continued improvement in the concentrating power of the kidney.

It appears that, though diuresis was satisfactorily established, in one case apparently as the result of surgical interference and in the other spontaneously, the urine was, for a few days, little more than a glomerular filtrate undergoing little concentration in the tubules. This is not surprising. The products of hæmolysis are toxic, and as they pass down, and are concentrated in, the tubules they produce damage which, though reversible, is undoubtedly extensive. The findings suggest that tubular damage will not be repaired until anuria is relieved and the cellular debris, acid hæmatin, and other toxic products are washed away by the resulting diuresis. It follows that, if decapsulation or any other form of interference can be shown to be effective in producing diuresis, it should be done early—as soon as *anuria is established. Though diuresis may be immediate* and profuse, the concentrating power of the kidney recovers more slowly, and improvement in the patient's condition will be delayed for some days.

But is decapsulation effective? And if so, how does it initiate diuresis? The operation has, in the past, been used in the treatment of various anuric conditions. It is comparatively simple and of little danger to the patient compared with continued anuria. The whole subject was well reviewed by Abeshouse (1945), who held that it was effective in the anuria following mismatched transfusion. Despite considerable interest in the operation over a number of years, and much intensive study of the renal lesions in this and allied conditions during the war years, reported cases of anuria following transfusion treated either conservatively or by operation are curiously few. Of 46 patients treated conservatively, 31 (67%) died :

Authors	*No. of cases*	*No. of deaths*
Bordley (1931)	16	11
Bordley (1931) (additional cases)	10	10
Daniels et al. (1941)	13	7
Goldring and Graef (1936)	7	3
Totals	46	31

Of 8 patients (including the present case) who underwent decapsulation 7 recovered (table III). Though the figures are too small for statistically significant conclusions to be drawn, they suggest that decapsulation does in some way lead to diuresis, and the impression is greatly strengthened by the uniform rapidity of its onset in every case, including the patient who died two days later.

Another significant point regarding the mode of action of decapsulation is that a good result appeared to follow operation on only one kidney in 7 of the 8 cases in table III. What little evidence is available suggests, moreover, that both kidneys recover their function though only one is decapsulated. After unilateral decapsulation for transfusion anuria, for instance, Lyons and Raines (1946) found normal phenolsulphonphthalein excretion (23% in half an hour from each kidney) twenty-six days later. Talbott (1942) performed unilateral decapsulation on the fourth day of oliguria and inserted ureteric catheters, collecting the urine from each kidney. There was good urinary flow, equal on the two sides, within twenty-four hours, and no striking difference in the renal efficiency on the two sides a fortnight later.

Talbott interpreted this result as implying that "unilateral decapsulation in this patient had no beneficial action on renal function." This does not necessarily follow, and the rapid recovery of renal function in both kidneys after one-sided decapsulation is a factor, were it established, that needs considering not only in explaining the good effects of the operation but also, by implication, in the elucidation of the ætiology of the anuria. Peters (1945) rejects plugging of the lumen of the tubules as sufficient explanation, and favours a mechanically raised intrarenal pressure produced by gross tubular damage and interstitial œdema. He demonstrates with an ingenious mechanical kidney that increased pressure, such as might be expected, will lead to a cessation of flow, and that lowering of tension to the extent that might be achieved by decapsulation can reinstate the flow, through his nephron. The theory is reasonable, and he naturally concludes that relief of intrarenal pressure by bilateral decapsulation will give the best results. Abeshouse (1945), on the other hand, discards tissue trauma, release of proteins from damaged muscles, drainage of subcapsular toxins, and other incidentals to operation, and considers, as do Lyons and Raines (1945), that removal of sympathetic tonic nerve-fibres reaching the kidney through the capsule, rather than relief of tension, is the most probable explanation *of the resulting diuresis.*

If the apparent success of decapsulation is due to removal of sympathetic tonic nerve impulses, is the resulting diuresis due, wholly or in part, not to the operation itself but to the high spinal anæsthesia usually employed; and would not spinal anæsthesia alone, or perhaps sympathetic nerve block, achieve the required result? The sympathetic nerves reach the kidney from the last two thoracic and first lumbar segments via the splanchnic nerves and the semilunar ganglion to the renal plexus. They influence renal secretion through their vasomotor action, stimulation producing diminished urinary output, and removal or paralysis causing polyuria. Neuwirt (1922) reported a case of reflex anuria due to very severe left-sided renal colic, in which bilateral splanchnic anæsthesia was followed by diuresis within a few hours. He considered this method preferable to spinal anæsthesia, because lowering of the blood-pressure was avoided. In the second case referred to in the present paper high spinal anæsthesia, induced on the day indicated in table II, was followed by an increase in urine from 59 to 101 oz. next day. Spontaneous diuresis was, however, already *in progress and could* well have been responsible for such a rise.

Peters (1942) appears to have described the first case in which splanchnic block was deliberately used in the treatment of anuria following hæmolysis. His patient, a Rh-negative subject, had complete anuria for ten days. Within five hours of bilateral block 700 c.cm. of urine was passed, and soon 1500–6000 c.cm. was being passed daily; recovery was complete. Since this article was written O'Sullivan and Spitzer (1946) have recorded a second case. Reporting a series of cases of acute renal failure complicating abortion, they describe two in which dramatic response followed bilateral splanchnic block. In one the anuria followed extensive hæmolysis after the last of several transfusions in a Rh-negative subject. In the second, a case of anuria complicating abortion, probably an essentially similar condition, in the treatment of which they consider decapsulation has no place, the patient also recovered, though only after a second splanchnic block done a few days after the first.

During the last few years it has become generally recognised that a similar pathology underlies the anuria developing in various conditions—e.g., crush syndrome, cortical necrosis in pregnancy and abortion, and sudden extensive intravascular hæmolysis from whatever cause. Recently evidence has been accumulating that in these conditions a redistribution of blood-flow within the kidney takes place, and that a closing down of the circulation through the cortex and its glomeruli gives rise to anuria, and, if sufficiently complete, cortical necrosis. This *condition of affairs Maegraith and Havard* (1946) have called renal anoxia. This conception has been vindicated by the important preliminary communication published by Trueta et al. (1946), wherein they claim that they have evidence, in animals, of the existence, via vasa recta and medullary blood channels, of an alternative route for blood passing through the kidney. They have demonstrated, radiologically and by direct inspection, a shunt of blood from the cortical to the medullary circulation as a result of various peripheral and central stimuli. They suggest that the lesion in "many loosely related syndromes—e.g., sulpha-kidney, incompatible transfusion kidney, Weil's disease, and some forms of nephritis—is the result of a defence device by which the cortex of the kidney is excluded from the circulating toxin or ther noxious agent, and thus protected. Too prolonged peration of this device may result in permanent lamage."

If this mechanism is under the control of the sympahetic nervous system, it is easy to see how the process nay be reversed by blocking the sympathetic. If this vere done soon after the onset of anuria, flow of blood hrough the glomeruli would be re-established, so preventing further cortical damage and also leading to liuresis and a more prompt elimination of toxic agents in he tubules. There is sufficient evidence to justify further rials of this comparatively trivial procedure in the reatment of all these allied types of anuria.

SUMMARY

A case of post-transfusion anuria is described in which lecapsulation was followed by immediate satisfactory liuresis and eventual recovery. Improvement in urea oncentration by the kidney and in the uræmic condition f the patient was delayed several days. Probably such mprovement cannot take place until diuresis sets in. t follows that, where decapsulation or other operative rocedure is contemplated, it should be undertaken arly.

The mortality in reported cases treated conservatively vas over 65%, whereas 7 of 8 patients recovered in whom lecapsulation was performed. Moreover diuresis invaribly followed within 12–24 hours, suggesting that coincilence is not an adequate explanation of their recovery.

Unilateral decapsulation appears to be sufficient and s probably followed by diuresis and eventual recovery n both kidneys.

Rapid diuresis but slow recovery of the concentrating ower of the kidney suggests that anuria and tubular lamage have a separate ætiology. Tubular damage is ustained as the toxic products of hæmolysis pass down nd are concentrated in the tubules. Raised intrarenal ension possibly plays its part in the production of anuria, ut a more satisfactory explanation is that it is reflex n origin, and that decapsulation is effective by removing ympathetic nerve impulses. Recent work has suggested ow such a reflex anuria may operate.

The spinal anæsthesia used in the operation of decapulation may be a factor in initiating diuresis.

Splanchnic block would be a more satisfactory method nd has been used with success in reflex anuria and in ransfusion kidney. The procedure is simple and deserves urther trial.

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"A phrase which seems to have arisen during the war is he radiologist's stock report: 'No osseous lesion detected.' hree of the words here are 'boss words,' and apparently referred in the way that Pinkerton preferred 'hebdomadary' o 'weekly.' 'Osseous'! Why not 'bony'? 'Lesion' is a ord slowly making its way into medical English as a general tility word for 'fracture, wound, disease, congenital deformity.' For 'injury' it is right enough; '*lædo*,' the Latin oot, means 'I hurt'; by a stretch it may include disease, but cannot see it fairly used in any other sense. And 'detected': he radiologist does not detect; Mr. Holmes did that. . . ."
—Dr. S. F. McDONALD, *Med. J. Aust.* 1946, ii, 701.

PALPABLE EPITROCHLEAR GLANDS

INCIDENCE AND RELATION TO SYPHILIS

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THE epitrochlear lymph-glands are seldom palpated as a routine in clinical examination but are more often sought for in special cases when their enlargement is expected. This practice has tended to establish a belief that all palpable epitrochlear glands are abnormal, because their normal limits of size and frequency of occurrence are not generally appreciated. There is, in particular, a common belief that their enlargement is suggestive of syphilis in the stage of general adenitis which precedes secondary skin eruptions. The origin of this sinister association, which still survives in some modern textbooks, is both ancient and dubious.

Richard Wiseman (1696) observed the epitrochlear glands in "King's evill" and believed that they were not "naturally born with us . . . but . . . arise upon the occasion of this disease," and their omission from writings of contemporary anatomists such as Salmon (1714) and Cheselden (1722) suggests that they were then unrecognised as normal structures.

Enlargement of the epitrochlear gland in primary syphilis when associated with a digital chancre aroused the curiosity of John Hunter (1810), who commented on one case in which epitrochlear adenitis had developed instead of an axillary bubo, and on another in which both epitrochlear and axillary glands were enlarged.

The belief that enlarged epitrochlear glands have a special diagnostic significance in syphilis at the pre-eruptive stage of adenitis is of obscure origin, and the literature contains conflicting opinions. Zeisler (1894) cited Sigmund as attaching particular significance to them at this stage, and Gruenfeld as having found them "without exception at certain periods of the disease." Hinton (1936) wrongly attributed to Fournier the opinion that enlarged epitrochlear glands were almost pathognomonic of tertiary syphilis. Fournier (1873) had, in fact, especially emphasised the rarity of their enlargement in the stage of general adenitis, insisted that their diagnostic significance had been grossly exaggerated, and fiercely reviled physicians who sought for non-existent glandular enlargement in the tertiary stage.

Lancereaux (1868) included the epitrochlear glands among those more rarely affected in the stage of general adenitis, whereas Ricord (1851) and Sir Jonathan Hutchinson (1909) did not mention them.

There is thus scanty support for a diagnostic significance of enlarged epitrochlear glands in syphilis from some of the greatest authorities, who in the pre-arsenical era probably saw more of the progressing disease than do most physicians living today.

PRESENT SURVEY

Palpable epitrochlear glands were so commonly observed in soldiers during the late war that I made a survey to define their normal limits of size and their incidence in adult males.

Of the 200 soldiers who were first examined, none had any disease which might cause a general adenitis or isolated enlargement of the epitrochlear glands. None were included who gave a history of "desert sores" on the hands or arms or who showed recent manual abrasions. Most had been referred for chest investigation, dyspepsia, fibrositis, sciatic pain, or urinary symptoms. It was not practicable to have a Wassermann reaction done in every case, but there was no evidence of syphilis in any.

The best method of detecting epitrochlear glands is to flex the patient's elbow to 90° and to palpate above the medial epicondyle of the humerus with a circular movement of the finger-tips. The glands can thus be rolled between the fingers and the lower end of the humeral shaft. It is more difficult to detect them in fat subjects than in thin.

TABLE I—EPITROCHLEAR GLANDS IN SOLDIERS

Age group (years)	No. of cases	Palpable glands			
		Bilateral	Right only	Left only	Total
16–20 ..	12	2	1	1	4 (33·3%)
21–25 ..	43	10	8	3	21 (48·8%)
26–30 ..	46	12	5	5	22 (47·8%)
31–35 ..	46	17	4	1	22 (47·8%)
36–40 ..	36	8	4	0	12 (33·3%)
41–45 ..	14	2	1	0	3 (21·4%)
46–50 ..	3	0	0	0	0 0
Total ..	200	51	23	10	84 (42·0%)

Table I shows that epitrochlear glands were palpable in 42% of 200 soldiers, with a remarkably constant frequency between the ages of twenty-one and thirty-five. In 17 cases one or both glands exceeded the size of a cherry-stone, and in 33 they were unilateral.

It seemed possible that some special factor in soldiers, such as repeated hand abrasions on the weapons and machinery of modern warfare, might have predisposed to minor infections and so increased the frequency with which epitrochlear glands were palpable. A control series of civilians not engaged in manual work would therefore have been desirable, but this presented obvious difficulties. Male civilians of military age were then in factory, agricultural, or transport work, which entailed equal opportunities of manual abrasions with military service, and few suitable hospital patients who were not so engaged were available. Nevertheless 100 civilian males, including hospital patients, healthy doctors, and laboratory-workers, were examined.

Table II shows that epitrochlear glands were palpable in 39% of 100 civilian males. In 3 cases they exceeded the size of cherry-stones, and in 16 they were unilateral.

TABLE II—EPITROCHLEAR GLANDS IN CIVILIANS

Age-group (years)	No. of cases	Palpable glands			
		Bilateral	Right only	Left only	Total
16–20 ..	10	3	0	1	4 (40·0%)
21–25 ..	13	4	1	1	6 (46·1%)
26–30 ..	16	3	2	1	6 (37·5%)
31–35 ..	19	6	4	3	13 (68·4%)
36–40 ..	15	2	0	1	3 (20·0%)
41–45 .	19	3	0	1	4 (21·0%)
46–50 ..	8	2	0	1	3 (37·5%)
Total ..	100	23	7	9	39 (39·0%)

There was no significant difference in their incidence between manual and non-manual workers.

It seems, then, that epitrochlear glands are palpable in about 40% of males between the ages of sixteen and fifty, whether soldiers or civilians. In the combined series of 200 soldiers and 100 civilians 197 epitrochlear glands were palpable, of which 28 (14·2%) exceeded the size of a cherry-stone. These findings indicate the need for caution in declaring a palpable epitrochlear gland to be abnormal or enlarged.

It is not denied that enlarged epitrochlear glands may be part of a syphilitic adenitis, but there is no reason for attaching a diagnostic significance to them, for they are often enlarged in other adenopathies, such as those of leukæmia, glandular fever, Hodgkin's disease, and tuberculosis. The present survey suggests that no epitrochlear gland smaller than a cherry-stone can safely be regarded as abnormal. Apart from the criterion of size, other factors, such as tenderness, the degree of mobility, and consistence of the gland, must be taken into account before describing palpability or enlargement as pathological.

SUMMARY

A survey comprising 200 soldiers and 100 male civilians between the ages of sixteen and fifty showed that epitrochlear glands were palpable in about 40%.

Of the palpable epitrochlear glands, 14% exceeded the size of a cherry-stone.

Appreciation of these normal limits is essential before describing a palpable epitrochlear gland as enlarged or pathological.

There is no reliable evidence to support the belief that enlarged epitrochlear glands are more characteristic of syphilis than of other diseases which cause glandular enlargement.

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REVACCINATION IN ADULTS

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During 1945 civilians were recruited by Unrra to administer the camps then being set up in North-Western Europe for "displaced persons." On the assumption that the risk of infection would be high in these camps it was decided that every member of the staffs should be vaccinated against smallpox unless he, or she, possessed a certificate of vaccination less than a year old.

The result of the vaccination performed by us, and the length of time which had elapsed since previous vaccination, were recorded. The following notes are based on 1364 vaccinations for which complete records are available. All vaccinations and readings of results were carried out by one person under conditions standardised from experience gained during a series of 400–500 vaccinations not included in this report.

MATERIALS AND METHODS

The subjects were adults of all ages between 20 and 60 years. Records of age were not made, but the numbers were fairly evenly distributed among the different age-groups. The sexes also were about equally represented.

The histories of earlier vaccinations varied greatly: many of those with long residence abroad or service in the Armed Forces claimed to have been vaccinated on numerous occasions; nearly half had not been vaccinated since infancy; and about 10% had never been vaccinated.

Lymph was obtained in ampoules containing 25 or 50 doses fresh each week from the Government Lymph Establishment. Part of each batch was stored at 4° C until required; the remainder was heated at 65° C for 30 min. to destroy the virus and was used as a control for protein sensitivity. The first few batches of heated lymph were tested by intradermal inoculation into rabbits to ensure that the virus had been killed; later, the fact that normal lymph "took" in susceptible persons, whereas the heated did not, was accepted as proof of inactivation of the virus.

The heated and unheated lymphs were of the same batch at any one session, but many different batches were used throughout the whole series of vaccinations.

Technique of Vaccination.—The average number of persons vaccinated at one session was 40–50. The left arm was the site of election, but a few females insisted on vaccination on the thigh. The deltoid region was cleaned by gentle swabbing with a mixture of ether and methylated spirit, and dried with cotton-wool. One drop of heated and one drop of active lymph were placed some 2 in. apart on the cleaned area. An incision about $^1/_4$ in. long was made through the heated lymph with a scalpel, and the material was rubbed into the cut with the flat of the knife; with the same scalpel, the process was repeated with the active lymph. The arm was left bare until the lymph had dried. No dressing was applied.

Reading of Results.—Each vaccination was observed after 2 or 3 days and again on the 8th day. Reactions were graded according to the time taken for the maximum to be reached, no account being taken of relative severity. This follows the line suggested by Leake,[1] though it was not possible to make daily measurements of the area of erythema which his complete method involves.

The following types of reaction are recognised by the International Sanitary Convention, 1944:

Typical Primary Vaccinia.—Maximum between 8th and 12th days, indicates complete susceptibility.

Accelerated Reaction (vaccinoid).—Maximum between 4th and 7th days, indicates partial residual immunity.

Reaction of Immunity.—Maximum between 2nd and 3rd days, indicates complete residual immunity.

A positive control reaction was recorded when, at the site of insertion of heated lymph, the skin incision showed gaping edges and was surrounded by an area of erythema about 5 mm. or more in diameter. In the non-susceptible individual no erythema was normally visible and the incision was obviously healing.

A second vaccination was done on the 8th day in all cases showing "no reaction." Thereafter most of these patients were seen on a single further occasion only (3 days later), because they were posted overseas. The readings of the second vaccinations were therefore tentative and not final.

RESULTS OF REVACCINATION WITH CALF LYMPH AT VARIOUS INTERVALS AFTER PREVIOUS VACCINATION

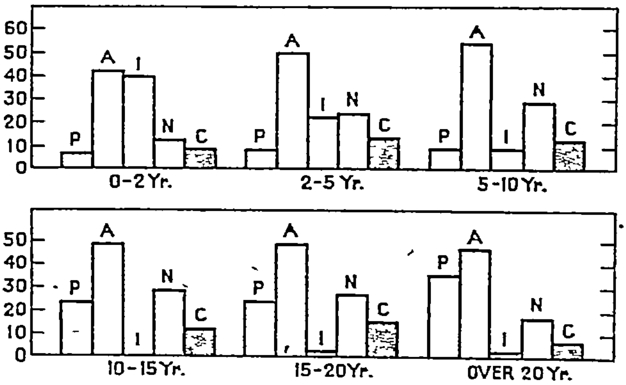
Years since last vaccination	Results					
	Primary	Accelerated	Immune	Nil	Total	Control reactions
0– 2	9	67	64	20	160	14
2– 5	15	97	40	43	195	25
5–10	8	48	8	25	89	10
10–15	16	34	0	20	70	8
15–20	25	54	3	30	112	16
> 20	213	284	4	100	601	37
Total ..	286	584	119	238	1227	110
Primary vaccinations	135	2	0	0	137	—

RESULTS

The results of these vaccinations are set out in the accompanying table, grouped according to the length of time which had elapsed since previous vaccination. In the accompanying figure the total in each group has been taken as 100 to facilitate comparison.

It will be seen that "control" reactions occur in all groups, and that the chance of such a reaction remains high for at least 20 years after vaccination. The relative number of primary vaccinias rises, and of immune reactions falls, with increase of the time interval. On the other hand, the proportion of accelerated reactions lies between 40% and 50% at all periods.

The table also includes the results obtained in 137 adults vaccinated for the first time. All these vaccinations "took" successfully. They formed a useful check on the technique and on the potency of the lymph because, by chance, two or more of these primary vaccinations were carried out at each session.



Percentage distribution of results of revaccination after various intervals: P, primary vaccinia; A, accelerated reaction; I, reaction of immunity; N, no result; C, positive reaction with heated lymph.

The results of second vaccinations are not shown because, as stated above, no final reading was made. It may be said, however, that of 201 second vaccinations 39 (20%) were considered as probable accelerated reactions when examined on the 3rd day, and the remaining 80% as again negative. It has been our experience that the beginning of an accelerated reaction can almost invariably be distinguished on the 3rd day; so these proportions are in all likelihood reasonably correct.

DISCUSSION

For practical purposes the occurrence of either an accelerated reaction or a primary vaccinia means that the vaccination has been "successful," but the differentiation into two types is of academic and epidemiological interest on the assumption that the former indicates partial immunity retained from previous vaccination and the latter shows complete susceptibility. In our experience the distinction can be made with confidence on the 8th day; an accelerated reaction is then obviously past the maximum and is beginning to form an eschar, whereas a primary vaccinia is just reaching the stage of pustulation.

The reaction of immunity, as a sign of complete protection resulting from previous vaccination, would be of great value if it could be recognised with certainty. This can be done when a papule surrounded by an area of erythema appears at the site of insertion of active lymph, and no reaction at all is caused by the heated material; such a result can be accepted as an immune reaction. Doubt must arise, however, when some reaction, though less in degree than that caused by the active lymph, is produced by heated lymph. It seems impossible to assess these cases by an objective standard, and it was our custom to take the past history into account. If the previous vaccination had been within 5 years and had left an obvious scar, the result was recorded as an immune reaction. After a longer interval, or if no scar was apparent, and in all cases of doubt, a second vaccination was performed. It is probable that this method erred on the side of safety because, as noted above, 80% of cases classed as "nil" on first vaccination showed no greater reaction 3 days after the second attempt.

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1. Leake, J. P. *Publ. Hlth Rep., Wash.* 1927, 42, 221.

The occurrence of about 5% of primary vaccinias in persons last vaccinated within 2 years was unexpected. Since, however, no scar related to that "vaccination" was ever observed, it seems likely that a non-specific reaction had been mistaken for a reaction of immunity. This was certainly the explanation in the case of a nurse who had been vaccinated, for the first time since infancy, a few months earlier, and had been certified immune. Feeling that the result was unlikely, she requested revaccination. After 3 days there was marked erythema round both active and heated lymph insertions, but a typical primary vaccinia developed later. This case also illustrates the lack of correlation between immunity and sensitivity to vaccine products, to which attention has often been drawn before.

The value of the immune reaction can thus be questioned for two reasons. First, the existence of persons who, without being immune to living virus, react to heated lymph in a manner which may closely simulate the reaction of immunity and may lead to mistaken readings. Secondly, the existence of others who are immune to vaccinia virus on the evidence of lack of response to repeated vaccinations but do not show a reaction of immunity.

There are grounds, therefore, for suggesting that some alteration in the international certificate of vaccination against smallpox would be advisable, because therein the reaction of immunity is accepted as valid, whereas no provision is made for lack of susceptibility—indeed it is stated "A certificate of no reaction will not be accepted." The method adopted by the British Army seems to offer a good alternative: the first vaccination is made by a single insertion and is examined a week later, no earlier observation being made. If a satisfactory "take" has not occurred, revaccination is carried out with three insertions; if again no reaction is obtained, "insusceptibility to vaccination" is recorded, and this certificate is valid for the same period as one of successful vaccination of the same date.

SUMMARY

A series of 1227 adult revaccinations against smallpox is described.

Details are given of the method of vaccination, including the insertion of killed virus as an indicator of sensitivity to vaccine lymph.

The results are grouped according to the type of response and the length of time since previous vaccination.

Sensitivity reactions are shown to develop at all intervals and to be unrelated to immunity.

It is suggested that these reactions lead on occasion to misinterpretation of the response to vaccination.

Attention is drawn to the lack of provision, in the international certificate of vaccination against smallpox, of a category to include persons who are insusceptible to vaccinia but do not show the reaction of immunity; an alternative method of certification is proposed.

"Some . . . benefit by taking only one meal a day . . . while others . . . make it a rule to take lunch as well as dinner. . . . For the one class, if they lunch though to do so is not beneficial to them, are at once heavy and sluggish in body and mind, being overcome with yawning, drowsiness and thirst, and if they go on to take dinner as well, they suffer from flatulence and colic, with violent diarrhœa. . . . On the other hand, if a man in the habit of taking lunch . . . refrain from doing so, he experiences at once . . . severe prostration, trembling and faintness. In addition, the eyes become hollow, the urine yellower and hotter, the mouth bitter, his bowels seeming to hang, with dizziness, depression and disinclination to exertion. Besides all this, when he tries to take dinner . . . this mere food, descending into the belly with colic and noise, burns it up; the patients sleep badly, with disturbed and troubled dreams."—From *Ancient Medicine* (ANON. ? 430–400 B.C.), translated by W. H. S. JONES (*Bull. Hist. Med.* suppl. no. 8: Philosophy and Medicine in Ancient Greece).

SEXUAL INVERSION

AN ETHICAL STUDY

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SEXUAL inversion is an attitude of mind in which the affections are turned toward members of the same sex. It is also called homosexuality (from the Greek *homos*, "same," as distinct from *heteros*, "other"; it is in no way connected with the Latin *homo*, "man"), and is properly considered only in relation to heterosexuality, in which the affections are turned towards members of the opposite sex.

Homosexuality does not necessarily imply any overt manifestation of physical sex. Lack of recognition of this fact is but one of many misconceptions that obscure clear thinking on this topic; there are many thousands of adults whose conduct is beyond reproach and who are useful and valuable members of their community, but whose interests lie exclusively with those of their own sex, and who with every propriety in the use of the word may be termed homosexual. The word itself bears, or should bear, no stigma of shame.

Heterosexuality also implies no connotation of physical sex, and may be correctly used to indicate a mixed group of males and females, such as a co-educational school, which is a heterosexual group, whereas the conventional public school may be described as a homosexual group. Popular prejudice, however, makes it unwise to use these terms in this way. As with a group, so also with the range of individual affections: the love of a mother for her son, of a brother for his sister, of husband and wife, are examples of heterosexual attitudes, whereas friendships between man and man, pupil and teacher, father and son, are all well-recognised types of homosexuality.

EVOLUTION OF AFFECTIONS

The growing child stands in an ambivalent attitude towards his parents, in which there are not only rapid alternations of love and hate, of laughter and tears, but also the closely interwoven strands of heterosexual and homosexual love, twin motifs which blend themselves into the pattern of subsequent love relationships. It is necessary to trace the normal course of both these strands as they change with the growing years.

The infant boy directs his affection toward the mother who feeds and tends him, and for the first five or six years his orientation is predominantly heterosexual. Sooner or later, however, there comes a change, and father comes into notice, at first merely as a source of supply and security, an ever present background to the little world of the nursery, but later in a more personal way as a friend and, if the home is happy, as a hero.

As the boy's interests spread, he chooses his heroes from other boys' fathers, from his school-teacher, his club-leader, or his scoutmaster, of whom unwittingly he makes father-substitutes; later his hierarchy is recruited from those nearer his own age, the athletes and elder boys of his circle, and the process reaches its climax in the period aptly termed by Furfey[1] "the gang age" of small-boydom, which is familiar to all parents who have watched their son pass through this trying stage. Mother, nurse, and sister have no place among the gods of the pre-adolescent, the group is all-in-all, and feminine influence disappears from his life: it is necessary that this should be so.

The attitude of this phase is exclusively homosexual; but, as the first age of friendship typically occupies the years of pre-adolescence, sexual manifestations on a physical or genital level are the exception, though some harmless sadism (which is not without its deeper significance) is not infrequent.

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[1] Furfey, P. H. The Gang Age. New York, 1926.

The break-up of the gang is brought about by the onset of puberty, which ushers in the critical period. Feminine influence demands readmission after its long exile, and from now onwards heterosexual development takes its normal course, starting with the first shy and clumsy calf-love, till the full circle of the generations enters its final phase. The boy, now approaching manhood, takes up a protective attitude toward a mate of the same sex as his mother who first gave protection to him. There has been brought about a complete reversal of heterosexual relationship, from the attitude of infantile dependence, taking all and giving nothing, to that of protective love.

This reversal of the stream of affection from the self to another is rendered possible only by the disappearance of the mother, and all who resemble her, during the long latent period between childhood and puberty. The homosexual phase, therefore, and the homosexual attitude, far from being a malign perversion of all that is natural, is no less essential than heterosexuality itself in the development of the adult personality.

THE CRITICAL STAGE

At the critical stage of passing from homosexuality to heterosexuality there commonly occurs a transient phenomenon in which a pure affection may be aroused by a younger boy, and not infrequently a real friendship may develop. To the elder partner in this romantic attachment there is afforded a most helpful link in the transition from group loyalty to heterosexual love, and he is given an opportunity to exercise on familiar ground the sense of protection and chivalry which soon must play an important part in his approach to the other sex, to which he is as yet a stranger. The youth is fortunate in his friendships who can pass smoothly from a girl-like boy to a boy-like girl during this decisive phase.

In some cases, however, this smooth passage is interrupted. If the circumstances of the boyish friendship are such as to invest it with an unusual degree of pleasure, if the elder boy has been starved of his normal quota of respect which is his due, or if his vanity has been fed by unwise influences at home, he may find that the element of hero-worship which characterises this type of companionship is so much to his liking that he is content to remain here. If, moreover, there are obstacles in the way of his further progress, such as a degree of adolescent gaucherie or a sense of inferiority which cripples his relations with girls of his own age and class, a deeply rooted fixation will arise at the level of homosexual friendship.

Undoubtedly the commonest cause of emotional blockage at this stage is the public-school system of education, in which boys are thrown together in circumstances that necessitate an artificial prolongation of the homosexual group of earlier years, which in a more natural environment should have suffered disintegration at or before the time when the impulses of physical desire make their appearance. The group is maintained in a condition of metastable equilibrium, and the spirit of the gang crystallises as loyalties which by their unreasoning intensity betray their complexive origin. But these youthful deviations are corrected with the onset of maturity, and there is no doubt that the capacity for leadership, and in particular for leadership of men, together with the sense of loyalty which characterise the British race are directly attributable to the boarding-school type of education which is so typical of this country. Sublimated homosexuality plays an immensely important part in the structure of society both at home and abroad, in every way comparable to the rôle of heterosexuality, which, as the foundation of family life, is acknowledged as the basis of our social system.

There remains, however, the problem of the individual who does not conform to type, and in whom the element of sexual desire has arisen to complicate his already grave psychological difficulties. Not infrequently it is the superior type of boy, who in the best sense of the word is an "individual," who finds himself unable to adapt himself to an unwonted distortion of emotional development. The endocrine system compels the inexorable changes of body and mind, and rather than stoop to masturbation—that most unnatural of vices because so entirely the product of an artificial civilisation[2]—the boy injects his adolescent ideals of physical beauty into the romantic friendship of the moment, and fixation at this level persists into the years of manhood. In less abnormal circumstances he would have withdrawn from the homosexual gang with the onset of puberty, and entered the age of romantic friendship before the appearance of physical desire, whose resurgence should coincide with the renewal of contacts with the opposite sex which furnish his natural phantasies with their material. If a youth is starved of this essential stimulus to sexual growth he will remain throughout his adult life at the sexual orientation of pre-adolescence, though having attained the bodily stature of maturity. The principal factor, therefore, in the onset of this condition is an external maladjustment of timing, operating on a fundamentally normal personality at a most critical phase of its development; there is no question, in the majority of cases of homosexuality, of endocrine dysfunction, the "female soul in a male body," still less of any streak of moral delinquency or inborn vice.

MEDICO-LEGAL ASPECTS

The clinical aspect of homosexuality which is most likely to obtrude itself on the notice of the general practitioner is in connexion with an alleged seduction of a young boy by a male invert. In many cases it is to the family doctor in the first instance that the harassed parents turn for advice, before taking the irrevocable step of reporting their suspicions to the police. There immediately arises a grave problem of responsibility, and it is no light matter to decide in which way a doctor may best discharge his duty when confronted with an issue of this nature. There is an acute dilemma at the highest ethical level.

It cannot be denied that the profession has obligations to society at large as well as to individual patients, but the controversy over the proposed State medical service has indicated in no equivocal manner that most doctors consider that their duty to the State is discharged most usefully through their duty to their patients who collectively form the State, rather than to a suprapersonal entity or abstraction to which individuality, their own no less than their patients', is subordinated.

Every doctor is entitled to act on the judgment of his own conscience, and in a matter such as this there can be no doubt that the first (but not the only) consideration is the welfare of the young boy who has been seduced, and whose best interests the family doctor has been called in to protect. This burden cannot wisely be discharged by passing it on to an unimaginative and uninstructed inspector, whose outlook has been conditioned by the conspiracy of silence for which the profession as a whole must take a major share of the blame. Such a step would inflict grave injury on the boy in question, who would perforce be subjected to the most sordid interrogation, and then be enmeshed in all the paraphernalia of criminal litigation. It would be along the path of least resistance, but also of least benefit to everyone concerned, least of all to the unfortunate boy whose interests the family doctor holds in trust as the one person who is in a position to give enlightened advice.

The emotional trauma suffered in the first instance by a boy who has been involved in a homosexual friendship is minimal, even when it is complicated by manifestations of physical sex.[3] Thousands of young boys at boarding school every year make some acquaintance with the problem, and among boys from other strata of society mutual masturbation and other sexual peccadilloes are of frequent occurrence during the years of puberty; they have in fact until quite recently formed one of the main channels—albeit undesirable—of sexual education among the masses. No attempt at exculpation is to be interpolated into these remarks, but a sense of proportion is necessary here.

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[2] Stanley Jones, D. *Brit. med. J.* 1940, ii, 206.

By far the most important factor touching the boy's inner psychology is completely and invariably overlooked—namely, that he has allowed himself, probably against his wishes, to be drawn into homosexual practices solely because of his attitude of hero-worship toward the man who has led him astray. His ideals in this respect are at far greater hazard to suffer damage than the natural course of his sexual growth, which has behind it the irresistible urge of the endocrine glands to restore him to the path of normality. His concept of manhood should descend in unbroken line through his successive father-substitutes, and for better or for worse it will have decisive influence not only on the tone of every detail of his adult behaviour but also on his whole approach to the wider issue of fatherhood. It is difficult to imagine a more certain way of inflicting irreparable damage on adolescent ideals than to drag through the mud of the magistrates' court, and later of the assizes, the unwholesome details of an intense friendship with which these ideals were inextricably bound, and which, however undesirable in the physical plane, was (unless the boy was utterly depraved) almost certainly not without another and less unpleasing side.

This aspect of sexual inversion may be unfamiliar to some; but, far from being revolutionary, it is merely a return to the commonplace beliefs of classical Greece, which in the opinion of many scholars contributed not a little to her greatness. This point of view was ultimately displaced by the Hebrew traditions of sexual severity that inform the patterns of morality in our western world.[4] The following quotation is from a book published in 1896 and now in its nineteenth edition[5]:

> "Personal affection was not the basis of married life; romance took a different form, that of passionate friendships between men. Such friendships among the Greeks were an institution. Their ideal was the development and education of the younger by the older man, and they were recognised and approved by custom and law as an important factor in the state.
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> "In Sparta, for example, it was the rule that every boy had attached to him some elder youth by whom he was constantly attended, admonished, and trained. The celebrated 'Theban band,' consisting exclusively of pairs of lovers, marched and fought in battle side by side, and by their presence and example inspired one another to a courage so constant and high that 'it is stated that they were never beaten until the battle of Chæronea, and when Philip, after the fight, came to the place where the three hundred lay dead together, he wondered, and understanding that it was the band of lovers, he shed tears.' (*Plutarch*, *Pelopidas*, chap. 18.)
>
> "Greek legend and history resound with the praises of friends, names that recall at once all that is most romantic in the passion of Greece. Not only, nor primarily, the physical sense was touched, but mainly and in chief the imagination and intellect. The affection of Achilles for Patroclus is as intense as that of a lover for his mistress (*Iliad* XXIV). It was his insistence on friendship as an incentive to a noble life that was the secret of the power of Socrates.
>
> "So much indeed were the Greeks impressed with the manliness of this passion, with its power to prompt to high thought and heroic action, that some of the best of them set the love of man for man above that of man for woman. It is in the works of Plato that this view is most completely and exquisitely set forth; among all the forms of love, that one is chief which is conceived by one man for another. Such a love is the initiation into the higher life, the spring at once of virtue, of philosophy, and of religion.
>
> "That there was another side to the matter goes without saying. This passion, like any other, has its depths as well as its heights. Still the fact remains that it was friendship that supplied to the Greeks that element of romance which plays so large a part in modern life; and it is to this, and not to the relations between men and women, that we must look for the highest reaches of their emotional experience."

Two thousand years of heterosexual civilisation have intervened since then, and the Greek view of life is unlikely to commend itself to the average general practitioner or to the anxious parents who have come to him for help. The immediate pressure of circumstances moulds our opinions and forms our beliefs, besides dictating our actions, but an enlightened view of the habits of other times is the mark of the man of culture. A widely sympathetic approach to the difficulties of the problem may serve to keep under control a situation which in less cautious hands would inevitably progress into a major tragedy. The family doctor who is resolute in his endeavour to protect the interests of the injured boy will see that so far as possible his young patient is spared the horror of having to give detailed evidence in criminal proceedings; his decision to advise the parents on these lines will be greatly fortified by a familiarity with ways of thinking that derive from other days.

THE DOCTOR'S RESPONSIBILITY

The general practitioner's responsibility as regards the offender also demands consideration. To counsel the parents to seek police intervention in no way discharges that responsibility, but merely passes on the burden to others who are less fitted to bear it, besides implicating in unsavoury proceedings the very patient whom he is seeking to protect. Should he be tempted to delude himself into thinking that it is to the invert's ultimate advantage to be kept in protective custody while undergoing treatment for his abnormality, and that the prison authorities will study the patient's convenience to the extent of sending him to the particular gaol (if any) where such treatment is available, he would do well to reflect that a major factor in the causation of homosexuality is a fixation at the point of transition to heterosexuality, and that, no matter how skilled the physician, his best work is wasted without a change of circumstance which will facilitate the development of heterosexual friendships. To commit a cultured invert to the soul-crushing durance of a long term of penal servitude, where his only contact with the opposite sex is an occasional sight of the prison charwoman, is as futile from the point of view of treatment as to hope to rehabilitate a chronic alcoholic by giving him occupational therapy in a brewery.[6]

To enter into the technicalities of treatment of sexual inversion is no part of the purpose of this article; rather is it to indicate in a simple manner those aspects of homosexuality which are most likely to come to the notice of the family doctor, and to suggest how best he may reconcile the conflict of loyalties, the conflict between the State and the two patients with whom he is directly concerned. For there can be no doubt that contact must be made with the elder boy or man who is the offender, and that this contact can be only on a professional basis, which at once and automatically establishes the doctor-patient relationship: the guilty person can face the doctor only as a healer and not as a judge, and he as a patient is entitled to the fullest benefit of the seal of professional secrecy.

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[3] Bennet, E. A. *Brit. med. J.* 1946, i, 289, 450. Rosanoff, A. J. Manual of Psychiatry and Mental Hygiene, London, 1938, p. 556 (quoted by Dillon, F. *Brit. med. J.* 1946, i, 450).

[4] Stanley-Jones, D. Sexual Inversion and the English Law: a Study in the History of Culture. *Med. Pr.* 1946, 215, 390.

[5] Dickinson, G. L. The Greek View of Life, London, 1896, p. 184.

[6] Stanley-Jones, D. *Brit. med. J.* 1946, i, 179.

There is, further, the burden of moral responsibility occasioned by mere juxtaposition of circumstance, which is clearly recognised in the case, say, of a traffic accident, and this also lays upon the doctor who is concerned with the incident the duty of getting into touch with the offender, if necessary on his own initiative, and of helping him in a need which is a thousandfold greater than that of the injured party.

Sufficient has been said to indicate that this burden cannot be laid aside by taking the easiest way out of an unpleasant situation ; not only does police intervention effectively and finally bar the way to any possibility of cure, but also it is difficult to see how a moral duty to society can be discharged by causing irreparable injury to one of its members, unless one is prepared to defend the ethical position that the greater good justifies the lesser evil. In which case the hypothetical greater good, after being defined, must establish its claim to certainty without a reasonable doubt, and in the present instance this is far from being so.

In the final analysis the problem resolves itself into a special case of the question of professional secrecy, and a return to first principles would indicate that, when a doctor is entrusted with a secret of guilt, he must be assured that the welfare of the future is sufficiently safeguarded, but he is under no obligation to satisfy the claims (other than to due recompense) of the irrevocable past. He must use his utmost endeavours to guard against a recurrence of the offence, but even here he should duly weigh the very problematical risk of further damage to boys in the patient's neighbourhood against the certainty of utter damnation if the law is allowed to exact its merciless and unfeeling penalty. There may be indications for the therapy of fear, albeit tempered with wisdom, and the wise doctor will ensure that the elder patient places himself unreservedly in the hands of a competent psychotherapist and remains there until the possibility of a relapse has passed. It is unlikely, however, that any suggestion of threat or coercion will be necessary, since the type of invert whose compulsions lead him into criminal offences with younger persons has acute insight into his unhappy condition, and is ever willing to grasp the hand of any who will stretch out to save him.

In the case of the irreclaimable offender (whose moral responsibility may be likened to that of a known typhoid carrier), undoubtedly the only satisfactory solution lies in a permanent segregation under humane conditions of the type aimed at in the " treatment " of incurable insanity. This, however, is at present a counsel of perfection. The burden of this essay is that it is the medical profession collectively that is responsible, by its policy of silence, for the present lack of facilities for the treatment of sexual psychopaths, and therefore it is the moral duty of medical practitioners individually to shoulder in the first place the heavy responsibility of dealing with cases of this nature. To the conflict between the claims of the community and the needs of the individual there can be, in this as in many other issues, no finality. The line of thought here suggested is but one out of several possible avenues of approach.

" The limited tenure of research positions under short-term grants is precarious and injurious for the investigator in training or pursuing a career. The determination and direction of fields of research by the distant control, often from beyond the grave, of available funds is inhibitory and stultifying to those who prefer to follow freely the bent of their own curiosity. In some instances a foundation has sought to remedy the situation by granting ' fluid ' research funds to certain medical schools to be administered by the faculty of the school itself. Wherever this has been tried I believe it has been eminently successful."—DR. ERNEST W. GOODPASTURE, *Science*, 1946, **104**, 473.

ANTERIOR BONE GRAFT FOR RECURRENT SHOULDER DISLOCATION

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THERE are already many different operations for recurrent dislocation of the shoulder, and this is not an attempt to introduce a new one. My aim is to call attention to an operation which is popular in Sweden and the United States and has a definite application in some difficult cases.

Treatment by anterior bone graft was first instituted by Eden in 1917. It is comparable with Putti's shelf operation for congenital dislocation of the shoulder, corrects the lesion at the appropriate site, and is fairly easy.

The *pathology of recurrent anterior dislocation* of the shoulder has been well recognised since Bankart's (1938) paper, and its amplification by Hill and Sachs (1940), Eyre-Brook (1942), and Bost and Inman (1942). The salient points are :

(1) Primary trauma which drives the head directly forwards.

(2) Injury to the labrum glenoidale, which, with the anterior capsule, is torn from the glenoid margin.

(3) Failure of the labrum glenoidale to become reattached to the glenoid rim, with resulting lack of restraint to the forward passage of the humeral head.

(4) A compression fracture of the posterolateral portion of the humeral head, caused by a digging-in action of the anterior glenoid rim during dislocation. This is a late phenomenon, present in old recurrent cases and demonstrable by radiograms of the shoulder taken with the arm in full internal rotation.

(5) Secondary changes, with traumatic arthritis, proliferation of bone at the scapular and humeral necks, eburnation of the glenoid rim, production of loose bodies, synovial thickening, and cartilaginous degeneration of the humeral head.

The *operations for preventing recurrence* have been aimed at various structures in the joint : capsule and ligaments (Bankart 1938) ; tendons and muscles (Nicola 1929) ; and bony structures (Eden 1920).

Bankart's operation, by which the torn edge of the capsule is reattached to the glenoid margin, has certain disadvantages : the boring of the drill holes is difficult, even with a dentist's angled drill, and the holes tend to cut out ; the articular cartilage of the glenoid fossa is damaged by the drilling ; an old fracture of the anterior rim may complicate the procedure ; and the capsule may be thin and unsuitable for suturing.

Repair by bone block is simple and effective.

Eden (1920) inserted a tibial graft under the periosteum of the scapular neck, allowing it to project 10 mm. beyond the glenoid rim.

Hybbinette, as reported by Orell (1940), used first a tibial graft in 1917, and later an iliac graft.

Oudard (1924) displaced a graft from the coracoid process to the anterior glenoid rim.

Speed (1927) placed a tibial graft extracapsularly on the anterior scapular neck in three cases.

Orell (1940) made a cleft extracapsularly in the scapular neck with a special osteoperforator and inserted a pointed os-purum transplant. Owing to rapid new bone formation immobilisation of the arm was necessary for only fourteen days.

A combined procedure of an anterior iliac graft and a Nicola tenosuspension was described by Ilfeld and Holder (1943).

All the above have reported good results with no recurrence and with full range and power in the arm.

OPERATION

The anterior iliac graft operation is simple, the removal of the graft from the ilium taking little more time than the tedious drilling and threading of the holes in the glenoid rim required by Bankart's operation. The technique is as follows :

(1) The joint is approached through a longitudinal incision separating the deltoid and pectoralis major muscles.

(2) The tip of the coracoid process, with its attachments of pectoralis minor, coracobrachialis, and short head of biceps, is cut across with bone forceps and turned down.

(3) The anterior circumflex vessels are isolated and divided between ligatures.

(4) The subscapularis muscle is exposed, cut across near its insertion, and reflected medially to expose the capsule. The division should not be too lateral, as the blending of the tendon with the capsule renders separation difficult.

(5) The capsule may then be found attached to a free *labrum glenoidale* and, on pulling the latter laterally, the joint and humeral head are exposed. Sometimes, owing to scarring, the capsule may have to be incised close and parallel to the glenoid rim to expose the detached labrum and the bare anterior border of the glenoid fossa which communicates directly without hindrance with the anterior neck of the scapula.

(6) A vertical incision is made in the periosteum of the scapular neck about $^1/_2$ in. from the glenoid margin. With a 1-in. osteotome a bone flap is easily raised in the cancellous tissue of the neck, and the bone is also rawed between this incision and the glenoid rim.

(7) The anterior part of the crest and outer surface of the ilium is exposed subperiosteally, and a bone graft 1 in. by $2^1/_2$ in. is excised. The graft should consist of half the thickness of the crest and the outer cortex. The curve on this graft is eminently suitable for its close fitting to the hollow of the scapular neck. The graft is inserted under the scapular bone flap so as to project about $^1/_3$ in. beyond the glenoid margin and lie extracapsularly. If the approach allows, the graft may be fixed in position with a vitallium screw.

(8) The cut subscapularis muscle is sutured over the graft and holds it firmly in position. The coracoid is replaced and retained in position with chromic catgut sutures through its surrounding ligaments. The skin is closed, and the arm is bandaged to the side.

The patient may get up on the fourth day. Movements of the shoulder are not allowed for six weeks.

CASE-RECORDS

CASE 1.—An African lance-corporal, aged 24, was admitted to a military hospital on Feb. 12, 1945, with a dislocated right shoulder. This was reduced without an anæsthetic.

He gave a history of an original injury while playing rugby football in September, 1943, when he fell on the back of his right shoulder and dislocated it. Since then the shoulder had dislocated many times and had been reduced sometimes with an anæsthetic, sometimes without.

On examination on the 15th he was a small well-developed young man. His right shoulder had full range, active and passive, and power was good. Radiograms of the shoulder were normal.

On the 28th an operation as described above was performed. The glenoid fibrocartilage was found torn from the anterior glenoid rim, which was smooth and bare.

His arm was bandaged to his chest wall for six weeks, and then active movements were begun. Four weeks later he had full range of movement of his shoulder. He returned to South Africa six months later, during which time there had been no recurrence.

CASE 2.—An Indian soldier, aged 26, was admitted to an Indian military hospital in February, 1945, with a history of recurrent dislocation of right shoulder. Examination showed full range and power in his shoulder, and a radiogram was normal. He dislocated his shoulder in the ward a few days later while putting on his coat.

Operation on March 12 showed that the glenoid fibrocartilage had been separated from the anterior glenoid rim and had not reattached itself. An iliac bone graft was inserted. The shoulder was immobilised for six weeks, and then active use was begun. He was slow in regaining full range, and three months later had 20° of limitation of full elevation. There was no recurrence within the first six months, and he then returned to India.

CASE 3.—An Italian cobelligerent, aged 22, was admitted to a British military hospital on Sept. 28, 1945, with a dislocation of left shoulder following an injury in a fight the previous night.

Radiography confirmed a subcoracoid dislocation, which was easily reduced without anæsthesia. He gave a history of an original dislocation following a parachute jump in 1942, when he landed on his left shoulder. Since then there had been about ten recurrences, some of which were reduced by the patient.

Radiography showed some irregularity and absorption of the anterior glenoid lip, and absorption of bone on the postero-lateral aspect of the humeral head.

On Oct. 5 the left shoulder-joint was exposed, a raw anterior lip of the glenoid fossa seen, and an iliac bone graft inserted. The graft projected $^1/_3$ in. beyond the glenoid margin.

Six weeks later active movements of the shoulder were begun. Patient's improvement was slow. Six months later he had had no recurrence of his dislocation, but there was limitation of full elevation by 20°. Both he and case 2 were poor patients and did not try hard to rehabilitate themselves.

COMMENTS

Though those surgeons who follow Bankart's technique may not wish to change, it is suggested that they would find the iliac graft method useful when the capsule is *thin, short, or friable* ; when the bore holes cut through the bone ; or when there is old damage to the anterior glenoid rim, with displacement and consequent difficulty in drilling.

The three cases described here have not been followed sufficiently long for the final result to be assessed, and, owing to the war, it will be impossible to review them later (case 1 being an African, case 2 an Indian, and case 3 an Italian). However, the operation has been performed many times on the Continent, and Thomasen (1944), in a review of the literature, states that after 169 recorded bone-graft operations (Eden-Hybbinette) only one recurrence was recorded.

SUMMARY

The operative procedure for the treatment of recurrent dislocation of the shoulder by an anterior iliac bone graft is described.

Three cases are reported.

This operation is especially indicated where the capsule is thin and friable, and when there is difficulty in Bankart's operation in drilling the anterior glenoid rim.

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". . . In times past, the doctor's field was shared, and productively tilled, by saint, monarch, *mountebank*, cleric, apothecary, and astrologer. Surgery waited upon stellar manifestation of divine approval, and epidemic disease was a visitation. Witches poisoned the patient during the doctor's absence, and demons strangled the sick. Anyone could concoct the simple drugs, conveniently drawing upon the materials of hennery, orchard, weed-patch, stable, and meat-stall. The physician's concept of human function was based upon a system inherited from philosopher and scholastic His notion of bodily structure was tinctured with these same beliefs, and included no knowledge of cellular composition. Man didn't even stay human ; he did not remain fixed in his proper phylum; he could be amphibious, arboreal, or subterranean. It was a world whose *malleability* was disconcerting to the doctor."—BARRY J. ANSON, *Quart. Bull. Nthwest Univ.* 1947, 21, 1.

Medical Societies

MEDICAL SOCIETY OF LONDON

AT a meeting of this society on Feb. 10, with Sir PHILIP MANSON-BAHR, the president, in the chair, a discussion on the

Surgical Treatment of Pulmonary Tuberculosis

was opened by Dr. GEOFFREY MARSHALL. Forty years ago, he said, there was an iron curtain between the physicians, who treated intrathoracic tuberculosis, and the surgeons, who treated tuberculosis elsewhere in the body. The physicians used only constitutional treatment and the surgeons only surgical treatment; and both got bad results.

About 1912 Rollier showed the amazing results obtainable with constitutional treatment in surgical tuberculosis. The next big advance was the introduction of the artificial pneumothorax; but physicians found themselves often frustrated by pleural adhesions. The problem was referred to the surgeons, who responded magnificently, changing the whole outlook in the chronic destructive type of disease.

In the treatment of cavitation, collapse therapy is essential; and only a minority get a lasting result from artificial pneumothorax without further intervention, usually consisting in the division of adhesions. Surgeons are sometimes reluctant to intervene when tubercles are seen on the pleura and adhesions, but even when these are present results are quite good. Often an artificial pneumothorax is not obtainable at all owing to dense adhesions, but it is essential to collapse the lung: "My experience is that if you do not close the cavity the patient will not recover." Of patients with uncollapsed cavities, 85% die within five years, while the remaining 15% survive to spread infection. It is true that the cavity disappears with two or three years' bed-rest; but it reappears when the patient gets up.

It used to be said that before thoracoplasty the patient should first be stabilised, in accordance with the principle that there was never any vital cause to hurry the operation. But the modern thoracoplasty, conducted in many stages by a team, is less dangerous and less of an ordeal, though it remains a trying and disfiguring operation.

Apicolysis has no place in present-day treatment. The operation for extrapleural pneumothorax is dangerous, patients often having a stormy passage in the first few weeks; but in those who survive it the results are almost ideal if the cavity is in the upper lobe. Better criteria for the selection of cases are needed.

Interruption of the phrenic nerve by crushing, the effect of which lasts 3 to 18 months, is ineffective with large cavities. It is, however, a safe and useful operation in the hands of the chest surgeon, and is particularly applicable to the symptomless cases now being picked up by mass radiography. When these young people are treated with simple bed-rest the lesions sometimes enlarge, perhaps proceeding to actual cavitation. An artificial pneumothorax can be done, but this is a two-edged weapon whose use is contrary to the dictum that the treatment should not be more dangerous than the disease. If there is some improvement with initial bed-rest phrenic interruption should be tried before pneumothorax.

PATHOLOGY OF CAVITATION

Mr. C. PRICE THOMAS said that the whole problem facing the surgeon in pulmonary tuberculosis is the problem of cavitation. The tuberculous cavity is from the first a tension cavity; the capillaries in its walls are also under tension, so that blood, instead of going to the cavity wall, goes to the nearby capillary bed. The cavity does not persist because of tuberculosis, but tuberculosis persists because of the cavity. "It is absolutely necessary to close tuberculous cavities."

Healing may be either "closed" or "open." Some small cavities may close by drainage through the bronchus. Usually, however, they close by closure of the bronchus; this is followed by absorption of air from the cavity, reduction of the tension, improved blood-supply, and healing. All cavities heal by the same principle. Where the patient is treated only with rest it is conceivable that the partial stenosis of the bronchus may become, with quiet inspiration, an absolute functional stenosis; otherwise the cavity will persist. All other methods depend on active relaxation. The best method is a complete artificial pneumothorax, with which 95% of cavities close. It should be remembered that with lateral thoracoplasty there is only lateral relaxation, and the vertical stress persists; the result therefore depends on the position of the bronchus or bronchi ending in the cavity.

Only two methods approximate to the perfect pneumothorax—thoracoplasty with extrafascial apicolysis, and extrapleural pneumothorax. Phrenic crush is effective against recent cavities under one inch in diameter. It has been observed with artificial pneumothorax that the diseased areas relax most—which makes the long-range effect of phrenic crush more understandable. Patients must be carefully selected for this operation, since once it has been done the risk of basal collapse following further intervention is greatly increased.

The extrapleural pneumothorax is effective, again given proper selection; but the idea of it as a substitute for thoracoplasty is to be deprecated. The morbidity and mortality tend to be under-rated; in 58 cases the mortality in the early phases was 15%; and 7 of the patients got tuberculous empyemas, 4 of which persisted. Pleural adhesions represent an attempt to get an extra blood-supply from the periphery; and it is important to select patients with early lesions (when the central blood-supply is not impaired). The operation should not be undertaken when it is likely to be difficult. When successful it is very satisfactory, providing a perfect pneumothorax without the changes in volume associated with the usual artificial pneumothorax. Experience shows that toxæmia is controlled more quickly and that cavities close more rapidly. However good the result from the extrapleural pneumothorax, it is a mistake to abandon it deliberately.

Thoracoplasty is a more definitive operation; but if it is done well and the disease is controlled no further treatment is needed—which is more than can be said of any other treatment. The depressing effect of the deformity can be minimised by gaining the patient's confidence before the operation. Cavity-closure ensues in 85–90%. The early mortality in Mr. Price Thomas's experience is 11·6%, and the late mortality 21·6%; mortality among the "stable chronics" is 8%, among the "relapsing chronics" 15·8%, and among the "slipping chronics" 55%. When the operation is undertaken during the first two years of the disease the early mortality is 1·9% and the late mortality 4%. The surgeon should be called early; and the guiding principle should be, "once you've put your hand to the plough don't turn back. Never take risks at the patient's expense; difficulties are for surgeons—not for patients."

DISCUSSION

Dr. A. HOPE GOSSE said that the operation of phrenic crush needs considerable experience and skill. Of a series of young people with early lesions treated in this way all except one now have sputa free of the tubercle bacillus; and, with this one exception, the cavities have closed. For this treatment the lesion must be early and unilateral, and the cavity narrow-walled and with a diameter not much larger than a florin. Any patient suitable for an artificial pneumothorax should first have a phrenic crush; the need for an artificial pneumothorax should be assessed after one month's interval. In this way some patients are saved the tedium and the risks of a pneumothorax.

Dr. R. R. TRAIL thought it apposite that the discussion should take place at a time when "a rather foolish correspondence" was going on in THE LANCET. He had never given up his faith in the surgical treatment of pulmonary tuberculosis.

Dr. JOSEPH SMART said that without a free pneumothorax it was not possible to get the concentric relaxation which was so important. He had often divided adhesions when tubercles were present on the pleura; and usually the reaction was no more severe. In any case the patient was better off with a free pneumothorax. As for the dangers of extrapleural pneumothorax, he thought the crux of the matter was the selection of cases. Given proper selection the results were quite dramatic.

Mr. R. C. BROCK could not think it safe to divide adhesions in the presence of tubercles; it was hard to assess the age of adhesions. A French surgeon had told him recently that he was doing one hundred cases of extrapleural pneumothorax a week; but perhaps the cases at the Brompton were not as favourable for this operation as those in sanatoria on the Continent. It was a dangerous operation, and he was not sure that the results on the Continent were better than in Britain. The disadvantage of replacing thoracoplasty by extrapleural pneumothorax was that a thoracoplasty had often to be done afterwards. If the patients were carefully looked after the deformity from thoracoplasty was usually negligible; in any case it was better to be deformed than dead. The dictum that delay in thoracoplasty is always desirable was "horrifying." In his view the critical phase in the life of the patient with chronic pulmonary tuberculosis was when he left the sanatorium for the first time: unless his disease was completely controlled by a perfect pneumothorax he was unsafe; and if surgeons would only step in with thoracoplasty much better results would be obtained. As for pneumonectomy, he was feeling his way gingerly, and the few cases he had done had been very carefully selected.

In reply, Dr. MARSHALL said that in the treatment of bilateral cavitation thoracoplasty was a dangerous remedy; but this was a dangerous disease. A thoracoplasty on one side and an artificial pneumothorax on the other was much less dangerous and was often highly successful. Mr. PRICE THOMAS said that about half the patients he operated on had bilateral disease. On the subject of pneumonectomy he was as cautious as Mr. Brock.

Reviews of Books

An Approach to Social Medicine

JOHN D. KERSHAW, M.D. Lond., D.P.H., medical officer of health, Accrington. London: Baillière. Pp. 329. 15s.

THIS book seeks "not to teach the reader social medicine but to show him where it lies and how it may be sought." The first half could well stand by itself as a description of the origin and purposes of our social fabric; in the second half Dr. Kershaw indicates the place he would give to medicine in this larger framework. Since medicine entered late into the scientific field, doctors followed the lead of their colleagues in the physical sciences, and adopted a mechanistic outlook—to the neglect, he suggests, of philosophy. Yet we must not forget that it was the sharp reaction from earlier unfounded theorising which gave us the hard facts on which we build today. This thoughtful book gives the casual reader a good idea of medicine's widening functions in a changing world; for those who wish to make a serious study of social medicine there could be no more encouraging introduction.

The Psycho-analytic Theory of the Neuroses

OTTO FENICHEL, M.D. London: Kegan Paul. Pp. 703. 35s.

THE author of *Outlines of Clinical Psycho-analysis*, published in 1934, rather than produce a second edition, has completely altered his previous book, and added a general introduction, a bibliography of over 1600 references, and an index of 40 pages. His facility in writing, which survived translation in the former book, is preserved now in his own English. His useful book not only covers many points of Freudian theory but illustrates the divergences of the psycho-analytic discipline from formal psychiatry. Thus "traumata" are never "physical," they are associated with castration and implied insecurity, and the intellectual and physical factors which form so important a part of Meyer's "psychobiology" are hardly mentioned. The index has only three references to the climacteric, three to "physical" matters, seventeen to the "body," and twenty to "organic" conditions; "neurology" is not indexed at all, and the thalamic centres and the sympathetic nervous system not even mentioned. The title of the book may justify this dichotomy, but the rift between neurology and psycho-analysis has not been bridged by Dr. Fenichel, able writer though he is; and we could wish he had written the book of a dweller in both worlds, like Stanley Cobb's *Foundations of Neuropsychiatry*.

He is notably frank in discussing contra-indications to treatment and trial analyses, but offers no suggestions for shortening psycho-analytic treatment. He emphasises the emotional character of "shock," but later admits that insulin and leptazol act best on different disorders, thus implying that the word "shock" itself may have other connotations. Similar and more serious difficulties may be found in formulations about the origin of the ego; but, open to dispute as these may be, his clarity in general and his careful documentation make the volume essential for the psycho-analyst, and to others a valuable book of reference.

Gray's Anatomy

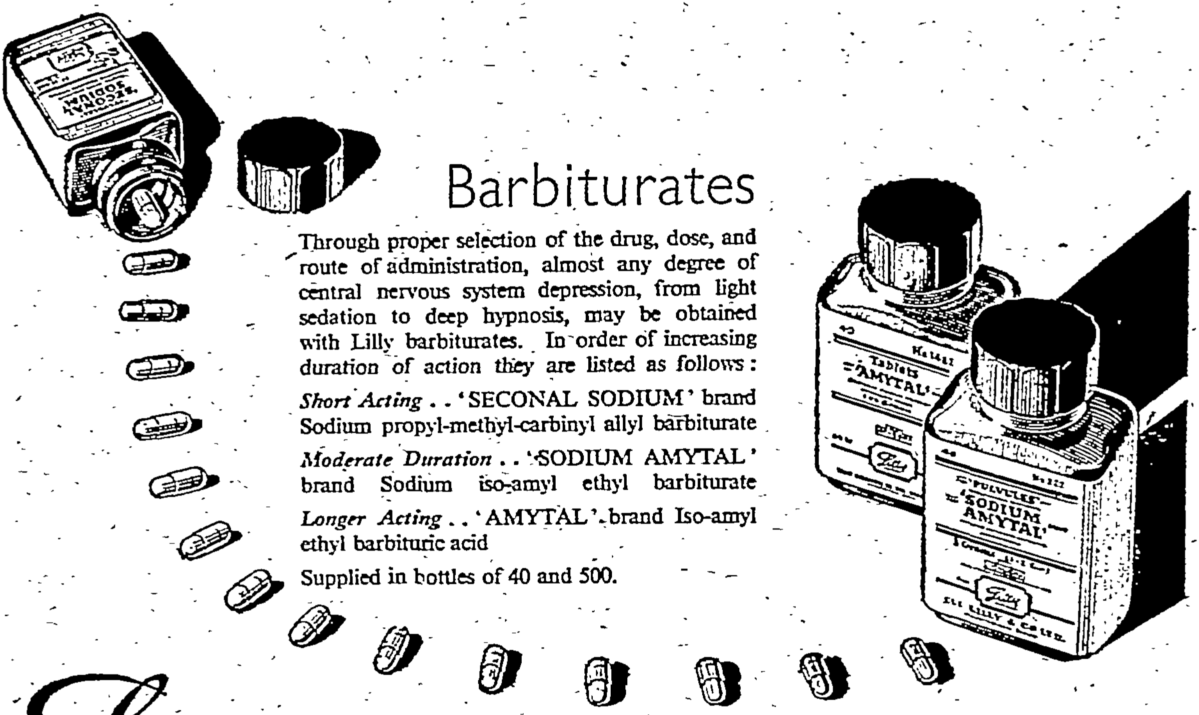
Descriptive and Applied. (29th ed.) Editors: T. B. JOHNSTON, O.B.E., M.D.; J. WHILLIS, M.D., M.S. London: Longmans, Green. Pp. 1597. 70s.

THE basic facts of topographical anatomy have not altered since Gray wrote his first edition in 1858, yet his book has now reached its 29th edition—roughly a new edition every three years. "Gray," containing as it does sections on histology, embryology, and neurology, all subjects which are rapidly progressing, is more than a reference book of topographical anatomy; and it is largely because these sections must be kept up to date that new editions are needed frequently. Though there are advantages in having all branches of anatomy collected together in one reference work, few medical students rely on "Gray" for their histology, embryology, and neurology; but if these sections are to be included it is important that they should be factual and accurate, without too much discussion of controversial subjects or unlikely theories. In this edition, for example, perhaps too much space is devoted to Carey's theory of muscle structure, which is far from being generally accepted; but Sharpey-Schafer's classical diagram of the sarcomere has at last been omitted. The picture of a spermatozoon is drawn at a magnification well beyond the resolution of any ordinary microscope and is therefore misleading. In future editions electron microscope pictures should replace such diagrams. It is impossible for the authors to please everyone, but a discussion of blood-groups, and especially of the Rh factor, seems out of place in an anatomy book. Much new matter has been added, including sections on the work of Holmes and Young on nerve regeneration, of Weddell and Woollard on cutaneous innervation, and of Brock on the bronchial tree. Apart from drawbacks due to poor paper, most of the illustrations are first-class, and many new ones have been added. The X-ray plates too are good, and we could do with many more.

Entstehung und Früherfassung des Portiokarzinoms

Dr. med. HANSJAKOB WESPI, Chefarzt der geburtshilflich-gynäkologischen Abteilung am Krankenhaus Frauenfeld. Basle: Benno Schwabe. Pp. 91. Sw. fr. 11.

THIS book is concerned with the early diagnosis of cancer of the uterine cervix by means of the Hinselmann colposcope. The author, who has charge of the gynæcological clinic of the University of Zurich, has for seven years been using this method, together with the Schiller iodine test, to establish the diagnosis in early and difficult cases. The colposcopic picture and the histology of the normal and pathological cervix are carefully described, and the various types of white leucoplakia, red erosion, and irregular surfaces which may be seen are usefully discussed. Case-records show the care which is taken in the examination of every patient whose condition gives rise to suspicion of early neoplasia, and illustrate the possibility of distinguishing between certain early cancers and simple inflammatory conditions. The numbers of patients with cancer of the uterine cervix who can be treated early and with success are increased when routine colposcopic examinations are made. Such close observation is only possible, however, where facilities such as those offered by his clinic are available; and gynæcologists in Switzerland seem to be fortunate in seeing many of their cases at a stage when the diagnosis is still in doubt.



Barbiturates

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THE LANCET

LONDON: SATURDAY, MARCH 22, 1947

Service Medicine

It is generally agreed that during the late war the medical services of the Armed Forces did their job remarkably well; but it is also generally agreed that their organisation left much to be desired. Many obstructions were broken down by forceful individuals of strong character, accustomed to insist that what was necessary must be done. But many tiresome arguments arose because the prevailing atmosphere in the regular Services—hard to define, perhaps, but impossible to ignore—does not at present encourage professional zeal and initiative. Further, the regular medical officer—with all respect to many admirable doctors—seldom enjoys such professional standing that he can confidently challenge even unenlightened orders or regulations.

This brings us to consider the nature of the authority which directs the medical services of the Armed Forces. The first astonishing discovery in this connexion is the absence of any single authority. The sailor, soldier, and airman, it seems, are such different persons that separate organisations are required to keep them in health and attend to their sicknesses. Yet the Navy, Army, and Air Force comprise a limited age-group, they share alike the stresses of tropical service, and their principal medical objective is the maintenance of health.

The consequence of having three small separate medical services, rather than one large organisation for the three branches, is best studied in the Army—the largest consumer of medical man-power. One bad result is that the Director-General of Army Medical Services is not a member of the Army Council. He makes his views known to the Army Council only through the Adjutant-General, who, however well informed he may be, is a soldier and a layman and therefore not the proper person to present a medical argument. Clearly, the spokesman of medicine ought to be a professional man constantly in touch with the highest administrative and political levels. It should be his duty and within his power to see that health considerations and medical problems are kept well to the front in any discussion of policy or in planning a campaign, instead of being fitted in after the main lines have been settled. The lack of status now accorded to Service medicine is further emphasised by the fact that the Director-General of Army Medical Services receives the rank of lieutenant-general. He is thus a person of less authority than the commander of a force of any size—of less authority, for example, than the chief of anti-aircraft command—and he does not, therefore, talk to important field commanders on equal terms. It is accordingly difficult for him to exercise what should often be a decisive influence, and many necessary enterprises—such as the field trial of penicillin in war wounds—have to be tactfully engineered on an "old boy" basis, often with resulting delay and frustration, instead of being organised with authority from the War Office. Devolution of authority to the man on the spot is an excellent principle, but one that can be carried too far. In a campaign the final medical authority is vested in the commander-in-chief, who acts (or does not act) on the advice of his own director of medical services—an officer junior to the Director-General of Medical Services at the War Office, yet not under his control. In short, London may offer advice and arrange for the supply of men and equipment, but it lacks medical authority.

Manifestly this is absurd. Medicine must speak as an equal in the highest counsels of the Armed Forces, and the health needs of sailors, soldiers, and airmen must be rated much higher than hitherto. It is as important, and as difficult, to plan strategically against malaria, dysentery, and anxiety state as to plan against attack by enemy aircraft.

Our plea, repeated yet again,[1] is for unification of the medical services of the Navy, Army, and Air Force under a single head, with rank corresponding to that of a full general. All who know Service medicine are conscious of the need for a great raising of professional standards such as can come only from combined planning for the complete medical needs of all three Services—real planning at the highest instead of the second-highest level. We need a training school for Service medical officers which will bear comparison with that of the Americans; we must avoid wasteful competition among the three Services for our too few doctors [2]; and we must have every activity of the Service chiefs and the Treasury subjected to authoritative medical comment offered directly—by doctors on equal terms. If the Navy, Army, and Air Force medical services do not themselves move towards such fusion as would be natural under the new Ministry of Defence,[3] it seems to us that pressure ought to be applied when the National Service Bill comes before the House of Commons.[4] The medical group in the House and perhaps also the presidents of the Royal Colleges, who will have access to full information about the state of British military medicine from their members who served the Forces as consultants, might reasonably ask the Minister of Health to consider whether, after all, he was wise to leave the Armed Forces out of consideration in making his plans for a comprehensive health service for the nation.

Postoperative Pulmonary Embolism

DESPITE almost exactly a century of study—for VIRCHOW established the nature of pulmonary embolism in 1846—there is much concerning this disastrous condition which remains mysterious. Fatal embolism is fortunately uncommon: though the majority of cases come to necropsy, the average incidence in post-mortems at general hospitals is less than 2%. It is moreover an affliction of mature years, almost unknown in childhood and adolescence, and rare in the twenties and thirties; nearly all the victims have been ill in bed for a long time, and more than two-thirds of them have had a serious operation within a fortnight; and often the embolism is merely the immediate cause of a death in any case soon inevitable. Nevertheless about a quarter of all the deaths are in patients who have had no operation at

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1. *Lancet*, 1946, i, 340.
2. Ibid, 1946, ii, 333.
3. Statement Relating to Defence. Cmd 7042. H.M. Stationery Office. Pp 12. 2d.
4. See *Lancet*, March 8, p 308.

all, but suffer from such conditions as varicose veins and valvular disease of the heart.

It is the surgical cases that present the most dramatic picture. The patient perhaps was a man of 60, who had lain abed for months and had then had a gastrectomy. Convalescence was unsatisfactory; there was a low fever; he appeared anxious, and was a difficult man to nurse. Twelve days after operation, when he was becoming more active, he called for a bedpan, was found to be severely shocked, and died within a few minutes or hours At necropsy the cardiac blood was fluid; but a massive clot filled both pulmonary arteries, and small thrombi could be expelled by pressure from the smallest vessels. We ask ourselves where and when did the clot form. Why did it form? Why did it move from its original site? Most urgently, what can be done to prevent the accident?

The pendulum has swung many times since VIRCHOW first suggested the pelvic veins as a site of the thrombosis, and since WELCH,[1] who began twenty years of study in 1887, demonstrated that the deep veins of the leg were often involved An important further step has been the distinction between thrombosis in phlebitis, where the clots are firmly attached and seldom move, and thrombosis in undamaged veins, which does not cause œdema but carries a far greater risk of embolism Some have supposed that this latter type of thrombosis in calf-muscle veins results from retrograde spread; others that the small veins in the soleus muscle, which itself is said to show degenerative changes, are the primary site. Latterly the work of HUNTER and other American investigators[2] has forcibly directed attention to this muscle; and all who have looked agree that a remarkably high proportion of bedridden patients—more than half in some hospital records—have these clots, though in one series, where over 50% showed them, only 3% died of embolism. BAUER[3] in Sweden, by phlebography, satisfied himself that the clots form in the deep veins of the leg, and sections at various levels suggest that the oldest clots are in these deep peripheral veins. But if this is accepted, we still have to ask why they form there. Mere immobilisation is not enough: though supports behind the knees, or abnormal postures during operation, may aggravate the condition, plaster casts do not cause thrombosis or embolism And if the majority of elderly patients kept abed with chronic illnesses develop these clots, we cannot very well hold surgery responsible for their formation, but only for their movement, and perhaps their enlargement Here the work of MACFARLANE, begun in 1937 and now continuing,[4] may prove of critical value He has shown that a fibrinolysin can be identified in the plasma of patients after operation; that is to say, the fibrinolysin always present is activated in such patients; and he has made the fascinating observation that fibrinolysin activation depends less on trauma than on a state of anxiety—which might explain the higher incidence of pulmonary embolism during air-raids. Equanimity has more than a moral value, and the bedside manner may extend its balm even to the veins of the soleus muscle.

How can pulmonary embolism be prevented? In the first place, every surgical patient of mature years must be considered a possible candidate Massage of calf muscles and active movements of the leg are advisable both before and after operation, and prolonged preoperative decubitus should be avoided. Dilatory operative technique and dilatory operation are dangerous: peace of mind, confidence, and a calm environment are to be promoted. Pain on palpation of calf muscles and hyperextension of the foot will suggest that thrombosis is already present, and in such circumstances American practice favours ligation of the vein and extrusion of thrombi, though it is hard to know whether this is effective Anticoagulants are in a different class; and in spite of its expense many believe that heparin should be given prophylactically to a large proportion of patients after operation. Presumably its action would be to prevent proximal spread of deep thrombi, for if the large veins are already involved its use might be risky.

We have travelled a long way, then, since VIRCHOW'S observations a century ago. When we know the cause of fibrinolysis we may perhaps control the dislodgment of clots.

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[1] Welch, W. H., in Allbutt's System of Medicine. London, 1899, vol. vi, p 155

[2] Hunter, W. C., Sneedon, V. D., Robertson, T. D, Snyder, G. A. C. *Arch. intern. Med.* 1941, 68, 1.

[3] Bauer, G. *Acta chir. scand.* 1942, 86, suppl. 74; *Lancet*, 1946, i, 447.

[4] Macfarlane, R. G. *Lancet*, 1937, i, 10; *Ibid*, 1946, ii, 562; *Ibid*, p. 862.

Atypical Smallpox

SMALLPOX is an import we could very well do without. Between January and June last year 55 cases of variola major were recognised in England,[1] and 15 of these were infected in or en route from India The remaining 40 cases were certainly infected in England, and though a direct connexion with a known imported case could be established in only 7 of these, the other 33 were grouped into ten separate outbreaks all of which occurred in districts and at times which suggested indirect association with cases known to have been ship-borne During the second half of 1946 the importation of fresh infection apparently ceased and there were no further indigenous cases, but it looks as if the events of last spring are now being repeated The first 2 cases recognised in the present outbreak at Grimsby, where there have so far been 15 cases with 6 deaths, were permanent residents of a common lodging-house frequented by sailors. These 2 men were taken ill on Feb. 13, and the source of infection was probably one of a number of seamen who stayed at the lodging-house for a night or so early in February. On March 3 a member of the staff of a large seamen's hostel in Stepney developed what was later recognised as smallpox modified by vaccination Here again the undetected source of infection was probably a seaman.* No link has been discovered between the two outbreaks, but both seem likely to have originated in modified or atypical cases connected with ships from abroad.

Atypical smallpox, sometimes with an almost negligible focal eruption, is not uncommon in vaccinated people whose immunity has waned or in whom revaccination has for one reason or another been ineffective. As **Stallybrass**[2] has remarked, immunity to smallpox, whether produced by artificial or natural means, is not a mathematically precise process, and there are considerable individual variations in the solidity and permanence of the resultant increase in resistance. Moreover, immunity to smallpox cannot yet be measured or even roughly assessed by skin or serological tests as can that to diphtheria. In discussing difficulties in the diagnosis of atypical cases **Conybeare**[3] has drawn attention to the help now obtainable from the laboratory tests recently described in detail by **Downie**.[4] It is not surprising that some atypical cases with a minimal focal eruption go completely undetected, since these people may never be sufficiently ill to call a doctor. After two or three days of malaise with headache and fever, at this time of year easily regarded as influenza, they suddenly feel better and may not pay any attention to the few spots—often not more than a dozen—which have appeared usually on the forehead and about the wrists or backs of the hands. In this infectious stage they go unhindered about their work and social occupations. So unless and until a more florid form of the disease appears in some person with a weaker immunity the presence of smallpox in a fairly well vaccinated community may remain unsuspected and all chance of tracing its origin may be lost. Even when smallpox is already in mind the clinical diagnosis of cases with a minimal focal eruption may be extremely difficult. Significant points are the prostration associated with the pre-eruptive illness, even when the rash itself is almost negligible, and the sudden cessation of the constitutional disturbance when the eruption appears. The centrifugal distribution of the eruption remains the sheet anchor of smallpox diagnosis; but the fewer the lesions the less evident is this characteristic pattern. The lesions of a minimal eruption lack the uniform shape and orderly development which are useful guides in a more pronounced rash; they also tend to be relatively superficial in the skin and to mature rapidly or sometimes to abort without pustule formation. Atypical smallpox should be seriously considered when papular lesions, however few, some of which have rapidly acquired vesicular or pustular heads, suddenly appear about the face, wrists, hands, or feet of any vaccinated person who has just recovered from so-called influenza In most cases of this sort the clinical diagnosis, even when made by an expert, should be checked by laboratory tests.

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[1] Maddock, E. C. G., Conybeare, E. T. *Mon. Bull. Min. Hlth & E.P.H.L.S.* 1946, 5, 224.

* Rather than a woman, as was mistakenly suggested in an annotation last week (p 339).

The focal eruption of smallpox may be more or less profuse and yet remain in some respects atypical. Such cases nearly always come under medical observation and are not often completely overlooked though they may be misdiagnosed, usually as chickenpox. In these, careful attention to the distribution pattern of the mature rash and to the nature and development of the lesions, plus the history of the pre-eruptive illness, will usually be sufficient for a confident clinical diagnosis; but here again the help of the laboratory is not to be despised. It is worth noting that in some of the Grimsby cases the distribution pattern of the mature eruption has been typical but the order of the outcrop has been unusual in that the initial lesions were on the body.

Another form of smallpox which may not be promptly recognised is the severe toxic hæmorrhagic type which is sometimes fatal before the delayed focal eruption appears. Such patients are critically ill with extreme prostration. They usually have a diffuse erythema, sometimes with petechiæ or purpuric spots over the bathing-drawers area, and conjunctival hæmorrhage is common These cases may be admitted to hospital as scarlet fever, measles, or septicæmia. Although usually unvaccinated, the patients sometimes give a history of a successful vaccination in childhood without revaccination; for infant vaccination does not necessarily provide lifelong protection against this severe and almost invariably fatal form of smallpox. At times like the present, when smallpox is prevalent, the medical staffs of hospitals should be specially on their guard against the inadvertent admission of such cases to open wards.

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[2] Stallybrass, C. O. *Publ. Hlth, Lond.* 1947, 60, 77.
[3] Conybeare, E. T. *Practitioner*, 1946, 157, 101.
[4] Downie, A. W. *Publ. Hlth, Lond.* 1947, 60, 82; see *Lancet*, 1946, ii, 205.

Annotations

BEFORE OR AFTER?

The essence of the National Service Bill now before Parliament is that all men between 18 and 26 years of age shall be liable to 18 months' full-time military service, to be followed by 5½ years' part-time service during which they may have to undergo a total of 60 days' further training. Postponement of service is mentioned, though the grounds for postponement are not defined; and for doctors and dentists who are working for additional qualifications the age-limit for call-up is extended to 30. The 8-year span of liability may perhaps be necessary to include any who through illness or for some other reason cannot be recruited in their teens: but it leaves the young man uncertain as to when he will have to serve, and all would welcome a specific assurance that this latitude will not be used to gratify the administrative whims of Service departments. The wide sweep of the age clause enables the Minister of Labour, if he wishes, to defer the call-up of medical students until they are qualified; but we are not told whether this will in fact be done: and he might hold that by keeping such students in line with others he would avoid the perils of establishing a privileged group.

Before qualifying, the medical student has six years of arduous, expensive, and unpaid work; and, by an unhappy tradition, the young doctor often receives only an apprentice's salary for the first few years. Hence the price paid by nearly all who elect to study medicine is the deferment of marriage and a settled home; and if military service is to be interposed before medical training the possibility of marriage may be yet further postponed. Some medical educationists[1] approve of an interlude of military service, between school and medical school, because it broadens the student's outlook and improves his judgment; but it amounts to an addition of nearly two years to the curriculum, which could only be tolerable if the methods of paying young doctors were changed so that they could support a family soon after qualifying.

That is of course mainly a professional matter. But there are also strong national reasons for postponing the military service of medical students until they have qualified. Presuming that in time of war they are going to be used as doctors, can we doubt that a period of training in Service medical work, with responsibility for the care of troops, will stand them in better stead than a corresponding period of general training at 18 years of age? Is it economical to teach young men to drive tanks, or look after aircraft, or keep naval stores, when they are going to be employed as medical officers? Few will deny that the future doctor, like anyone else, will gain much by serving in the ranks; and if it were administratively possible there is something to be said for the suggestion[2] that his military service should be done in two spells—one after leaving school and the other after qualifying. But if the choice is between service entirely before medical training or entirely after it, the latter appears more advantageous to the Armed Forces themselves.

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[1] See *Lancet*, 1946, ii, 305.

It is also less wasteful to the community as a whole. The latent shortage of doctors will become manifest when the National Health Service comes into operation, and this shortage cannot be overcome for many years because of the insufficient capacity of our medical schools. Until (if ever) there is a surplus of doctors, every man or woman who has passed successfully through a medical school must be regarded as a national asset. The effect of calling up men before military training is to subtract at least 18 months from their professional working lives, and such wastage of medical educational resources should be avoided if possible. The Services may say that in peace-time they could not find work for all the men who qualify in medicine each year; and the emphasis might have to be on training and observation of Service medical methods rather than on active employment for all. But is there any reason why a considerable proportion of these young men should not be seconded for part of their time to the Colonial Medical Service or indeed to any other national service which has need of them?

The medical schools can turn out only a limited number of doctors each year, and the greatest advantage will be gained if these qualify at the earliest age that they are competent for their work. Even with this principle conceded, they must still undertake "national service," but we hope that in course of time the present narrow connotation of that term will be extended (as it already has been with miners) and that it will come to include work in civilian hospitals abroad or even at home. If the different Government departments begin to compete for the services of young doctors, the Medical Priority Committee would be the right body to judge between them, and it will gain wide support if it tries to arrange a realistic distribution.

THE STEVENS-JOHNSON SYNDROME

THE rare syndrome of which two examples were described in these columns last week by Dr. Murray and Dr. Nellen is one of the conditions which may lead the doctor to suspect smallpox and the smallpox expert to say: "It isn't smallpox, but I don't know what it is." First noted in France in 1822 by Alibert and Bazin, it was not until a century later that Stevens and Johnson[3] in the U.S.A. drew attention to its characteristic features—swinging fever, skin rash, stomatitis, and ophthalmia—though Hebra had included it in his *Diseases of the Skin* of 1866 under the name of erythema exudativum multiforme.

It is found almost exclusively in boys or young men. The rash is usually but not always preceded by several days of gradually increasing cough, malaise, headache, and vomiting. The distribution of the rash is mainly peripheral, the dorsum of the hands and feet, the forearms and legs, and the face being the sites of election. It starts as macules or papules about 1·5 cm. across, each surrounded by a ring of erythema; later, vesicles appear, followed by crusts which leave little or no mark. As a rule the rash does not itch. For about the first week the temperature swings between 102° and 105° F, after which it falls to around 99° F. The most unpleasant and dangerous part of the illness is the swelling and infection of mucous membranes, particularly of the conjunctiva, mouth, and urethra. The tongue and lips may swell to twice their normal size, and the eyes may be up with pus; the Rosenbergs draw attention to the air of dejection which these swellings give to the patient. Partial or complete blindness is a common sequel, resulting from corneal ulceration and scarring, bilateral suppurative keratitis, and other causes.

So far, attempts at incriminating an organism have failed—Vincent's organisms have not been found regularly in the mouth, fluid taken from a vesicle of one of Dr. Murray's cases proved negative when examined for variola-vaccinia antigen, and no predominant organism was grown from a purulent urethral discharge. The ætiology must be regarded as unknown, though allergic sensitisation seems to be a factor. As regards treatment, there is not much evidence that the sulphonamides have any specific effect; whether the fall in temperature had any association with the penicillin given in Dr. Murray's case is uncertain. The most urgent measure seems to be protection of the eyes.

THYROIDECTOMY OR THIOURACIL?

DISCUSSION of toxic goitre nowadays centres round the place of thiouracil in treatment. At the Medical Society of London meeting on March 10 the balance of opinion was against thiouracil; its drawbacks, said Dr. Horace Evans, are the risk of idiosyncrasy, the persistence of the tumour, and the need for protracted treatment. There is, he suggested, little to choose between the results with thiouracil and those after subtotal thyroidectomy by an expert surgeon; surely the short treatment by surgery is preferable. In his view thiouracil has its value in the preoperative preparation of iodine-sensitive patients, and in the treatment of those who refuse operation or are poor operative risks; it is a substitute for operation where expert surgery is unobtainable.

Mr. Geoffrey Keynes also preferred surgical treatment He argued that the sustained use of thiouracil, which is a dangerous drug, must mean psychic trauma to both patient and doctor. Means, of Boston, found that the condition after withdrawal of the drug was satisfactory in only 10% of over 1000 cases; and when the drug was resumed toxic reactions became more frequent Mr. Keynes mentioned cases in which thiouracil has proved ineffective or actually dangerous. Some patients with toxic goitre—particularly the nodular variety—get worse despite this treatment; some are intolerant of thiouracil; a pregnant woman treated with it may give birth to a baby with a large thyroid; and there is a possible, though unproved, risk of carcinomatous change. He preferred a carefully planned operation; in over 2000 cases operated on at St. Bartholomew's Hospital, London, the death-rate was under 1%. The trouble with thiouracil is that it does not act on the gland; by depriving the gland of iodine it stimulates it to further activity. Preoperative treatment with thiouracil may prejudice surgical chances, for after this treatment there is often torrential hæmorrhage at operation. Thiouracil may be of value in the preoperative treatment of patients whose condition is really acute, otherwise its use means loss of time and effort, since before operation its effect has to be damped down again with iodine. To the question "Have we gained from thiouracil?" Mr. Keynes's answer was: "While the drug is being given with enthusiasm we have lost heavily. So far, on balance, there is a heavy loss."

This view was largely supported by the meeting; for the young woman with thyrotoxicosis, it was suggested, "there is much to be said for leaving the invisible scar rather than the larger goitre." Dr. Evan Bedford's faith in surgery was unimpaired: "I cannot conceive of the heart patient," he said, "who cannot be prepared for surgery with iodine; I go on with it, if necessary, for a month." The aim, when there are cardiac complications, is not only to end the thyrotoxicosis but to produce myxœdema; with primary goitres there may be a case for thiouracil, and operation, if undertaken, must be radical. As a therapeutic test, Dr. Evans held that thiouracil is useless; others thought it might have some value.

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[2] Hoffstaedt, E. G. W. *Ibid*, p. 506.

[3] Stevens, A. M., Johnson, F. C. *Amer. J. Dis Child.* 1922, **24**, 526.

The case for thiouracil was put by Dr. W. R. Trotter. The criterion in choice of treatment should, he maintained, be the case-mortality. The operative mortality of subtotal thyroidectomy in Mr. Keynes's series is under 1%; but the overall rate for the country is at least 5%, and there is little hope of the general run of surgeons ever gaining the proficiency of the expert. The claim for thiouracil is that if it generally superseded surgery fewer people would die. In Dr. Trotter's opinion the danger of thyroid enlargement with thiouracil has been exaggerated. If there is any swelling this simply calls for reduced dosage; but usually the gland remains the same size or actually shrinks—probably because of a natural remission. Thiouracil, he agreed, is not a radical cure; so it is probably owing to spontaneous remissions that the drug can sometimes be discontinued without symptoms recurring. He agreed, too, that thiouracil is unsuitable for nodular goitres, since most of these are already causing, or are likely to cause, mechanical obstruction.

THE FILMSTRIP IN MEDICAL TEACHING

A FILMSTRIP resembles a box of lantern slides in being a collection of pictures or texts for projection on to a screen, but here they are assembled on a continuous strip of 35 mm. ciné-film. Its uses in the training of medical students were discussed at a joint meeting of the Royal Society of Medicine and the medical committee of the Scientific Film Association on Feb. 12. As Dr. Peter Hansell pointed out, filmstrip is much lighter to carry about but more easily scratched than slides, and it is tedious to change the order of the pictures. However, a teacher can have his various illustrations, tables, texts, and charts copied on a filmstrip, slip it into his waistcoat pocket, and go off to his lecture secure in the knowledge that his projectionist cannot screen his pictures in the wrong order. If he wishes radically to alter the presentation of his lecture he must make up a fresh strip, but they are cheap enough for this not to be a serious deterrent. A special projector is necessary, and Dr. Brian Stanford emphasised that there is room for improvement in the design of those now on sale.

A more advanced concept of the filmstrip is a prepared sequence of pictures, each showing, for example, some change from the last, so enabling the stages of a process to be followed step by step. The advantage here over slides lies in the very fact that the order cannot be muddled by the projectionist, and the advantage over ciné-film is that each stage can be held on the screen for as long as the teacher desires. Indeed, he may project his pictures on the blackboard, draw in the next step with chalk, and then flick on the next picture, so building up an artist's presentation of the subject however imperfect his draughtsmanship. This technique has obvious applications in the teaching of anatomy and surgery. By extending it further, a subject, such as first-aid, may be broken down into its visual stages which are then presented at a speed convenient to the intelligence of the class. Sometimes, as Mr. J. P. Stephenson showed, no commentary is necessary, and the filmstrip will have much the effect of an animated diagram film at a fraction of the cost. Other filmstrips require verbal explanation; this may be provided extempore by the teacher or may be based on a booklet issued with the filmstrip. An example of the last class is the nutrition series issued by Common Ground Ltd., with teaching notes for school-children and fuller ones for adult audiences.

The manufacture of the more ambitious kinds of filmstrip is a growing branch of the film industry, which has specially trained artists already at its command. The making of instructional films is becoming more and more a composite function, involving the simultaneous production of strips, booklets, wall-charts, note-sheets, and even models by a team consisting of educational psychologist, practising teacher, subject expert, filmmaker, and unifying producer.

KIDNEY AND LIVER IN WEIL'S DISEASE

DIMINISHED renal function is one of the outstanding features of Weil's disease: fatal cases usually terminate with oliguria leading to anuria. This renal failure is of complex ætiology. The kidney lesion is mainly tubular and resembles the pigment kidney of incompatible blood-transfusion or crushing injuries.[1] There are at least three possible sources of the pigment. It may be bilirubin; and comparable changes occur in other forms of severe jaundice. It may be myoglobin, suggesting an analogy with the crush kidney; and severe muscle necrosis is a feature of Weil's disease.[2] It may be derived from hæmoglobin; in Weil's disease blood destruction occurring in the spleen is greatly increased.[3] In addition to the pigment effects there is also the direct action of the spirochætes on the kidney. The uræmia, however, is not only renal but also prerenal. The cardiac output is thought to be low, possibly because of the myocardial changes, and the blood-pressure falls; so there is probably a reduced renal blood-flow.

Though jaundice is the most obvious clinical finding in Weil's disease, it seems likely that hepatic failure contributes little to the fatal outcome. Hepatic lesions are, in fact, often minimal. Wylie [4] found that necrosis of the liver is an inconstant feature of experimental leptospirosis icterohæmorrhagica. Hutchinson and his colleagues [1] described five fatal cases in an outbreak in the British Army in Italy and remarked on the absence of hepatic damage. Often the liver shows only lymphocytic infiltrations around the portal tract, resembling the late stage of acute infective hepatitis. Liver-cell mitoses indicate that repair is already in progress. It may be that the maximal liver damage is early and that recovery takes place while the renal damage is still progressing. Study of hepatic histology by aspiration biopsy in the earlier stages may reveal more severe damage than in patients dying later from uræmia.

In human Weil's disease much further research is needed into the mechanism of the uræmia and the jaundice. Careful studies of the circulation and of renal and hepatic function by modern methods are still lacking: the evidence at present rests almost entirely on necropsy studies and animal experiment. Uræmia being the most usual termination, treatment should be directed to the kidney. In mild cases a minimum fluid intake of 2 litres a day with early alkalisation of the urine may be sufficient. In an anuric patient Williams [5] established a diuresis by high spinal anæsthesia, but this measure lowers the already low blood-pressure, so peritoneal lavage or use of the artificial kidney [6] may be more successful. It should, however, be remembered that Weil's disease is a severe acute toxæmia with lesions in almost every organ. Early diagnosis is essential, and, as Bulmer [7] has shown, prompt penicillin therapy may prevent the development of the serious renal complications.

1. Hutchinson, J. H., Pippard, J. S., Gleeson-White, M. H., Sheehan, H. L. *Brit. med. J.* 1946, i, 81.
2. Jeghers, H. J., Houghton, J. D., Foley, J. A. *Arch. Path.* 1935, 20, 447.
3. Martin, L., Pettit, A. O. Spirochétose Icterohæmorrhagique, Paris, 1919.
4. Wylie, J. A. H. *J. Path. Bact.* 1946, 58, 351.
5. Williams, M. H. C. *Lancet*, Jan. 18, p. 100.
6. Kolff, W. J. The Artificial Kidney, Kampen, 1946.
7. Bulmer, E. *Brit. med. J.* 1945, i, 113.

OPERATION NUTS

UNLESS new action is taken, the shortage of oils and fats will continue till 1960 or even longer. Britain's deficit alone is estimated as equivalent to $1^1/_4$ million tons of ground-nuts a year. India, once the largest exporter of these, now requires for her growing population all that she produces.

The world's hunger, it has been said, is Africa's opportunity, and last summer a mission went out to examine the feasibility of East and Central Africa taking India's place as chief provider. The mission's scheme,[1] which has the Government's full support, is inspiring not only in its scope but in its implications for a hungry world and a needy quarter of the African continent. Within the next six years 3,210,000 acres of undeveloped land in Tanganyika Territory, Northern Rhodesia, and Kenya is to be cleared and planted with ground-nuts. *Arachis hypogæa,* which bears this nut (better known also as the earth-nut, pea-nut, or monkey-nut), has been chosen because, of all annuals, it gives the highest yield of oil per acre, and because its production can be almost wholly mechanised. Speed is the essence of this vast programme, and already the world is being scoured for bulldozers to clear the 150,000 acres which are scheduled for planting before the end of this year. The cost to Britain will be in the neighbourhood of £24 million, but with a probable production of over 600,000 tons from 1952 onwards we shall be saved over £10 million a year on our food bill.

As a business undertaking the plan can hardly fail: what of it as a colonial enterprise? The governments in Africa have acclaimed it, stipulating only that labour shall not be diverted from established industries, that the land shall not be exploited, and that the project shall be capable of eventual integration into the African economy. These provisos, it seems, are to be met: labour is to be drawn from areas of over-population and under-employment; the quality of the land is to be improved, and the improvement maintained by its being kept under grass for two in every four years; and control is to pass, after an agreed period, to the local governments. The report suggests—though this will be for local decision—that Africans themselves, when once trained for the task, might farm the land collectively. In direct employment the immediate benefits are not great: once development is complete the scheme will require only some 30,000 African men. Many in this and other countries, however, will judge the quality of our intentions by the conditions of life and work which these men are offered. The surveyors' recommendation, endorsed by the Government, is, so far as it goes, clear enough:

> "We consider that each of the 107 units could be so organised as to provide a centre for the introduction of improved standards of housing, health, nutrition and welfare, in short, as a model of better general standards of living for the African people. The adoption and maintenance of these standards should not present any insuperable difficulty since the project will from the outset provide housing, medical attention and welfare for these new communities and will also produce or procure for them the bulk of their staple foodstuffs."

Establishment of these new communities will be no small task. Families coming from different areas may not take kindly to mixing in a single community. As a pastime back-garden farming may catch on, but there must also be some substitute for the excitements of village life. Children must be schooled, and after leaving school employed—perhaps in village crafts—if hooliganism is to be averted. Here is town-planning with a vengeance. The Colonial Medical Service's resources in personnel are already fully stretched; so the scheme must from the start be medically independent. The organisers, likening their undertaking to a military operation, are seeking to benefit by the Army's campaigning experience. Hospital and field medical equipment are to be of standard Army pattern, and a R.A.M.C. officer has been seconded as chief health officer, to be joined probably by an Army hygiene officer.

For Africa one virtue of the scheme is its flexibility: it can be scaled up or down as needs dictate, and the developed land may be used for other cereals and even for animal husbandry. Among the other likely benefits are a strengthened economy; improvements in water-supplies and in road, rail, and port facilities; the fruits of research into such fields as meteorology, soil fertility, and crop diseases; and the disappearance, through bush-clearing, of the tsetse fly from large areas. The greatest indirect benefit will be the opportunity for the African to learn modern farming methods. Only one man is needed for every hundred acres, but of the 300 farming each 30,000-acre unit 70 must be taught to be technicians. About the need for an object lesson on these lines the surveyors are emphatic:

> "Some idea of agriculture in East and Central Africa can be gathered by imagining the deplorable state of production which would occur with farms in Britain if all straw and other crop residues were burnt, no manures of any kind were ever applied to the land, and a small hand-hoe was the only implement used in crop production. If we add to this a condition of malnutrition and such debilitating diseases as malaria and internal parasites, including hookworm, some idea may be formed of the conditions of crop production in tropical Africa."

Finally the scheme will provide much-needed living-space.

> "Excess of population," says the report, "could be accommodated on millions of acres of potentially good agricultural land which exist both in Tanganyika and Northern Rhodesia. But much of this is tsetse infested and densely covered with bush. There can be no hope for migrations of people into such land, so long as they have to depend on the axe and the handhoe to bring it into use. Only by means of the tractor and the bull-dozer, the ripper and the disc-plough can such land be brought into a state fit for permanent human habitation."

These are the methods now being called into use. For once, it seems, good business may go hand in hand with sound colonial development.

JOINT CHANGES IN CANCER OF THE LUNG

JOINT changes are occasionally recognised in cases of pulmonary carcinoma and other lung tumours, and they may even be the earliest feature which brings the patient to the doctor. Complete examination then reveals an unexpected radiological opacity which represents a neoplasm of the lung. This tumour may be symptomless, and on first sight it may seem difficult to establish any connexion between lung and joint conditions. It is common to find in such cases that the joints have been treated as rheumatic without benefit. They are characterised by a polyarthritis affecting principally wrists, fingers, and ankles—less often elbows, knees, and spine. There is considerable swelling of soft tissues, and bone changes typical of hypertrophic pulmonary osteo-arthropathy are seen in advanced cases. Clubbing of the fingers is common and takes the drumstick form. Pain is a constant and distressing feature, associated with severe limitation of movement. There appears to be little relationship between the site and size of the lung tumour and the severity of the joint lesions.

The arthropathy may be dramatically relieved on removal of the lung. Patients who were so crippled that it was difficult to place them on the operating-table have claimed loss of pain and improvement in joint movement on their recovery from anæsthesia after pneumonectomy.

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[1] A Plan for the Mechanized Production of Ground-nuts in East and Central Africa. Cmd. 7030. H.M. Stationery Office. Pp. 48. 1s.

Some have been walking about comfortably a week or so afterwards, and though structural changes persist the swelling of soft tissues may resolve.

Three cases which fall into this category are reported from Argentina by Rottjer and colleagues.[1] In their patients, whose ages were 44, 47, and 64, pneumonectomy was performed with sudden relief of the "rheumatic manifestations." The tumours were classed as adenocarcinomata, but they do not say whether there was the extensive tissue breakdown or infection which is usually seen in this type of case. No satisfactory explanation of the association of joint and lung conditions has been forthcoming. Anoxia can hardly be the link, since improvement results from excision of the affected lung. Theories based on dyspituitarism and endocrine disturbances have been advanced, but more attention should be given to sepsis from breakdown of the growth. The syndrome can only be regarded as an occasional occurrence, but it deserves more detailed investigation and should be borne in mind as a possible pointer to early diagnosis.

THE SPRINGS OF DELINQUENCY

STUDIES of criminal psychology have important bearings on juvenile delinquency and on remedial methods in punishment. The Institute for the Scientific Treatment of Delinquency was established fifteen years ago, after the Medical Research Council had shown that scientific methods of diagnosis and treatment could be applied to people serving prison sentences. A letter from the Archbishop of Canterbury, Lord Horder, Sir Cyril Burt, Mr. J. A. F. Fergus, and Dr. Edward Glover, in the *Times* of March 12, tells the present need of the institute for support. During the war it undertook many clinical studies of delinquent and antisocial disorders, and much successful treatment. The recent crime in an approved school, where the violent fantasies of adolescence found outlet in actual murder, illustrates the need to continue and expand such studies. The crime, horrifying as it is, reveals so little grasp of reality or of ability to picture consequences, such hunger for notoriety at any cost, and such disregard for the sufferings of others that it is a symptom of very grave disorders in the children who committed it. If we are to prevent similar disasters we must find methods of training delinquents more effective than our present ones. The institute exists to forward such studies, and many interested in juvenile delinquency will wish to give it their support. The address is 8, Bourdon Street, London, W.1.

PLASTIC EYES

THE acrylic resins, used for some time in dentistry, have proved satisfactory for making artificial eyes. Plastic eyes are unbreakable and can be added to or subtracted from if the socket changes in shape. It is also claimed that the constant action of the tears does not roughen their surface and necessitate a change of eye every 1 or 2 years, as happens with glass; but the eyes have not been long enough in use for anyone to make dogmatic statements about their lasting powers. In difficult sockets an impression of the socket can be taken with 'Negocoll,' which is just solid at body temperature and liquefies on further slight warming, the plastic eye being then shaped from this mould. The iris is painted on paper and incorporated in the eye behind a layer of clear resin.

These eyes are somewhat heavier than glass ones, but no other disadvantage has become apparent except the price, which must be reduced before they can hope to become popular. The cost is now five times that of a glass eye, and there seems no reason why this should be so. The skill required to blow a glass eye must surely be greater than that needed to make one in plastics.

The acrylic eye has been adopted by the American Veterans Administration for all ex-Servicemen who require artificial eyes, and no complaints have so far arisen.

CONTROL OF ANTIBIOTICS

THE Penicillin Bill, presented in the House of Lords on March 5 by Lord Listowel, makes it an offence to sell or supply penicillin (or similar substances included by regulations) to the public except by or under the direction of a doctor, dentist, or veterinary surgeon, or by a chemist on the prescription of a doctor, dentist, or veterinary surgeon. The Government's advisers think that free access to penicillin would be dangerous to the public health, and for this reason it has been decided to continue the measures of control made under the Defence Regulations by the Minister of Supply, even though there is now enough penicillin for all home purposes and a surplus for export.[1] The main danger is thought to be that indiscriminate and inadequate dosage might lead to the production of insensitive organisms. Penicillin might also be used for the self-treatment of venereal diseases, which would add greatly to the difficulty of preventing their spread.

The Bill applies only to the supply of penicillin to the public. It does not impose any controls on wholesale dealings or exports. Power is given to the Health Ministers to make regulations bringing under the same control any "other anti-microbial organic substances produced by living organisms," after consultation with the Medical Research Council.

STAFF SHORTAGE IN MENTAL HOSPITALS

THE murder of a patient in the Oxford County and City Mental Hospital last November, which was described at an inquest on March 3, was a dreadful result of the lack of nursing staff. The ward in which the murder was committed contained 91 patients, and only one nurse was on duty at the time. Two other patients were in the habit of helping the nurse in the mornings, and they were washing the murdered patient in the bathroom at 6.30 A.M. on the day in question. According to their evidence, they afterwards carried her back to bed, but the nurse testified that when she visited her at 7 A.M. she was dead, having been strangled. The verdict was of murder against some person unknown.

These dangerous staff shortages must not be allowed to go on. The mental hospitals should at once start considering the employment of part-time nurses on terms similar to those which have proved successful in institutions for the chronic sick. The mental subcommittee of the Rushcliffe Committee have already recommended scales of pay for such nurses, which the Minister of Health has approved.[2] For nurses working less than 30 hours a week they are: ward sister 3*s*. an hour, deputy sister 2*s*. 6*d*., staff nurse 2*s*. 3*d*., nursing assistant (class I) 2*s*., temporary war emergency nurse 1*s*. 10*d*.

LORD HORDER, who is chairman of the Standing Committee on Nutrition of Food and Agriculture Organisation of the United Nations, left for Washington on March 15 and will be away until April 14.

THE first scholarship for the British Empire Nurses' War Memorial Fund has been given by the Royal College of Physicians of London. Lord Moran, in announcing the gift, spoke of the nurses as colleagues to whom doctors owe everything: "it would be impossible for us to work without them." The sum of £200 a year for seven years has been given under covenant, which will bring in the necessary £350–375 for this travelling scholarship. A second scholarship has been given on similar terms by Viscountess Mountbatten.

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[1] Rottjer, E. A., Aguilar, H., Lascalea, M. C. *Rev. San. milit.* 1946, 45, 1163.

[1] See *Lancet*, March 8, p. 309.

[2] Circulars 27/47 and 27a/47.

Reconstruction

GENERAL PRACTICE TOMORROW

H. H. Leeson
M.C., M.R.C.S.

Regulations and terms of service for general practitioners under the National Health Service Act must soon be made. General practitioners are the shock troops of medicine—on whose skill, decision, and courage the whole service will stand or fall—and the new arrangements must be such that the finest type of men will want to undertake the work. What then will attract the best type into this branch of medicine? Here in brief is what we want:

Reasonable working hours.
Suitable premises to work in, with ready facilities for all forms of simple examination.
Relief from clerical duties other than patients' case-taking.
Reasonable holidays each year, and relief if sickness overtakes us.
A service in which we can practise our craft without having to build up a business connexion—one in which other doctors can be colleagues, not rivals.
Opportunities for study and refresher courses when necessary.
A living wage on qualification with prospects of making a good income, according to ability, by the age of 40 (or less).
A pension on which to retire in comfort in our old age.

REASONABLE WORKING HOURS

Most general practitioners begin their day about 9 A.M., with morning surgery, and thenceforward are more or less busily engaged till tea-time at 4.30-5 P.M. Then comes evening surgery, which may end at any time from 6.30 onwards according to the district. Most people would call this a good day's work, but the practitioner's day seldom ends there. The evening rarely passes without further calls, and when these have been attended to he may still be called out after he has gone to bed. This goes on week in, week out—Sundays and half-days excepted, unless an emergency arises. No-one could describe this life as "reasonable working hours." No wonder there will be a rush for specialist jobs.

What then should be considered a reasonable day for a general practitioner? Of course, he will have to hold morning surgery as usual, and also evening surgery as usual, and pay such visits during the day as are required; but once evening surgery is over he should be free of all duties until 9 A.M. next day. He should also be entitled to a half-day once a week and to a whole day off on Sunday. During his absence from duty the work must be taken over by an emergency officer. Easy to arrange when the health centres are started.

These proposals might at first meet with criticism from the public; but opposition should be dispelled when it is explained that doctors, like others, get tired, and that when tired their brains may become clouded and their judgment warped, with consequent risk of mistakes.

SUITABLE PREMISES

How many doctors have suitable premises to work in? The average general practitioner cannot afford the substantial sum needed for good accommodation and equipment. It is not his fault that he has not got the place he would like. What he wants in order to provide a better service is free and rapid access to a first-class X-ray and laboratory service: the swab, the blood-count, the hæmoglobin estimation, and the X ray have now become indispensable.

CLERICAL WORK

Those of us who are fortunate enough to employ a secretary or book-keeper dispenser know how much they can relieve the busy doctor of clerical work. With the advent of health centres most of this non-professional labour will disappear, the general practitioner being responsible for his own case-takings only. All record-keeping, forms, and returns should be tackled by the clerical staff under the lay superintendent.

REASONABLE HOLIDAYS

A month's holiday each year is essential to any brain-worker whose work is as long and arduous as that of a general practitioner. It need not be taken all at once. Yet not many of us get it—principally, I believe, because of the expense. To begin with, thirty days' locum fees at £2 per day=£60. Then the house has to be run, and food, &c., provided; on top of which comes a month away, probably for four, at some hotel or farmhouse. £100 goes nowhere.

Under a national service, properly run, the picture should be very different. The locum is provided; the health centre goes on; and there are holidays with pay. The only expense to the doctor would be the cost of his family by the sea or in the country. *In comparable forms* of Government service at least a month's holiday with pay is allowed. Why not for the general practitioner?

COMPETITION OR COÖPERATION?

The time is long past when doctors should be forced to look on patients as a means to an end. Here I cannot do better than quote the Spens report:

> "The help, support and comfort that a doctor can give to his patient must, in our judgment, be seriously affected if a doctor is himself seriously worried. . . . We have no doubt that low incomes have in fact been a source of great worry to many general practitioners and prejudiced their efficiency. If, therefore, we are to attract the finest type of man into the profession, we must ensure that he is able to look on each patient as a case and not as a source of income."

I am sure all of us who have been in the public service—*in Army, Navy, or Air Force, or in municipal life*—must have appreciated, as I did, the delightful spirit of camaraderie, and the mutual assistance and coöperation that existed there. In the late war, when many general practitioners worked under my administration, I was much impressed by the speed with which they acquired esprit-de-corps and their liking for it compared with the competitive and soul-breaking methods of civil life.

OPPORTUNITIES FOR STUDY

The science and art of medicine move so fast these days that it is difficult for even the most successful general practitioners to keep themselves up to date; yet all should be cognisant of the latest forms of treatment. Not very long ago, in a remote country district, an elderly practitioner told me that his initial dose of the sulphonamide group of drugs was one tablet three times a day; yet his patients thought a lot of him. A compulsory refresher course every three years should be provided without expense *to* the doctor, and should be followed by a rise in pay.

REMUNERATION

And now I come to the most controversial part of my article. What remuneration should a doctor receive in a publicly organised service and how should it be computed?

It is obvious that a young man or woman, on entering the service, must have something to live on; and this should be the basis on which all future emoluments are built up. The Spens Committee very rightly recommended for assistants a salary on entry of £500 per annum. If this were regarded as the basic salary for all doctors, it could then be supplemented according to age, length of service, ability, position held, and number of patients for whom responsibility is taken.

On this plan remuneration would fall under the following heads:

Basic salary.
Increments for length of service.
Capitation fee.
Administrative, specialist, or extra-duty pay.
Locality allowance.
Mileage allowance.

Every doctor would draw the basic salary of £500. In addition he would receive, say, £25 per annum for each year of service, and capitation fees according to the number of patients on his list. Doctors undertaking administrative or specialist work, or extra duties, would be paid according to the particular post held, and their income therefrom would take the place of the capitation fees paid to the general practitioner. A locality allowance would be given to doctors working in unattractive or congested or less healthy areas, and a mileage allowance to rural practitioners who, owing to distance, cannot look after as many patients as their urban counterparts. Finally, a higher capitation fee might be paid in respect of patients over 60 years of age, so as to compensate doctors working in places where there are many elderly people demanding more than normal attention.

The number of years a practitioner has already spent in practice should be allowed to count for seniority in the new service: thus a doctor of ten years' standing would enter with ten years' seniority for pay and other purposes. I have suggested elsewhere [1] that a practitioner of more than ten years' standing should be graded as a specialist in general practice.

PENSIONS AND SUPERANNUATION

General practitioners as a class are not well-to-do; in fact lack of means often obliges them to go on working long after the usual retiring age. On the institution of the new service some elderly doctors may find themselves in a somewhat parlous position: in these difficult years they may have saved little or no money, and the compensation paid by the State for the goodwill of their practices will not suffice to keep them. These men will be ineligible for a pension in the ordinary way, yet it will be in the interest of the community that some of them should now retire. How is it to be done?

I suggest that (save in exceptional circumstances) all practitioners who join the service on its formation and are 65 years of age or over shall be given the option of (*a*) *receiving a cash settlement for their practices*, or (*b*) forfeiting their right to a lump sum, receiving in lieu a pension for their lifetime. On this plan a practitioner whose financial position is sound could augment his capital by accepting a lump sum, while one whose resources are poor would be able to choose a pension instead.

What should this pension be? The ordinary Civil Service scale of $^1/_{80}$ of retiring salary for every year of completed service would not be applicable unless amended. If, however, this small body of men were allowed to reckon the number of years since qualification as years of service, then in most cases they would get $^{40}/_{80}$ of income on retirement, which should meet their needs in their old age. For this class of man some sort of "means test" might have to be devised, in which the applicant would be required to prove that in his case the concession was necessary.

CONCLUSION

After many conversations with all grades of medical men—young and old; consultant, specialist, or general practitioner—I am certain that the success or failure of the National Health Service will depend in the first place on the terms and conditions offered. Let us therefore profit by the lessons of the past. *No ship ever sailed well yet with a discontented crew.*

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1. Leeson, H. H. Your Doctor of the Future, High Wycombe, 1944, p. 26.

Special Articles

LACTATION

A POSTGRADUATE LECTURE

In his lecture to postgraduates at the Royal College of Obstetricians and Gynæcologists on Jan. 10 Mr. S. J. FOLLEY, D.SC., *of the National Institute for Research in Dairying, Reading, discussed recent researches into the physiology of the mammary gland which are likely to have clinical applications.*

Earlier work indicated that œstrogen mainly stimulates the growth of the mammary ducts, while progesterone is particularly related to lobule-alveolar development. Species differences in the mammary growth response to œstrogen have however been recognised. In species such as the rat, œstrogen causes very little alveolar growth; in guineapigs, ruminants, and probably monkeys, considerable (though not necessarily normal) alveolar as well as duct development results from treatment with œstrogen alone. In the ruminant these findings may be of practical importance in connexion with the artificial induction of udder development and lactation in barren animals. On one view ovarian hormones do not directly cause mammary growth but do so indirectly by stimulating the secretion by the anterior pituitary of two specific mammogenic hormones which are the direct agents promoting growth of the mammary ducts and of the alveoli. While the integrity of the anterior pituitary does seem to be necessary for normal mammary growth under experimental conditions, the truth of this "mammogen" theory has not yet been proved with certainty.

Modern studies on the function of the mammary gland date from the discovery in 1928 that the anterior pituitary is concerned in the initiation of lactation (lactogenesis). This work was the first of numerous studies which have culminated in the preparation, as a pure protein, of an *anterior-pituitary hormone, prolactin*, which is widely regarded as a specific lactogenic hormone solely responsible for lactogenesis. However, it appears probable that other anterior-pituitary hormones are also concerned in the initiation of lactation, so we are led to the conception of a lactogenic hormone complex. Prolactin is less effective than crude anterior-lobe extracts in stimulating already established lactation (galactopoiesis), and here again a hormone complex, which may or may not be identical with the lactogenic hormone complex, is probably involved. This explains the variable and sometimes disappointing results obtained in clinical trials of prolactin for the treatment of hypogalactia, since the preparations used are standardised only in terms of prolactin by the *pigeon crop-gland method*.

Experiments on small animals had led to the view that œstrogen inhibits lactation, a view which has been accepted and applied in practice by many clinicians. The reality of the inhibitory action of œstrogen has however been questioned, and some clinicians ascribe the beneficial effects of œstrogen in cases where lactation is contra-indicated to the relief of painful breast engorgement. The fact that œstrogen under some conditions exerts mammogenic and galactopoietic effects is illustrated by recent work on the artificial induction of udder growth and lactation in virgin goats and heifers.

The posterior pituitary is now thought to be concerned not with the secretion of milk but with the mechanism governing its egress from the mammary gland—in other words, with the process of suckling or milking. When a cow is milked, palpation of the teats or the operation of any other conditioned stimulus is quickly followed by a sudden rise in milk pressure in the udder cisterns—the so-called "let-down"—only after the occurrence of which can the correct yield be obtained. The let-down has been ascribed to a nervous reflex causing contraction of smooth muscle-cells associated with the alveoli, or alternatively causing "erection" of the udder tissues due to occlusion of venous vessels and the engorgement of a corpus cavernosum with blood. According to a recent view, the let-down results from the contraction of smooth muscle-cells associated with the alveoli under the influence of oxytocin reflexly secreted by the posterior lobe of the pituitary in response to the stimuli of milking.

The research done on the physiology of milking throws light on some of the difficulties encountered in infant-feeding, since a failure of the discharge mechanism will amount to a failure of lactation, and many cases of deficient lactation in women may be due not to secretory deficiencies but rather to a breakdown of the neuro-hormonal mechanism governing the discharge of milk from the mammary gland.

MICROFILM PROJECTORS

A CORRESPONDENT remarks that the microfilm projectors now available are, in general, adaptations of models originally designed for reading newspapers measuring about 18×24 inches, and radical changes in their design will have to be made if they are to be used for books and journals whose pages seldom measure more than 9×12 inches. He sends us the following suggestions for the design of a microfilm projector suitable for use in a medical library.

To be acceptable to the student (undergraduate or postgraduate) the projected image must be presented under conditions comparable to those under which he reads his book: it must be in front of him, inclined at an angle approximately normal to his line of vision, and so placed as to permit a notebook to be near at hand which is properly lit for comfortable writing but not much brighter or dimmer than the projected image. The viewing surface must be screened from the general room lighting, for otherwise the projected image would be diluted, and being low in contrast would be difficult to read.

One of the chief objections to microfilm is that, being a continuous strip, it is awkward to refer from one "page" to another some distance away. In fact, with existing apparatus, it is tedious to read a long text which refers over a number of pages to, for example, a diagram or chart which was printed on the page on which it was first needed. For this reason the projector should provide a mechanical means of transferring rapidly and easily from one section of the microfilm to another either forwards or backwards, and it may be desirable to make this mechanism foot-controlled.

A useful addition would be a numbered counter or dial which, when set initially to the page number, will change automatically as the pages pass through the projector. This is important in cross-referring, for as the "pages" flash through their numbers are illegible, and much time would be wasted and annoyance caused by continually stopping to find which page is now in the field; a counter will remain legible and can be followed all the time.

It is sensible to make the microfilm in such a way that, no matter what the size of the book, it appears a constant size on the microfilm; therefore the projected image, to be read comfortably, must be at least as big as the largest size of page customarily used, yet not much bigger or the angle of ocular scanning will be larger, and eye-fatigue set in rapidly. This is an important consideration which is closely allied with the contrast of the projected image, for if these two factors are neglected microfilm reading becomes tedious. But since different books are printed in different type-sizes variable magnification is desirable, ranging over ×6 to ×10.

A microfilm reader designed to satisfy the foregoing subjective requirements will also have to possess the following features.

Optics.—The optical train must be of first-class design, casting a clear, sharp, contrasty image, and be well ventilated. It should consist of a pre-focus compact-source lamp, backed by a mirror and facing an achromatic condenser system of sufficient diameter; the lens should be an anastigmat in a focusing mount. The film gate should consist of a plane-parallel glass pressure-plate bearing on a metal aperture. The entire optical system must be capable of being easily dismantled for cleaning, and so constructed that elements can be replaced only in their correct positions. The intensity of the light-source must be controllable.

Film Transport.—The pressure-plate must rise automatically before any film transport occurs, and fall back automatically when the film is stationary. It must be automatic, in that the film will come to rest with a "page" exactly in position over the gate, and not in any intermediate position. This transport can be electric, so that pressure on one button will cause the film to advance continuously until the desired page is nearly reached, and then under stabbing pressure will advance one page at a time, while pressure on another button will cause the film to run backwards similarly. As mentioned previously, these buttons may be foot-controlled. An alternative system can be devised which, looking like a 3-bank typewriter in which each tier is numbered 0–9, will permit the exact page desired to be automatically presented by prodding the appropriate keys: or a telephone dial system can be used. It is evident from these proposals that the mechanism is activated by motor rather than by hand.

Loading.—The projector must take both short lengths (6 inch) and long rolls (of up to 100 ft.) of film. The sprockets should engage smoothly and positively and the counter must be capable of being set initially to the page number in the gate and then remaining automatically in step. It would be desirable for the gate to accept both loose rolls and permanently maintained cassettes.

Construction.—The microfilm reader so designed would be a library model, made for hard and constant wear. It must be rigidly and soundly constructed, with fool-proof loading and working mechanisms capable of being easily serviced or replaced.

But this is only one opinion. It seems reasonable to ask, say, five men who use microfilm occasionally to try the best existing types of apparatus and then to draw up their own list of requirements. (They must be *occasional* users, for regular users will have become accustomed to the characteristics of a given model, and one can get used to anything with practice.) With these desiderata for guidance, manufacturers might abandon their present production of ad-hoc adaptations of apparatus originally made for other purposes, and produce a microfilm projector designed from the start for the medical library.

B.C.G. IN SCANDINAVIA

A LARGE part of *Nordisk Medisin* for Jan. 10 is devoted to several papers on B.C.G. by representatives of the four Scandinavian countries.

In Denmark B.C.G. vaccinations enjoy such a vogue that they are numbered by the ten thousand, and in the island of Bornholm more than 22% of the whole population had undergone such vaccination by 1945. One of the Danish targets at the present time is to vaccinate with B.C.G. every tuberculin-negative child at the school-leaving age, and to catch all the older tuberculin-negative persons as they present themselves for admission to higher schools, universities, and fighting services. In Norway Dr. J. Heimbeck continues to pursue the careers of his B.C.G.-treated nurses as they grow older and older and are more and more difficult to trace. In Sweden type-determinations of the tubercle bacilli found in the rare cases developing tuberculosis after B.C.G. vaccination have yielded the reassuring information that these bacilli were of the *human* type—i.e., not to be identified with bovine-type B.C.G. At present every B.C.G. vaccination is a notifiable operation in Sweden, and it is hoped that even after this precaution has been shelved, reliable data will continue to be recorded with regard to the total number of vaccinations and the incidence of tuberculosis after vaccination. In Finland, as in the other three Scandinavian countries, experiences with B.C.G. are encouraging despite the fact that the B.C.G. vaccinations in the Finnish army were carried out during the war under extraordinary difficulties.

BOOKS FOR BRITISH MUSEUM

DURING the blitz the library of the British Museum lost 200,000 of its 19th- and early 20th-century textbooks. In medicine the specialties which suffered most were specific diseases of the various organs, midwifery, mental diseases and psychiatry, and climatic treatment (including books dealing with spas and the Swiss and Mediterranean resorts). Though many of these books are no longer of any great value in themselves, copies should be kept on record in the national library, and Mr. A. F. Johnstone-Wilson, the assistant keeper, would be grateful for any help which doctors can give him. He should be addressed at the department of printed books, British Museum, London, W.C.1.

In England Now

A Running Commentary by Peripatetic Correspondents

In the nurseryman's seed catalogue I was a bit startled to see under the heading "Herbs" not only sage, thyme, marjoram, and such like but belladonna and henbane. In imagination I saw the enthusiastic amateur, resolved on a herb garden to provide varied seasoning for monotonous dishes, planting a packet of every herb listed. Being indigenous plants, belladonna and henbane should grow from seed much more readily than sage or parsley. Any medical student will show you the shiny black berries of deadly nightshade in the woods and perhaps even the hairy leaves of hyoscyamus niger.

Cooks are not very discriminating. When the recipe tells her to put "a bunch of herbs" in soup or stew she will naturally pick a piece of every herb available. One cook I had boiled Michaelmas daisy leaves instead of spinach; they looked and smelt quite like spinach in the pot, but some intuition led me to ask her to show me the plant from which she had gathered the leaves. An Irish cook I had ignored the garden mint and made sauce of a wild, hairy variety growing in a waste corner of the garden; it tasted unusual but was harmless. Another Irish girl sliced, fried, and ate some hyacinth bulbs, under the impression that they were onions.

So I wrote a friendly note to the firm when I ordered my seeds, asking if it was not rather risky to include poisonous plants among herbs. They replied that the classification was "herbs" and not "culinary herbs" and that those for domestic use were starred. The demand for henbane and belladonna was so great, they said, that it seemed simplest to catalogue the seeds in this way, and they enclosed the labels of the seed packets in question which bore a warning note that these plants are dangerous and highly poisonous.

I suppose it is all right. But in a country where dangerous drugs seem to be constantly left in cars, dropped in the street, or used to flavour the icing of Christmas cakes one doubts whether poison labels get the respect they deserve.

* * *

When Adam delved and Eve span,
Who was the committee-man?
Surely the answer's plain as day—
Coiled beneath the tree he lay,
Waiting till man at last should reach
The doubtful faculty of speech,
And two, though company, should note
A third can give a casting vote.
Who else in Eden would incite
The first debate on wrong and right,
Or advocate as human food
Knowledge of evil and of good?
From which original mistake
No-one profited save the Snake,
Who watched, though source of all our woe,
Our proletarian parents go
To toil outside that Paradise
Where self-communing still he lies.

W. R. B.

* * *

Running commentary, or cautionary tale? I don't know. Perhaps both. During the Great Frost I had to drive 50 miles for a check-up on my resected colon. Despite a blizzard from the east, the outward journey was uneventful. The first note of warning was sounded when the radiographer invited me to strip and put on a dressing-gown. Shivering, I extended myself on the metal couch and a cold nozzle was introduced. A long pause; then the radiologist appeared, muttering, "Let's hope there won't be a cut. It plays Old Harry with the exposure." His assistant released the forefront of the barium enema and an icy sensation in the rectum made me gasp, but my colon was made of sterner stuff and clamped down firmly on the intruder. Much time passed, but after adjurations to "give it all you have," man triumphed over Nature, and a Zeppelin-like shadow appeared on the screen. An invitation to get rid of this in an adjoining apartment was hastily accepted, but subsequent screening revealed "a normal pool in the cæcum."

After a cup of tea had lulled my lower bowel into a deceptive tranquillity, I began the homeward journey. The blizzard mounted, and even in a heavy overcoat my teeth chattered and my hands and feet grew numb. At the 30th milestone the "normal pool" suddenly became highly abnormal. The only possible refuge was a railway culvert facing east. Huddling under its indifferent shelter, hasty preparations were made, when, as by magic, a female form on a bicycle rapidly appeared. A mad plunge into the heavy snow of an open field beyond, and catastrophe was just averted. As I brushed most of the snow from the inmost recesses, and regained the car, I fully determined to advise my patients that train was better than car on such excursions.

* * *

Rather incongruously the Sage was smoking a churchwarden and listening to the Children's Hour when I paid my last weekly visit to inquire about his pernicious hypermetropia. He switched off.

"I like hearing the B.B.C. trying to romanticise the Stuarts," he said. "D'you remember that bit in Pepys about Charles II and his naked women?" "Anyway I prefer them to the Tudors," I answered, remembering all I owe to Haig and Haig, Dewar, and the rest. "The Tudors had their uses. It has always been the function of Welshmen, people who can take a detached, outside view of our codes, to break up the established ways of the dominant Anglo-Scotch. Henry Tudor's son nationalised the Church and monasteries, rather selfishly perhaps; Cromwell, who was half Welsh, tried to nationalise everything; then in our time Lloyd George nationalised insurance; and now we have your Mr. Bevan." "*My* Mr. Bevan!" I snorted, but refused to be drawn further.

"You old men are all the same," said the Sage. "Where do you think this comes from?" He picked up a newspaper cutting and holding it at arms-length read:

> ". . . in his Bill he was content with an antiquated notion of medicine and of medical service; he took for granted without inquiry a notion built of some vague knowledge of village clubs and the old-fashioned *vade-mecum* way of doctoring. . . . Gloss it as we may, contract practice will stand lower in public esteem and will be of lower average efficiency and much less humane; it will damp the aspirations and blot the high-minded ideals with which I, who know, say the young physicians of today are entering our profession; it will push them back to old-fashioned routine and to ill-remunerated and therefore undervalued services."

"Guy Dain?" I guessed. "No. Clifford Allbutt in the *Times* of Jan. 3, 1912." "Damn your eyes," I said.

* * *

Cautionary Tale.—During the war children's physicians often found themselves *called on to* help with adult wards. This is a necessary preamble to the following case-history.

A girl of ten years was sent to the children's outpatient department because of a curious loss of power in her limbs with inability to walk. It was obviously of psychological origin. The background was of a broken home: father had left mother about five years before, the child and her mother had been living with grandparents and various uncles and aunts and cousins. Suggestions about reconciliation and getting back to a normal home life were not well received. Child-guidance was arranged, but the child meanwhile got worse, refusing even to get out of bed, and it was thought that a period in hospital might help. The day she was due for admission happened to be the day of the outpatient clinic. I was told that her father wished to see me and when he came in he seemed to have a familiar face. He remarked that he thoroughly approved of my suggestions and was sure I could help his daughter because I had helped him so much!

It was not long before I had him placed in my memory. He had had a particularly objectionable peptic ulcer, liable to bleed at intervals and not responding to treatment. I had been asked to see him at our base hospital by a surgical colleague because, despite operative treatment, he was still full of symptoms. My inquiries had pointed clearly to domiciliary unhappiness and I had strongly advised him to leave a nagging wife. He had had five years of complete absence of symptoms; but was I responsible for his daughter's psychosomatic disorders?

Letters to the Editor

THE STUDENT NURSE

SIR,—It is grievous to think that the efforts of Dr. Russell Brain to obtain some amelioration in the teaching of medicine to nurses met with no support in the General Nursing Council. Those who failed to appreciate the importance of his proposal can have had little practical experience either of teaching medicine to nurses or of the examination itself.

Speaking as a teacher and examiner of some experience, I am convinced that the curriculum as established leads to the teaching of too much medicine with an infinity of useless details: many of these nursing trainees cannot possibly absorb what is placed before them, but their efforts lead to an appalling mental muddle. The answers to the questions in the last paper on medicine provided many characteristic examples, of which a few are given. The train of thought in each case is easily followed.

"The characteristic point in the joint is the appearance of Aschoff's nodules, consisting of small blisters." (Acute Rheumatic Fever.)

"The Basal Systolic Rate is carried out each week." (Idem.)

"Chloral Hydrate is present in the blood, and patients suffering from anæmia suffer from loss of it."

"In uræmia acetone nodules can be detected on the skin like beads."

"The child may be born without a mouth or nose." (Congenital Syphilis.)

"Has no accommodation of the pupils to light." (Idem.)

"Mumps is an enlargement of the Parathoid glands. Treatment, exercises of the lower jaw, as chewing some apple."

The first reaction on reading such replies is to smile; this is followed by admiration for a gallant, if ineffectual effort of memory, succeeded in turn by fears as to the application of such imperfect knowledge in crises and the administration of drugs and, finally, by despair that schedules can be of such a calibre as to produce such answers.

The need for nurses is great, and calls for every effort to eliminate wastage. A reconditioning of the syllabus and examination should be one of the first steps of the General Nursing Council to meet the need.

Lastly, it is up to all of us, teachers and examiners, to take to heart those last dozen lines of your leader, "First Things First."

DOUGLAS FIRTH
King's College Hospital. Consulting Physician.

SIR,—In your issue of Feb. 1 it is suggested that student nurses should receive a maintenance allowance, say £100 per annum, at a flat rate during training. This would certainly be a step towards recognition of student status. The increment system is a relic of the housemaid's wages, so much a year, rising. But the exact figure to be paid would require most careful consideration, having regard to all the alternatives now open, and should be designed to attract the optimum number of suitable candidates.

Apart from the special case of students, it seems a matter for regret that the Rushcliffe Committees did not seize the opportunity to work out a scientific scale of salaries based on some system of points. Such a scheme could have taken into account advantages and disadvantages—risks, real or imaginary, distastefulness of the work, deficiency of amenities, &c. It might also have more justly assessed the relative contribution made by members of each branch of the service (e.g., by ward sisters).

The practice of computing salaries as a cash payment, plus a valuation of emoluments which actually vary in real value from hospital to hospital, has drawbacks. It prevents exact comparison between the position of student nurses and other categories of student or of entrants into commerce or industry. It has permitted an unfair valuation of emoluments, so that the nurse who does live out often finds herself trenching on her cash salary to provide the necessities of life. Moreover, had all salaries been paid on a cash basis, each nurse paying for her board and lodging, even if obliged to live in, I doubt if the discrepancy between the salaries of male and female nurses permitted in the Rushcliffe scale could have been condoned.

A later article (Feb. 8) put in a plea for separate finance for training school and hospital. Such separation of accounts and aims would be easier if training in each region were organised on a regional basis, only selected hospitals being allowed to take students, and these being required to offer a high standard of staffing and equipment. So long as hospitals are allowed to recruit students without reference to the needs of the service as a whole the practice of relying mainly on student labour is likely to continue, with its attendant evils of long-drawn-out training and wastage and spoiling of good material.

I think all nurses are greatly indebted to THE LANCET for its constant discussion of the problems connected with the reorganisation of the nursing services on which much of the success of the National Health Service must depend.

London, W.2. G. B. CARTER.

SIR,—I am in entire agreement with the argument and the conclusions of your correspondent of Feb. 8. May I, however, correct one misconception which may arise from the reference made to the Nightingale Training School at St. Thomas's Hospital?

Quoting from Worcester's book on *Nurses and Nursing*, your correspondent gives the impression that the Nightingale School is a separately endowed school, financially independent of the hospital. This is unfortunately not the case. Virginia Dunbar in her thesis *The Origin and Early Development of Two English Schools of Nursing*,[1] which was written during a year's study of original sources, deals specifically with this. Whereas, in 1864, when the school started, the Nightingale Fund undertook all the expenses of its fifteen students for one year, by 1867, when the number of students rose, the fund was unable to pay for their maintenance, and the additional students had to pay this themselves. By 1892 the hospital paid a deficit of £444 on the first year's maintenance of the "free" students, and after the first year accepted them all on the staff of the hospital for a further compulsory period of one or two years. By 1900 the hospital was also providing tuition during the second and third year of training, and today the position is very much the same. The Nightingale Fund now undertakes the tuition of probationers in their first year; but the training lasts four years, and the hospital is responsible for everything the fund does not pay.

The fund, raised as the nation's gift to Miss Nightingale in acknowledgment of her work in the Crimea, was £44,000, and this she put in trust for the Nightingale School and certain other activities connected with the training of nurses. I am not aware that any considerable additions have since been made to the fund, and from time to time the income has been applied to other activities within the ambit of the trust. The Nightingale School is not therefore a "well-endowed school," and in fact has almost lost its original independence. Its merit lay in its original conception and demonstration, but this conception has failed to gain acceptance in its country of origin.

OLIVE BAGGALLAY
Secretary, Florence Nightingale
London, W.1. International Foundation.

AN EXPERIMENTAL COMMUNITY

SIR,—Questions of medical administration are at present diverting attention from the proper scope of medical endeavour. In two short generations the advance of biological, social, and medical science has transformed the potential field of medical practice. In the welter of information there seems danger of losing our way.

In medical teaching it is a platitude that an understanding of physiology is the necessary condition of a proper insight into pathology. Now that biological science has shown the intimate interplay between living things and their environment, on the nutritional, personal, and social levels, there is need to reapply this old saw. We must now distinguish normal living function within environmental complexes from pathological function.

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[1] This thesis in manuscript can be seen in the libraries of Bedford College for Women and the Royal College of Nursing where Miss Dunbar studied during her year as a scholar of the Florence Nightingale International Foundation.

With regard to the "gain" in antitoxic value—i.e., the ratio of the secondary response to the primary—it appears that the primary response was measured by Mr. Holt as an arithmetic mean by testing one pooled serum *from a number of animals.* The secondary response, however, was measured as the geometric mean of the values of a number of sera tested individually. The scatter of values after one injection is therefore unknown and may have been relatively great. In our view such a comparison is inadvisable, particularly as the smaller responses are usually subject to a greater scatter, thus providing a considerable divergence between the arithmetic and geometric means. Any conclusions as to so-called gain in antitoxin must take into account the following principles. An animal's response to a secondary stimulus depends on:

(1) The amount, nature, and antigenic efficiency of the stimulus.

(2) The degree of potential immunity reached by the animal at the time of injection.

(3) The amount of circulating antitoxin at the time of injection, in relation to (*a*) the combining-power and nature of the antigen and (*b*) the maximum response of which the animal is capable.

The fact that Mr. Holt finds there is an optimum concentration of aluminium for the production of good immunity is of great importance, and confirms and extends the observation of Miss Llewellyn Smith (1932) who found that the addition of Willstätter cream to a *sample of* A.P.T. *increased its antigenic efficiency.*

In the early days of A.P.T. the nodule formation and occasional sterile abscess produced by the carrier was much objected to, and on the basis of these objections we concentrated on producing A.P.T. with the minimum concentration of aluminium hydroxide consistent with a good depot effect. As far as can be judged in the absence of a common reference standard we have succeeded in producing A.P.T. of the same order of potency as those with large amounts of aluminium phosphate. It is possible that the "foreign-body" reaction produced by aluminium phosphate is less likely to lead to sterile abscesses than the reaction produced by aluminium hydroxide.

Wellcome Physiological Research Laboratories, Beckenham, Kent.

MOLLIE BARR
A. T. GLENNY.

THE INTRAVENOUS DRIP

SIR,—Having initiated the popularity of the administration of continuous intravenous fluid by the drip method in this country 13 years ago, I have felt a grave responsibility at its widespread abuse. From almost the commencement, I urged that continuous intravenous fluid should never be given without keeping a properly recorded balance-sheet. Unhappily, I constantly find patients receiving the drips on the least provocation, but the balance-sheets are conspicuous by their absence.

The dangers of overloading the circulation because of well-meaning but unphysiological enthusiasm, short staffing, or forgetfulness, are so great that I am metaphorically hoarse from endeavouring to promulgate the gospel that "it is better to administer too little intravenous fluid than too much."

Professor Bentley's admirable pen-picture (March 15) of the dangers of abuse of a sovereign remedy will, I hope, attract great attention. The administration of parenteral fluid is largely in the hands of resident medical officers and house-surgeons, and I venture to think that if the instructions on p. 45 of the newly issued 15th ed. of *Pye's Surgical Handicraft* were adopted in every hospital, the abuse to which Professor Bentley refers would be reduced to vanishing-point.

Therapeutic pendulums are for ever swinging. Sometimes they swing too far, and become unhitched. The barber-surgeons overdid blood-letting, and a good remedy with definite indications became defunct. I fear that if Professor Bentley's injunctions are not heeded, a future generation may accuse us of having caused many deaths by drowning, and another excellent, nay, life-giving therapeutic procedure will pass into oblivion.

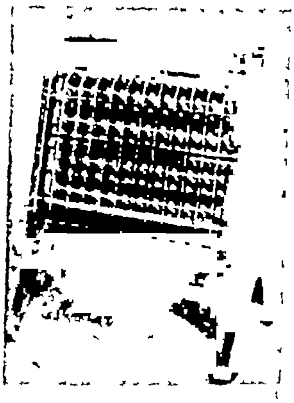
HAMILTON BAILEY.

London, W.1.

DEATH IN THE FIREPLACE

SIR,—In your leading article of Dec. 7, 1946, you urged the need for fireguards on electric and gas fires to protect the public—particularly children and old people—against the risk of clothes catching fire.

Fresh data have since come to hand which indicate the size of these risks. The Birmingham Accident Prevention Council, to whom the figures were submitted by the Birmingham coroner (Dr. Davison), inform me that during the past five years in Birmingham there have been 14 deaths from burning by electric fires and 6 by gas fires—20 in all. No exact data are yet available for non-fatal accidents of this kind, but such as we have indicate that they are to the fatal accidents about as 4 to 1. Taking the population of Birmingham (1,000,000) as a random sample of the 40 millions of England and Wales, we may conclude then that in the whole country during this five-year period these heating appliances have been associated with something like *800 fatal and 3000 non-fatal* accidents. The figures are, admittedly, not large in relation to the total number of such fires in use—and some of the accidents have certainly resulted from gross carelessness. On the other hand, there are grave reasons why we should not accept this accident-rate with complacency. It should be remembered that most of these injuries, even if not fatal (and many more recover now than was the case ten years ago), result in extensive scarring and often in impaired functional efficiency throughout the victims' lives. It is clear, too, that with the present coal shortage and the rapidly growing use of electric and gas fires (particularly of the mobile types) these accidents are likely to become more frequent. There is already evidence of such an increase.


Improvised grill guard fitted to standard electric fire.

These accidents could be prevented comparatively easily, and "if preventable why not prevented?" The case-histories of our patients show that their clothing usually caught fire because of a momentary contact of inflammable material with the heating elements—it would not have ignited if a suitable light guard had prevented this contact. The man in the street can easily satisfy himself on this point. He has only to hold a piece of inflammable clothing material (flannelette or winceyette) in front of an electric fire to find that at a distance of 1 inch or less it will burst into flame in a few seconds, whereas at 2–3 inches it can be held for more than two *minutes and still will usually not ignite.* A grill guard which keeps clothing at a distance of at least 2½ inches *from the fire will therefore prevent an accident in most* circumstances. (With gas fires the grill should stand away somewhat farther—not less than 3½ inches.)

Open coal fires are, it is true, responsible for considerably more accidents than electric and gas fires. (There were 61 deaths from coal-fire accidents in the Birmingham coroner's series for the past five years as compared with 20 for electric and gas fires.) Unfortunately it is much more difficult to secure protection against open fires. An efficient guard for these must be large and usually has to be removed for cooking and for stoking the fire. It also gets in the way in a small crowded room. In spite *of legislation in 1908 (Children and Young People's Act)* which made it an offence to be without a fireguard where there are young children in the dwelling, the Registrar-General's returns do not indicate that it had any decided effect on deaths from burns, and the Act has now become almost a dead letter. It would not be *feasible* to make the provision of a fixed guard compulsory on all new *open* fires, but such a provision could easily be insisted on in respect of electric and gas fires. A well-designed guard need detract little or nothing from the appearance of such fires and the additional cost would be small.

It is simple to improvise a grill guard for existing electric or gas fires. A cake-cooling tray or griller can be bought for a few pence at most ironmongers and easily wired to the bar or bars covering the elements (see figure). Failing this a piece of wire netting will serve, but care must be taken to ensure that the cut ends are turned in so that they cannot catch on clothing.

It has been suggested that such a fixed grill guard would considerably diminish the heating efficiency of electric and gas fires. Experiments suggest that this is not the case. At a distance of 26 inches from the fire illustrated, the rise in air temperature ten minutes after switching on was only 1° F lower with the guard in place, and at twenty minutes was only 2·5° lower. After that time the guard seemed to cause no further reduction.

Birmingham Accident Hospital. LEONARD COLEBROOK.

COMPRESSION OF MEDIAN NERVE IN CARPAL TUNNEL

SIR,—I was greatly interested in the article by Dr. Brain, Mr. Dickson Wright, and Dr. Wilkinson in your issue of March 8, but I am sorry that they do not mention the value of immobilisation of the wrist in both the diagnosis and treatment of this condition. The clinical picture of parasthæsiæ and impairment of sensation in the median-nerve distribution, plus wasting of the thenar eminence, usually following either a single injury or a period of overuse, is not an uncommon one.

The differential diagnosis from such conditions as the costoclavicular syndrome or lesions of the spinal cord may be very hard. A period of 3–4 weeks' immobilisation of the wrist will produce relief of the symptoms if these are due to compression of the median nerve in the carpal tunnel. I mention these points in case the recent article may lead to unjustified surgical onslaughts on the median nerve. If there is any doubt about the diagnosis of any pressure neuritis, it is wise only to operate when there has been relief with immobilisation and recurrence on activity. I have also wondered whether the apparent increase in frequency of the various types of pressure and friction neuritis is only due to one's being more aware of the syndromes, or whether there is a factor such as dietetic deficiency which is making the nerves more sensitive to trauma.

Liverpool. R. ROAF.

SIR,—I would like to point out an error in the first two illustrations to the article on compression of the median nerve in your issue of March 8. The transverse carpal ligament (flexor retinaculum) is represented as terminating distally at the distal skin crease, whereas this actually is its superior border. In the position represented, the nerve would be compressed, if at all, against the radius.

King's College, London, W.C.2. DAVID ADDERLEY.

SIR,—The article by Dr. Brain, Mr. Dickson Wright, and Dr. Wilkinson calls for comment.

First, the structure shown in fig. 1 as the anterior carpal ligament does not correspond in site, size, shape, or slope to any structure in the human body. Secondly, every reputable textbook of anatomy for the last 140 years at least describes the median nerve at the wrist as normally possessing those outward appearances of enlargement, pinkish coloration, and surrounding cellular tissue which your contributors regard as abnormal.

> *Cloquet* (1816)—" It passes . . . under the annular ligament of the carpus, adheres to them (the tendons) by a very delicate membranous cellular tissue, becomes thicker and broader than it was before."
>
> *Quain* (1837).—" Somewhat enlarged, and slightly reddish in colour . . ."
>
> *Piersol* (1906).—". . . it spreads out into a reddish gangliform swelling."

May I add the following notes ?

1. The arteria comes of the median nerve supplies the lower two-thirds of the nerve in the forearm. It is often somewhat enlarged and is regarded by some anatomists as the main primitive artery of the limb.

2. The anterior carpal ligament maintains the transverse arch of the hand, which is exaggerated in flexion, diminished in extension. The carpal tunnel is more circular and larger in flexion ; smaller and more flattened in extension.

3. Wasting of the thenar, hypothenar, and interosseous muscles is a normal feature of old age. The hand tends more and more to assume Hilton's position of rest with slight ulnar adduction.

4. The fibrocartilaginous ligaments of the metacarpophalangeal joints tend to show chronic thickening with limitation of the movements of the joints with (*a*) old age, (*b*) the menopause, (*c*) leucorrhœa, pyorrhœa, and gonorrhœa, and (*d*) heavy manual work, including domestic work such as scrubbing and ironing.

5. The number of sesamoids which ossify often increases in number and size as part of this general process of ageing.

6. Pins-and-needles and varying degrees of acroparæsthesia are common in working women, for vasomotor disturbances are more common in women than in men (cf. Raynaud's disease).

7. These patients would possibly have done just as well had the hand been tied up loosely over a golf-ball, tangerine, or other rare object with a view to resting the part.

8. Intermittent heavy muscular work, such as in fine-weather gardening, easily produces this " syndrome " in men over middle age, particularly if the handle of the working tool is of the wrong dimensions.

9. The baby does not learn to oppose the thumb until he is about 6 months old. It is not surprising that this movement should be one of the first to be lost in any process of " wear and tear " ageing.

10. Lastly, no clinician should regard anything in the body as abnormal unless it has been submitted to that acid test of anatomical accuracy and precision—Quain's *Textbook of Anatomy*.

Anatomy School, University of Cambridge. H. A. HARRIS.

⁂ We have shown Professor Harris's letter to Mr. Dickson Wright, who replies as follows : " In our diagram the artist certainly placed the anterior carpal ligament too high ; but no-one will suffer from this, because it emphasises the point which was felt important —namely, that the median nerve swelling extended two inches above the ligament. I have now observed in two more recent cases that this neuroma makes a visible and palpable swelling, pinching of which produces paræsthesiæ in the three-and-a-half-finger distribution.

" The idea that the compression was produced in the carpal tunnel was entirely due to Dr. Russell Brain, who asked me to explore the cases we described. The nerves disclosed at operation were quite abnormal and resembled in no way the appearance of the median nerve at the wrist in the living subject, the recently dead, or the pickled specimens with which Professor Harris deals. As he has expressed himself so freely in a clinical matter I feel free to say that here he is anatomically in the wrong. True, most of the anatomy books of the last 140 years say that the median nerve *in the palm* is flattened, swollen, and pinkish; but the swelling in our cases resembles Professor Harris in that it goes far too far, extending for at least three inches above the ganglionic enlargement described in the textbooks. As Professor Harris seems so interested in clinical matters and advises on treatment it would perhaps repay him to see one of these operations and verify the pathological appearances described in the article.

" The mockery which followed the discovery of the pathology of the herniated disk has now died away leaving Mixter and Barr holding the field with a great discovery and benefaction to their credit. Now Dr. Russell Brain has just as neatly extricated still another nerve attrition with just as clean-cut a syndrome from the numerous forms of palsied, painful, and anæsthetic hands. I think many will have cause to be grateful for this help in the diagnostic and therapeutic field, in spite of Professor Harris's effort to throw the condition back on to the dust-heap of toxic neuritis.

" One final observation. The patients, now increased to 11 in number, were all relieved by dividing the anterior carpal ligament, although they received no treatment for gonorrhœa. leucorrhœa, pyorrhœa, or old age."—ED. L.

ENOUGH TO EAT?

SIR,—Mr. Strachey's statement (quoted in your leader of March 8) that the poorest third of the nation is eating far more than before the war is nonsense. Of the whole population in 1937 some 10% received rather less than present rations and 5% considerably less. This 15%, or many of them, are eating more: but this is not in any way due to rationing but to the abolition of unemployment. The *Sunday Times* on March 9 published the following table comparing the weekly consumption of the working class in 1937 (including a proportion of unemployed) with present rations:

	Average consumption 1937–38 (*a*)	*Present ration*
Meat	1/6 (*b*)	1/–
Bacon, ham	6 oz.	3 oz.
Bread, flour	$4\frac{3}{4}$ lb. (*c*)	3 lb.
Milk	3 pints (*d*)	3 pints
Butter	$7\frac{1}{2}$ oz.	3 oz.
Margarine	3 oz.	3 oz.
Lard	2 oz.	1 oz.
Cheese	3 oz.	2 oz.
Sugar	$1\frac{1}{2}$ lb.	8 oz.
Eggs	$3\frac{1}{2}$	1

(*a*) Ministry of Labour survey.
(*b*) at present prices.
(*c*) Plus cakes.
(*d*) Plus cream 2d.

Note how much less is the *maximum* present ration than the working-class *average* of 1937—meat and bread two-thirds, fats half, sugar and eggs a third. Hard necessity has considerably reduced the standard of living in this country: not merely the wealthy but the majority of the working classes have substantially less to eat than before the war and have to expend enormously more time to get it, although school meals and works canteens do something to close the gap for those who can use them. Not only are our rations near the necessary minimum but they are monotonous, allowing little scope for individual taste or preference. It is time that claptrap about our being as a nation better fed now than formerly ceased: we are *worse* fed and everybody knows it except apparently the Minister of Food.

Bristol. E. WATSON-WILLIAMS.

DOCTORS' SALARIES

SIR,—Let us all—but let hospital committees in particular—take belated note of Mr. Harold Dodd's strictures upon the scandalously inadequate salaries currently offered to medical men for responsible posts. Although the pound sterling is now no more than half its pre-war value, salaries for registrar appointments requiring higher qualifications remain in the region of £300–400 at best, and other posts are scaled comparably.

Tragically enough, the distinguished members of our profession who are either directly or morally responsible for these rates find plenty of takers in a glutted labour market where the alternative is to emigrate or starve.

Mr. Dodd understates his case, and his specimen budget is pared to the bone. Where is it possible in London for a young doctor to find a flat for less than £5 a week? Or buy food for himself and his wife for much less than another £5?

After five years of war service, and ten years from qualification, I find myself, highly qualified, working twice as long, and probably twice as hard, as any trade-unionist, and daily responsible for life-and-death decisions, for the wages of an incompetent bricklayer. This may have been all very well in an era where my subsequent earnings could possibly have brought some recompense; at least I would have had a sane motive for putting up with it. Today no such thing is true, and a careful study of your advertisements leads me to believe that I may look forward at best to a salary of about £1500 (i.e., £800, 1939) less income-tax. That is the scale the leaders of the profession are not only proffering to their successors, but tacitly (and for all I know, overtly) recommending to the bureaucrats.

I regret bitterly that I was ever so misguided as to enter a profession which rewards both skill and devotion so ill; and if ever I can afford to have a son I will see to it that he is apprenticed to a grocer, and a colonial one at that.

CHIEF ASSISTANT.

THE NATIONAL SITUATION

SIR,—The significance of your correspondent's article last week on Exports and Agriculture is immense. I desire to congratulate THE LANCET most warmly upon its initiative in drawing the attention of a wide circle of professional opinion to this aspect of our affairs. An adequate food-supply is fundamental to all health, and the fact that our food-supply may have to rest for its essentials largely upon our own efforts, within our own shores, is so novel that it will have to be thought over again and again before we can adjust our conceptions to the new conditions of our times.

Food in surplus quantities exists in North America, in Australia and New Zealand, and to a certain extent in South America, but scarcely anywhere else in the whole world. If this food is evenly spread throughout the world's population, the people of this country will find themselves on shorter commons than they have known for many a long day. If we are to have a preferential share of it, we shall have to obtain this by an export effort of absolutely unprecedented extent, directed largely into areas of high industrial productivity which have little room to receive it. Furthermore, we need many other materials, such as metal ores, which are indispensable if our industrial activity is to be maintained. Towards this end our scanty exchange resources will continually need to be realigned.

We need, for example, tungsten, and we need oats. But we can grow oats and we cannot grow tungsten. In such circumstances, the phrase "uneconomic" as applied to cereal production in this country may well be no longer applicable.

All this is taking on a very immediate importance as the dollar loans begin to run out and the floods and the snow force the importance of our own production so painfully to the fore. The fact is that already our own consumption of foodstuffs in this country has fallen as compared with last year. Nor are the levels from which it has declined as high as we had been given to believe. In a recent answer to a question in the House of Commons, Dr. Edith Summerskill stated that the often-quoted figure of 2900 calories per head as a daily British intake was only obtained by dividing the total food moving into civilian consumption by the total number of the civilian population. There is reason to believe that the actual intake, as measured by dietary surveys was, even before the recent decline, no more than 2500 calories per head. The minimum for overall average health and activity is usually taken as about 2400 calories. If these figures are correct, we have reached, and indeed dipped below, the danger-line.

The lesson of all this is terribly clear. It is that a concentration of attention and energy upon home food-production is literally vital, and that a sense of urgency, so far almost completely lacking, must now be the order of the day in tackling this task.

House of Commons. WALTER ELLIOT.

SIR,—Since when has your distinguished journal made itself responsible for propounding political and economic topics thereby inevitably sliding along the nasty path of Party Politics? I cannot—at all events easily—accept the excuse you put forward by stating the truism that medicine is a part of our whole social framework.

Mundesley, Norfolk. S. VERE PEARSON.

⁂ Tuberculosis, to which Dr. Vere Pearson has devoted his professional life, sufficiently illustrates how economics can dispose of what medicine proposes. He will agree that doctors are not purely technicians and should hear more than is audible through a stethoscope. The article in question is a sober analysis of the national situation, written without party bias and leading to conclusions on food-supply, food prices, and urbanisation which (if correct) are important to social medicine.

—ED. L.

Mr. J. F. Foster, formerly registrar of the University of Melbourne and secretary of the Australian Vice-Chancellors' Committee, has been appointed secretary of the Universities Bureau of the British Empire.

Public Health

Testing of Milk

MILK testing is not an end in itself. When any new official test is introduced we have to consider not only its objects and method but also the action to be taken on the results. In announcing (circular 17/1947) a new method—or rather the modification of an older one—for testing non-designated milk, the Department of Health for Scotland makes the object and method clear but is less definite about subsequent action.

The object is strictly limited to the discovery of supplies of milk of poor keeping quality (pathogenic contamination is not dealt with), and the method is a variation of the Hiscox modification of the methylene-blue test. To pass the test, milk, to which has been added, within one hour of the arrival of the sample in the laboratory, a small quantity of methylene blue, must *not* decolorise this dyestuff by 12 NOON on the day after the sample has been taken, the milk and dyestuff being held, meanwhile, at atmospheric shade temperature.

There is little doubt that this procedure gives a much better idea of the keeping quality of the milk—and perhaps also a rather better idea of the cleanliness of production and handling—than the methylene-blue test at 37° as used at present for designated (accredited or tuberculin-tested) milk in England and Wales. It has the same advantages over the resazurin tests now used for both designated and non-designated milk in the National Milk Testing and Advisory (N.M.T. & A.) scheme. Perhaps it is no objection to the new procedure to say that unlike the 10-minute resazurin test of the N.M.T. & A. scheme it cannot in any way be employed as a rejection test—i.e., a test by which a consignment of milk of really poor quality can be spotted *quickly* and prevented from contaminating, and very possibly spoiling, a larger bulk at a collecting depot. The new test will undoubtedly serve as a sound basis for advisory work to the producer, which is its purpose under the new Scottish scheme; but certainly there are advantages in having one which serves both purposes—i.e., as a platform rejection test and as a basis for advising the ignorant, or warning the careless, producer. The 10-minute resazurin test, or a 15-minute methylene-blue test at 37°, meets both requirements fairly well.

If, however, experience in England with the N.M.T. & A. scheme is applicable to Scotland, it may well be found that the factor limiting the usefulness of the test will not be the testing and laboratory end, but the paucity of competent staff available, particularly during the summer months, for speedily giving advice to the farmer whose milk is below standard. It is to be hoped that, with the lower average summer temperature in the northern half of Britain, the difficulties arising from the sheer weight of advisory work in the early days of this scheme will be less acute than those, fortunately now overcome, that impeded the N.M.T. & A. scheme in England in its first two or three years. But if the Scottish scheme is to be successful from the beginning, it may be necessary for the Department of Health, in consultation with the Department of Agriculture, to pay a good deal of attention in the immediate future to the training of those who, with tact and knowledge, are to advise the dairy farmer on hygienic methods of milk-production.

Infectious Disease in England and Wales

WEEK ENDED MARCH 8

Notifications.—Smallpox, 7; scarlet fever, 1217; whooping-cough, 2461; diphtheria, 182; paratyphoid, 4; typhoid, 4; measles (excluding rubella), 12,137; pneumonia (primary or influenzal), 958; cerebrospinal fever, 86; poliomyelitis, 10; polioencephalitis, 0; encephalitis lethargica, 0; dysentery, 69; puerperal pyrexia, 128; ophthalmia neonatorum, 81. No case of cholera, plague, or typhus was notified during the week.

The 7 cases of smallpox were notified at Grimsby.

Deaths.—In 126 great towns there were no deaths from enteric fever, 1 (0) from scarlet fever, 1 (1) from diphtheria, 37 (6) from measles, 15 (1) from whooping-cough, 89 (9) from diarrhœa and enteritis under two years, and 92 (17) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 290 (corresponding to a rate of 29 per thousand total births), including 33 in London.

Parliament

FROM THE PRESS GALLERY

New Grants to the Universities

IN the House of Commons on March 10, in reply to Sir ERNEST GRAHAM-LITTLE, Mr. H. DALTON, Chancellor of the Exchequer, in the course of a statement on new grants to universities, said he had received and considered a report from the University Grants Committee on the financial needs of the universities for the five years 1947–52. The universities would need Exchequer grants on an increasing scale for some time to come, both to effect improvements and to increase the number of students. Parliament would therefore be asked to provide recurrent grants rising from £9 million for the academic year 1947–48 to £9,970,000 for 1948–49 and thence by annual increments of £650,000 to £11,920,000 for 1951–52. The recurrent grants for the present academic year would amount to between £6 million and £7 million. These figures excluded the grants of £500,000 now made to teaching hospitals, which would continue during the financial year 1947–48 and the amount of which for future years had not yet been determined.

The University Grants Committee estimated that the universities' programmes of development would necessitate during the quinquennium non-recurrent grants amounting to £50 million, of which £40 million would be for new buildings and new equipment. Mr. Dalton accepted this estimate and would do his best to meet it. He was advised, however, by the Minister of Works that, even after allowing for a high degree of priority, the best forecast at present possible did not justify the expectation that universities would be able to undertake more than £20 million worth of new building during the quinquennium. He appreciated that this must retard to some extent the expansion of the universities which the Government earnestly desired to see, but for the present it would only be prudent to plan on this restricted basis. The position, however, would be reviewed from year to year. The sum which Parliament would be asked to vote for the financial year 1947–48 was £11,875,000, which included the grants to the teaching hospitals.

Extra Rations for the Sick

On the motion for the adjournment on March 10, Colonel M. STODDART-SCOTT raised the question of the refusal of the Ministry of Food to grant extra rations which had been recommended by doctors. Since rationing was introduced, he pointed out, there had been no drop in the mortality-rate, and there had been an increase in the number of sufferers from gastric ulcers and other gastric complaints, and in nervous and cardiovascular diseases. The rise in the incidence of tuberculosis had also coincided with the reduced diet; and the Minister of Fuel and Power had stated that increased absenteeism in the pits was connected with minor unnotifiable diseases. The survey by the Oxford University Institute of Statistics[1] showed that the present rations for adults were insufficient for their proper maintenance. Sir John Boyd Orr, speaking last August in Copenhagen, said:

> In the United Kingdom it is estimated that the additional food needed to bring the diet of the whole population up to the desired health standard would represent an increase of 25% of meat, and 65% to 75% of other animal products, and fruit and vegetables.

Since then there had been a cut in our bacon ration and the meat ration had been lowered by twopennyworth per week. Therefore, Colonel Stoddart-Scott contended, extra rations were more essential in sickness.

During the last six months of last year 235 cases were refused extra rations by the Ministry of Food. The Special Diets Advisory Committee was composed of ten distinguished physicians and research people. Six of them were consultants, and none was a general practitioner. All had the benefit of age on their side, as the average age was well over 55. This committee, which met only twice during the last six months, drew up a list of diseases with the appropriate diets, but did not deal with the individual cases which were referred to individual members of the committee. That system might have been all right in war-time but it was unnecessary now when the nation was probably worse fed than it was in the war years. Even if the 235 cases had been granted extra rations, it could not have affected the efficiency of our national scheme of rationing. He suggested that if in the administration regions medical advisory committees appointed by the Ministry could be set up, one of whose members would visit border-line cases and make a decision on the spot before a plea was finally turned down, much of the present public anxiety would disappear. Extra rations, he urged, should now be granted not just for the treatment of cases but for the alleviation of discomfort and to help to prolong life.

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[1] See *Lancet*, March 15, p. 338.

Mr. SOMERVILLE HASTINGS thought that both the public and the medical profession were satisfied with the arrangements, which seemed to have worked admirably for many years. The position of the doctor in private practice was not easy. If he turned down an application for extra milk he might offend his patient. There was a shortage of certain foods, he admitted, and many patients—the majority perhaps—would benefit by extra food and extra milk. But the doctor was strengthened by being able to point out to his patient that his case did not come within the confidential list of diseases eligible for extra nourishment. Some doctors undoubtedly succumbed to pressure from the patient. How else could one explain the extraordinary figures recently obtained from the Ministry, showing that the proportion of people receiving extra milk was more than three times as great in Hampstead as in Tyneside or South Wales? As to the suggested panel of doctors in each area, Mr. Hastings feared that doctors, unwilling to refuse their patients, would call in specialists in a great number of cases.

Dr. EDITH SUMMERSKILL, parliamentary secretary to the Ministry of Food, declared that Colonel Stoddart-Scott's contention that the incidence of disease had been greater during the last few years was not borne out by the public-health statistics. In granting extra food for invalids it was necessary to distinguish between the medical foods needed for therapeutic reasons and medical comforts. The members of the Special Diets Advisory Committee were men who were highly responsible and authorities in their particular field, with a wealth of clinical experience. The committee did not pass judgment on treatment; it advised the Minister on applications from medical practitioners for additional foodstuffs. It was, in fact, an appeal board, and on the whole she thought it had performed its functions well. It was true that the Ministry relied on one or two members of the committee, but these men were highly qualified, and it would be difficult, and certainly not expeditious, to refer each case to every member. The Minister was considering the proposal to set up committees in various parts of the country, but the chief reason why the proposal was opposed at the moment was that medical comforts were to have a bigger place in the Ministry's allocation scheme than heretofore, and she was therefore reluctant to set up committees of busy people who might never be called on to do any work. Some scheme might be devised whereby another doctor could see the patient, and then report to the committee, but she was afraid that this proposal might in effect prove cumbersome, and that it might impose on an already efficient machine another which might never be called upon to function.

QUESTION TIME

Health Surveys

Mr. JOHN MORRISON asked the Minister of Health how many persons were employed by his department to make house-to-house inquiries about health conditions: what was the total annual cost of this activity; and what were the qualifications of those engaged.—Mr. JOHN EDWARDS replied: I assume that the hon. member refers to the monthly survey of illness carried out on behalf of my department by the Social Survey of the Central Office of Information. Each month inquiries are made of a sample of the population by 70 part-time investigators, who are members of the trained staff of the survey. The work is directed by one research officer who is a qualified statistician. The approximate annual cost, including salaries, of this regular inquiry is £12,000.

The *Times* (March 13) announces that the Conservative and Liberal Associations of Luton have approached Dr. Charles Hill, secretary of the British Medical Association, to be their *prospective Parliamentary candidate*. The two associations have joined "to form a common front against Socialism."

Obituary

BRYAN AUSTIN McSWINEY

M.B., SC.D. DUBL., F.R.S.

IN the ten years that Dr. McSwiney spent at St. Thomas's Hospital as professor of physiology and later as dean he became identified to an extraordinary degree with his school of adoption, and his death on March 8 at the age of 52 will be a heavy loss to it.

Born in Chicago, he spent most of his childhood in America, till in 1907 he was sent home to Ireland to finish his schooling at Clongowes Wood College. After a year spent in private study in Germany he entered the University of Dublin in 1912. The outbreak of war interrupted his studies, but in the intervals of serving as a surgeon lieutenant R.N.V.R. (at Gallipoli and elsewhere), as an assistant to the scientific adviser to the Ministry of Food, and as a lieutenant in the R.A.M.C., he took his B.A. in 1916 and his M.B. in 1917. On demobilisation he was appointed assistant to the professor of institutes of medicine at Trinity College, and in 1919 he became lecturer in experimental physiology at the University of Leeds. A year later he moved to Manchester to take up a similar post there, and from 1923 he was also tutor and secretary to the faculty of medicine.

In 1926 McSwiney was nominated for St. Bartholomew's, but in the same week he received a call to Leeds which he accepted on the grounds that there was an honours school and that money had been secured for expansion. "His programme," writes J.K.J., "was a double one—to create an adequate department for a more than doubled entry compared with pre-war days, and to push the honours course as a means of creating a body of interpreters between the clinicians and the pure scientists, who had become rather unintelligible to each other. He had an acute eye for merit, and a gift of encouragement, and he gave an example of ignoring the clock. In result in his short tenure four of his staff passed out to chairs, and several more were dispatched to better themselves. In addition to the number of B.SC. honours students who are now physicians and surgeons, he gave facilities to several B.A. and B.SC. graduates employed on his staff to qualify in medicine in order to work with better coöperation with the practising profession. When he had brough his department to a remarkable level of efficiency and productivity, and had done what he had set himself to do, it became evident that his joy was in the doing, not in the prospect of a calmer life in the house he had built. London seemed to offer more chances of collateral adventures and new experiences." In 1936 he moved to St. Thomas's Hospital medical school.

It was not long before his influence began to make itself felt at St. Thomas's. The physiological curriculum was steadily modernised, and where possible the human subject was made to take the place of laboratory animals in the students' practical work; contacts between physiology and physical medicine were strengthened, and with an increase in staff and equipment an active programme of research was put in hand. In these early years McSwiney's energies were thus largely concentrated upon his own department, but during this time he gained the confidence of his colleagues, and with the coming of war his unique gifts and tireless energy brought him quickly to the fore in the medical school's affairs.

When the bombing in 1940 temporarily reduced the number of beds at St. Thomas's to less than 100 it became essential that the medical school should leave London. This decision was reached in September and McSwiney was asked to act as dean. So well and so energetically did he fill this position that the school reassembled three weeks later in temporary but adequate accommodation at Hydestile and Godalming. During the difficult war years the maintenance of the school and of its standard of efficiency were largely due to his inspiration and energy, and in 1945 his unobtrusive drive ensured uninterruption in working and smoothness of return.

During the whole of this period the school of physiology had been in no way neglected, and he took an active part in initiating and carrying out research himself and in stimulating younger men to like activity. And his scientific status had been steadily growing. In 1944 he delivered the Oliver-Sharpey lectures to the Royal College of Physicians on afferent fibres of the abdominal viscera, and in 1945 the Purser lecture at Trinity College, Dublin, on visceral sensation. In recognition of his work on the physiology of plain muscle and the circulation the Royal Society elected him to their fellowship in 1944. From 1935 to 1945 he served the Physiological Society as treasurer, and at the time of his death he was one of the editors of the *Journal of Physiology*. His enthusiasm for the application of physiology to clinical medicine was the mainspring of his work on oxygen masks and his interest in physical education. He served on M.R.C. committees on the physiology of muscular work and physical exercise, and on traumatic shock. Shortly before the war he made a tour of Europe studying physical education in the different countries, and in his report of this visit to the physical-medicine section of the Royal Society of Medicine in 1938 he urged that the medical man must be trained so as to be able to direct the physical education and nutrition of the school-child.

But from the time he became dean, though not relinquishing his interest in physiology, he devoted his energies to the advancement of medical education as a whole, and he was lately elected to the senate of London University. In August, 1945, he went to Trinidad to examine and to advise on medical education there. After this preliminary survey he went again in April of last year, this time to Jamaica as well as Trinidad. In July he carried out a similar mission to British East Africa, and in December he left for Cairo, India, and Australia. He flew back to this country from Australia in February, arriving in the midst of the cold spell, and contracted bronchitis and bronchopneumonia. He died suddenly when apparently well on the way to recovery.

"Bryan McSwiney's scientific attainments were well recognised when he joined us," writes J. St.C. E., "but it was the stress of the war and the difficulties of the post-war years that brought into the open his real greatness. He was a born administrator and a man of true vision. His mind was set upon the future and he had a conception of medical education which could only have been held by a sensitive person with a wide knowledge of humanity. Yet his dreams were always controlled by an acute sense of what was possible and by a capacity for intense concentration upon detail. He had remarkable gifts of foresight and great business acumen which his friendly personality made it possible for him to employ where others might well have failed. His keen sense of humour and capacity for making contact with people of widely differing backgrounds enabled him to bring to the service of the school a body of knowledge and interest which could only have been gathered by a man of outstanding character.

"Yet with all his urge for improvement and progress, there was a part of his character which was deeply rooted in the past. He loved old furniture and good wine, good conversation and good manners, and he was a discriminating judge of water-colours and etchings. Slovenliness of body or mind he abhorred, and his standards of conduct were based upon a strong but unobtrusive sense of religion and a family life of singular happiness and fullness."

Another colleague continues: "A companionable man, McSwiney disliked being alone, and perhaps above all things he liked talking and listening to talk. For this reason he seemed to resent going to bed: if he could get anyone to stay up with him, he preferred to go on talking into the early hours of the morning rather than to ensure a long night after a strenuous day. . . . The Sherrington School of Physiology has lost a stimulating and inspiring chief, the medical school has lost a dean of drive and vision, the almoners of the hospital have lost a forceful counsellor, and everyone who knew McSwiney has lost a friend."

Dr. McSwiney married Miss Mabel Marie Law and they had three sons and two daughters.

LOUIS COBBETT

M.D. CAMB., F.R.C.S.

Dr. Louis Cobbett, who died on March 10 at the age of 85, was the last survivor of the group of pathologists who carried out the researches for the Royal Commission on Tuberculosis, which ended its work shortly before the outbreak of the first world war.

Born at Weybridge, the third son of Arthur Cobbett, he was educated at Lancing College and Trinity College, Cambridge. He took the Conjoint qualification from St. Thomas's Hospital in 1890, and his F.R.C.S. the following year, and graduated M.B. in 1892. After holding a house-appointment under Sir William MacCormac, he was appointed demonstrator to C. S. Roy, Cambridge's first professor of pathology. In 1894 he was awarded the John Lucas Walker studentship, which he held for the next three years. To this period belonged his work on the diphtheria bacillus, and his M.D. thesis of 1899 was on the action of antitoxin. The outbreaks of diphtheria at Cambridge and Colchester at the turn of the century gave him opportunity to apply his theories epidemiologically, and in the first volume of the new *Journal of Hygiene* he described how an outbreak had been checked by the isolation of contacts. With Nuttall and Strangeways he also discussed the cultural characters of the diphtheria bacillus, based on 950 bacterial examinations.

The Royal Commission on Tuberculosis, set up in 1902, had its origin in the meeting of the British Congress of Tuberculosis the previous year, when Koch, with all the weight of his great authority, dropped a bombshell on the medical world by announcing that human tuberculosis differed from bovine and could not be transmitted to cattle. Lord Lister was in the chair, and Cobbett related how Lister quickly seized the point that though Koch had proved his statement he had not shown that the converse necessarily followed—namely, that bovine tuberculosis could not be transmitted to man. Other Government committees and commissions on tuberculosis had merely taken evidence and "contracted out" the experimental work. But the new commission immediately broke fresh ground by setting up its own experimental farm and research station at Stansted, and there Cobbett, as their scientific investigator, began a series of experiments on animals to explore the pathogenic effects of a large number of strains of tubercle bacillus isolated from human sources, of which lymph-glands formed the majority. This work helped to establish the fact that the bovine strain was pathogenic to man, and the results were published in two large closely documented interim reports in 1907. Cobbett also collaborated with Stanley Griffith in a report in 1913, on tuberculin tests, which was one of the last issued.

When the commission finished its labours Cobbett turned to the production of a textbook embodying the findings of the commission and adding much important matter from the vast store of knowledge he had acquired during these years of work. Unfortunately this book, *The Causes of Tuberculosis*, appeared in 1917 when bacteriologists were thinking more about gas-gangrene and tetanus antitoxin than about the tubercle bacillus, and it did not become as widely known as it deserved. It brought the findings of the commission to bear on seed and soil at a time when the new-founded State tuberculosis dispensaries were beginning to tackle their many problems. Written in a scholarly style, it has become one of the classics of tuberculosis literature. Some years later Cobbett made a further contribution to the subject in a paper on racial immunisation in tuberculosis.

After holding the chair of pathology at Sheffield for a year, Cobbett returned to Cambridge in 1907 on his appointment to the university lectureship in bacteriology, and he held this post till 1929. After his retirement he continued his own research work in the department and gave courses of lectures for part II of the natural sciences tripos. S. R. G., to whom we owe much of this memoir, writes: "Helpful to his juniors, wise, kindly, and courteous, he was always accessible to those who sought information and ready to place his knowledge at their disposal. To me one of the pleasures of visits to Cambridge in the twenties was the opportunity to call upon Cobbett in his laboratory, for he always had something to give out of his wide experience."

MRS. BEDFORD FENWICK, editor of the *British Journal of Nursing* and founder of the British Nurses' Association, died on March 13 at the age of 90. She was matron of St. Bartholomew's Hospital from 1881 to 1887.

Appointments

BELL, R. B., M.R.C.S.: temporary M.O., Croydon airport.
JONES, E. O., M.R.C.S.: dermatologist, Royal West Sussex Hospital, Chichester.
MACLAUGHLIN, J. H., M.B. Belf., D.P.H.: asst. M.O.H., Rotherham.
MOORE, E. H., B.SC., M.B. Lpool, D.P.H.: deputy M.O.H., Warrington.
STEVENSON, J. J., M.B. Edin., D.M.R.: asst. radiologist, Royal Cancer Hospital (Free), London.

The Hospital for Sick Children, Great Ormond Street, W.C.1:
BEYNON, D. W., M.B., M.R.C.P.: resident asst. physician.
DEAN, JOHN, M.B., M.R.C.P.: house-physician.
FETTES, EDITH, M.R.C.S.: resident aural registrar.
GRIFFIN, MONA, M.B. Aberd., D.C.H.: asst. resident M.O., Tadworth Court.
MORRISON, ELIZABETH, M.B. Aberd.: resident anæsthetic registrar.

The South Eastern Hospital for Children, Sydenham:
MCKEAN, C. W. F., M.B. Camb.: dermatologist.
ROLES, F. C., B.CHIR. Camb., M.R.C.P.: pathologist.

Kent County Council:
Asst. pathologists:
BOWERS, V. H., B.SC., M.D. Lond.
CLOSE, H. G., M.D. Lond.
GRIFFITHS, L. L., M.B. Dubl., D.P.H.

St. Helier County Hospital, Surrey:
GOODHART, C. E. D. H., M.D. Camb., D.A.: senior anæsthetist.
STEWART, J. D., M.B. Edin., D.P.H.: director of physical medicine.
TRESIDDER, A. G., C.I.E., M.S. Lond., F.R.C.S.: ear, nose, and throat surgeon.

Examining Factory Surgeons:
CLOHESSY, C. J., M.B. N.U.I., D.P.H.: Ramsbottom, Lancs.
CRETNEY, ERIC, M.B. Manc.: Goole, Yorks.
MCGUINNESS, J. A., L.R.C.P.I.: Leigh, Lancs.
NOLAN, J. P., M.B. N.U.I., D.P.H.: St. Blazey, Cornwall.

Colonial Service:
ANDERSON, N. E. W., M.B. St. And., D.P.H., D.T.M. & H.: senior health officer, Nigeria.
BEAN, A. H., M.R.C.S.: specialist, Nigeria.
BILLIG, REBECCA, B.M. Oxfd: lady M.O., Malaya.
CAMERON, D. L., M.B. Edin., D.T.M. & H., D.P.M.: alienist, medical department, Nigeria.
CHEVERTON, R. L., M.R.C.S.: deputy director of medical services, Nigeria.
EVANS, L. W., B.SC. Wales, M.R.C.S.: deputy director of medical services, Malayan Union.
GALT GAMBLE, MARGARET, L.R.C.P.I.: lady M.O., Gold Coast.
GEMMELL, JAMES, L.R.C.P.E.: M.O., Nigeria.
GILLES, E. O., L.R.C.P.E.: senior health officer, Nigeria.
HALL, R. N., M.R.C.S.: specialist, Nigeria
HAY, I. K., M.B. Aberd.: M.O., Nigeria.
HOLNESS, MARGARET, M.B. Lond., D.T.M. & H.: lady M.O., Nigeria.
HOWARD, A. C., M.D. Lond.: M.O., Cyprus.
HUNTER, WILLIAM, M.B. Glasg., D.T.M.: senior M.O., Nigeria.
JONES, B. S., M.D. Camb., F.R.C.S. Edin.: specialist, Nigeria.
MCQUADE, H. G., M.B. Camb.: M.O., Nigeria.
MENZIES, G. M. M., M.B. Aberd.: senior M.O., Nigeria.
MOIR, K. T., M.D. Edin., D.T.M., D.T.H.: senior specialist, Nigeria.
MONTGOMERY, T. H. L., M.B. Belf., D.P.H., D.T.M. & H.: senior health officer, Nigeria.
NAUDI, J. P., B.SC., M.D. Malta: deputy director of medical services, Nigeria.
NELSON, WALLACE, M.B. Edin.: deputy director of medical services, Nigeria.
POONOOSAMY, VALAYDON, L.R.C.P.E.: M.O., grade 2, Mauritius.
SHEARER, GAVIN, M.D. Glasg., D.T.M.: senior M.O., Nigeria.
SHELLEY, H. M., F.R.F.P.S., M.R.C.P., D.T.M. & H.: director of medical and health services, Cyprus.
SIMPSON, THOMAS, L.R.C.P.I., D.T.M. & H., D.M.R.E.: specialist, Nigeria.
SORLEY, J. T., M.B. Aberd., D.T.M. & H.: specialist, Nigeria.
SUAREZ, CARLOS, M.R.C.S.: M.O., British Somaliland.
VAUGHAN, G. W., M.B. Glasg.: asst. director of medical services, Nigeria.
WARD, THELMA, M.B.: lady doctor, Malaya.
WEIR, H. C., M.B. Dubl.: senior M.O., Nigeria.
WILLIAMS, F. G., M.B. Birm.: M.O., Nigeria.
WILSON, CARMICHAEL, M.B. Dubl.: deputy director of medical services, Nigeria.

Notes and News

MEDICAL LIBRARIES

Mr. W. R. Le Fanu, the librarian of the Royal College of Surgeons, has done a useful piece of work in compiling, with the help of ASLIB, particulars of the medical libraries in the British Isles.[1] He has spread his net so wide that he might have added the Eugenics Society, which has a library of three thousand volumes. But the Middlesex county hospitals, which already have libraries for the use of their medical staff, are rightly included. Some county councils still do not provide this service but other local authorities are planning to provide libraries for all members of the hospital staff as well as the patients. In a supplementary list Mr. Le Fanu gives the information bureaux in the London area. Outside London the libraries and information bureaux are combined in one list, completed by an index to all the libraries and subjects.

MORE HERBS

Mrs. Quelch goes on and on—*Herbs for Daily Use* (1941), *Herbal Remedies* (1945), and now *Herbs and How to Know Them* (London: Faber, pp. 280, 8*s.* 6*d.*)—and definitely up and up. She is a modern Culpeper, with a winning belief in the virtues of the things that grow in meadow and woodland, almost it would seem purposely for the health and comfort of man. And she ropes in her friends to make little portraits of them, which have some of the charm of John Gerard's woodcuts. It matters not that herbs at the moment are outside the main stream of medical thought and practice—that herbalists would not feel at home in a health service. Better far to stay, with Mrs. Quelch, in the pleasant backwaters with the dragonflies and the lazy sunshine, Chaucer and Shelley and Wordsworth benignly looking on. Where we should all be the better for joining them *si opus sit.*

Mrs. C. F. Leyel, who is chairman of the Society of Herbalists, has now completed the second volume of her series of Herbals. This is entitled *Compassionate Herbs* (Faber, pp. 224, 12*s.* 6*d.*) and is limited to herbs used for healing injuries and wounds. Though these have borne the test of centuries of experience they are, she says, entirely neglected in modern surgery—albeit they include cinchona, balsam of Peru, and sphagnum moss. The book has a remarkable index giving the names of the herbs in 10 languages with a high degree of accuracy. There are also 15 attractive line drawings.

REGISTRY OF BONE TUMOURS

A REGISTRY of primary malignant tumours of bones has been set up, with its headquarters at the department of pathology of the Royal College of Surgeons of England, to collect records of cases of primary tumour of bone, including joints and cartilages, especially those in which cure or prolonged alleviation has been attained by treatment. All cases claimed as five year cures will be considered by the committee, but in future only cases in which histological proof of the nature of the tumour, by biopsy or following amputation, can be obtained will be considered. Where histological diagnosis is in doubt, the consultant panel in morbid histology, set up by the Pathological Society of Great Britain and Ireland in conjunction with the British Empire Cancer Campaign and the National Radium Commission, will be consulted. Those interested are invited to send records, with amputation or biopsy specimens, to Prof. R. A. Willis, at the college, Lincoln's Inn Fields, London, W.C.2. Donors will be sent reports on the pathological investigation of specimens received, and in return will be asked for follow-up information regarding patients.

A NURSING BROCHURE

MANY matrons, when they get inquiries from prospective nurses, are obliged to send out dull and out-of-date prospectuses giving no clear picture of the opportunities which training offers, and indeed often repelling candidates by their official tone. Walthamstow Infectious Diseases Hospital has taken the trouble to publish an encouraging illustrated brochure, pointing out that a two-year course leads to qualification as a fever nurse, and that students will be working a 48-hour week, in agreeable country surroundings within a bus ride of London. Their hours of duty are fairly set out: 7 A.M. to 8 P.M., with four hours' break for meals and leisure on four days a week, one whole day off with breakfast in bed, and two free evenings (beginning presumably at 5 P.M.). They get a month's leave yearly. The pictures do not give a false impression of luxury, and it is clear that some trouble has been taken to present a just, as well as a pleasant, picture of what the nurse may expect.

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[1] *Journal of Documentation*, 1946, 2, 120; in booklet form from ASLIB, 52, Bloomsbury Street, London, W.C.1. 5*s*.

RED BOOKS

FOR the first time since the war the Postmaster-General has been able to issue new editions of his lists of Post Offices in the United Kingdom (1*s.* 6*d.*) and of London Post Offices and Streets (9*d.*). With the current Post Office Guide, also issued at the end of last year, these scarlet paper-covered volumes set out all that the Post Office is ready to do for us. They may also be used as an informal and inexpensive gazetteer, where the spelling and location of the smallest villages can be found.

HELP FOR EUROPEAN LIBRARIES

THE Central Medical Library Bureau set up by the Royal Society of Medicine to fill the gaps in the medical libraries of our Allies has now been at work for a year, and with the aid of a generous grant from the Rockefeller Foundation it has made good progress. Back numbers of many journals are unobtainable and cannot be reprinted, and with the consent of the publishers the bureau's first task has been to supply microfilms of these missing issues. Although production of the film is slower than could be wished, 5000 pages have been filmed in a day. A camera has been discovered which is specially designed for making microfilm, and it is hoped to have four in operation before the end of the second year of the scheme. A suitable microfilm reader has also been selected and many of these instruments have been sent to the beneficiary libraries. The bureau is in touch with libraries in Belgium, Czechoslovakia, Denmark, Holland, Iceland, Norway, Poland, the U.S.S.R., and Greece.

University of Oxford

Dr. A. G. M. Weddell has been appointed reader in human anatomy.

Dr. Weddell, who is 39 years of age, took his M.B. Lond. at St. Bartholomew's Hospital in 1933, and after holding a house-appointment there was awarded a Commonwealth Fund fellowship in 1935. The next two years he spent in America working at Rochester, New York, with Dr. G. W. Corner, and then at St. Louis University with Dr. Ernest Sachs. On his return to this country he was appointed demonstrator in anatomy at University College, London. His early publications include papers on arterial vascular patterns, pathways transmitting sensation of taste, and cutaneous innervation in relation to cutaneous sensibility. During part of his service with the R.A.M.C. during the war he worked in Oxford at the Military Hospital for Head Injuries, and while there he described in our columns (jointly) the clinical application of electromyography and the costoclavicular compression of the subclavian artery and vein. In 1942 he was elected to a Hunterian professorship of the Royal College of Surgeons, and in the following year he was awarded the John Hunter medal and the triennial prize (1940–42) of the college for his research work on the ultimate distribution of the sensory peripheral nerves. During the latter part of the war Dr. Weddell was disembodied from the R.A.M.C. in order to carry out work for the Royal Naval Personnel Research Committee of the Medical Research Council.

University of Dublin

On March 12 the following degrees were conferred at Trinity College:

M.D.—L. R. S. MacFarlane, J. V. Morris.

M.A.O.—D. V. Latham.

M.B., *B.Ch.*, *B.A.O.*—J. R. A. Burns, M. H. Daniels, Kathleen M. Ellis, O. S. J. Redman, H. G. Scott, Jack Steinberg, Margaret P. Steiner, C. D. Turpin.

University of Birmingham

Mr. Hugh McLaren has been appointed first assistant to the professor of obstetrics and gynæcology. Mr. J. A. H. Waterhouse, PH.D., has also been appointed lecturer in human genetics, and Miss Muriel Johnstone, PH.D., officer in charge of records in the department of human genetics.

Association of Sea and Air Port Health Authorities

The 48th annual meeting of the association will be held at the City Hall, Belfast, from May 13 to 15. The medical speakers will include Dr. Lloyd Hughes, who will read a paper on the Hygiene of Crews' Quarters and Provisions, Dr. Samuel Barron (Sanitary Control of Foreshores of Belfast Lough), Dr. Melville Mackenzie (International Health), and Dr. W. G. Swann (Health Control at an Air Port). Further information may be had from the secretary of the association, Health Department, Civic Centre, Southampton.

Royal College of Surgeons of England

At a meeting of the council, held on March 13, with Sir Alfred Webb-Johnson, the president, in the chair, diplomas of fellowship were granted to the following:

L. E. D. Knights, F. S. Mitchell-Heggs, P. I. Hywel-Davies, M. S. Ambrose, I. F. Rose, P. G. Epps, A. J. Walton, L. L. Whytehead, A. C. Bingold, P. T. Savage, J. D. Cronin, R. L. G. Dawson, G. F. Smart, M. H. M. Ryan, Wallace Black, A. M. Abrahams, Ibrahim Demerdash, E. W. Grahame, R. J. Last, L. P. Le Quesne, A. L. Lomas, J. J. MacHale, A. T. Mansuri, A. J. Marsden, N. E. Stidolph, L. P. Thomas, J. V. Todd, M. F. A. Woodruff.

Diplomas of membership were granted to R. M. Forrester and A. M. McCall. The following diplomas were also granted, jointly with the Royal College of Physicians:

D.Phys.Med.—M. H. L. Desmarais, A. J. Enzer, A. J. Martin, J. R, Preston, Alan Stoddard.

D.O.M.S.—J. R. Acfield, M. H. Adams, R. P. Baird, George Bennett, David Black, O. F. Bowes, Louis Boxer, A. V. Clemmey, J. E. Coates, D. B. H. Dawson, A. L. Dick, G. de L. Fenwick, Malcolm Ferguson, R. G. S. Ferguson, A. B. W. Ferreira, C. F. Garfit, O. M. Haarburger, W. H. C. M. Hamilton, L. B. Hardman, Joan Haythorne, A. C. Higgitt, J. C. Hill, B. L. Hoffman, J. M. L. Howat, H. L. Hughes, H. H. Johnson, Anna M. Joyce, J. A. Langille, M. N. Laybourne, V. T. Lees, G. D. Lehmann, Gerald Leiman, Robert Leishman, J. A. N. Lock, J. D. Lodge, Helen C. Longmore, J. G. Louw, R. J. H. McMahon, N. L. McNeil, Kathleen F. Matthews, R. A. Megally, A. D. Milne, J. E. Moffett, T. G. S. Murray, W. C. G. Murray, C. T. Newnham, Marjorie E. Pollard, C. E. Powell, R. E. Rees, K. W. B. Rostron, H. B. Smith, Vincent Tabone, M. A. Weaver, J. E. Wolff, M. H. Wright.

The following were recognised as resident surgical posts for the final fellowship examinations: R.S.O. at Highgate Hospital, London; R.S.O. at Archway Hospital, London; junior R.S.O. and H.S. for one year at St. Stephen's Hospital, London.

During April and May courses of lectures in surgery, anæsthesia, oto-laryngology, and orthopædics will be held at the college. Further particulars will be found in our advertisement columns of March 15.

British Institute of Radiology

Dr. A. E. Barclay, Prof. J. A. Crowther, SC.D., Prof. Sidney Russ, D.SC., and Prof. J. Heyman, M.D., have been elected honorary members of the institute.

The Roentgen award for 1946 has been made jointly to Brigadier D. B. McGrigor and Lieut.-Colonel Eric Samuel for their series of papers on the radiology of war injuries.

Streptomycin in the United States

The price of streptomycin in the United States, which a year ago was about £5 per gramme, is now about 30*s.* per gramme; government officials, says B.U.P., estimate that it will drop to about 22*s.* 6*d.* in July and will settle at about 17*s.* 6*d.* in 1948. The demand is expected to reach about 1 million grammes a month—a little more than three times the present rate of production.

Pasteur Exhibition

An exhibition will be held at the Science Museum, South Kensington, from April 10 to May 26, which includes a chronological account of the chemical and biological work of Louis Pasteur. Another section deals with the Pasteur Institutes established throughout the world for the preparation of sera and vaccines for the combating of disease epidemics. The exhibition has been arranged and provided, with the help of the cultural relations department of the French Foreign Office, by the Palais de la Découverte in Paris, where it has recently been on show. The Science Museum is open, admission free, from 10 A.M. to 6 P.M. on weekdays, and from 2.30 P.M. to 6 P.M. on Sundays.

Health and Tuberculosis Conference

A Commonwealth and Empire Health and Tuberculosis Conference is to be held at the Central Hall, Westminster, London, S.W.1, from July 8 to 10. The speakers will include Mr. Aneurin Bevan (Minister of Health), Mr. A. Creech Jones (Secretary of State for the Colonies), Mr. Walter Elliot, M.P., Lieut.-General Sir Bennett Hance (India), Dr. Jean Gregoire (deputy minister of health, Quebec), Dr. G. J. Wherrett (Canada), Dr. B. A. Dormer (South Africa), Dr. Esmond R. Long (Philadelphia), and Dr. H. Corwin Hinshaw (Mayo Clinic, U.S.A.). Subjects for discussion are: Tuberculosis in the Commonwealth, Sanatorium Design, Aftercare and Rehabilitation, the Human Factor, the National Health Service Act, Colonial Tuberculosis Services, and Prevention and Treatment of Tuberculosis. Further information may be had from the National Association for the Prevention of Tuberculosis, Tavistock House North, London, W.C.1.

REVISION OF THE ANATOMICAL CURRICULUM AT BIRMINGHAM UNIVERSITY *

S. ZUCKERMAN
C.B., M.D. Birm., D.Sc. Lond., F.R.S.
PROFESSOR OF ANATOMY IN THE UNIVERSITY OF BIRMINGHAM

THE general move to raise the scale of university education in Great Britain has provided a new incentive to the reform of the medical curriculum, and one which reinforces the stimulus furnished by the Interdepartmental Committee on Medical Schools in its well-known "Goodenough Report."

The problem of reform is not new, and its ventilation by the Goodenough Committee merely represents the last of a series of reviews which started in 1925 with Abraham Flexner's comparative study of medical education. The trend of most discussion has been a desire to introduce into medical education both the sense of the social needs which such an education should satisfy and the conceptions and methods of the intellectual and critical, as distinct from the informative, side of a university education; more specifically, the desire to depart from vocational instruction, which is largely didactic and descriptive, to an education that has as its basis a general scientific understanding of the mechanisms underlying the processes of health and disease.

To effect such changes it is clearly necessary to revise the curriculum, for one of the objects would be to introduce new "priorities" that will be more in line with present-day trends in knowledge and needs than the old traditional ones, whose effect is to starve important subjects at the expense of topics which continue to be emphasised merely because they always have been.

Anatomists have long been conscious of the fact that they are often regarded by their colleagues in other departments as being among the worst sinners in this respect. Nevertheless they are custodians of a section of medical education which, however much belittled, no-one seems anxious to jettison. Not surprisingly the subject has in some quarters become imbued with a slight sense of inferiority. The result has been bad for anatomists, whose numbers are added to by fewer and fewer scientific recruits, and bad for the subject, since questions of reform have mostly limited themselves to artificial attempts to vitalise the subject by pruning, and by adding to the medical curriculum such matters as genetics, experimental embryology, and so on.

This is clearly not the way which anatomists need follow in contributing to the reform of the curriculum. No useful purpose is necessarily served by uncluttering the subject of unwanted detail merely to create a vacuum which might be filled, according to the taste of the individual teacher, by borrowings from other subjects, or merely to provide more time for another subject to crowd itself with fresh detail, which from both the intellectual and vocational points of view might be no more relevant to the future and immediate needs of the student than were the anatomical details which he would otherwise have been expected to master.

REINTEGRATION OF ANATOMY WITH PHYSIOLOGY

After carefully considering the part anatomy should play in the student's non-clinical education, and in the belief that half-measures were not likely to solve the fundamental difficulties, we have in Birmingham taken the radical step of completely reintegrating the subject with physiology. The term reintegration is used advisedly, for it is only relatively recently that the two disciplines went their separate ways.

It is worth noting this fact carefully, if we are to understand the significance of the change that has been made, and its underlying reasons. Anatomy today is most commonly regarded as the subject which deals with the structure of the body and with the factors concerned in its development and maintenance. Considered as a scientific discipline its domain has become the field of structural organisation. But a hundred, and even fewer, years ago it was being taught and developed as a single subject with physiology. In 1845 William Bowman, whose achievements graced medical science over a large part of the 19th century, and who received his earlier medical education in Birmingham, provided, in collaboration with Robert Todd, one of the first English textbooks of physiology—and it was called not a textbook of physiology but "The Physiological Anatomy and Physiology of Man." At that time anatomy was the basis of most of our beliefs about the function of the organs and tissues of the body. In the preface to his six-volume "Cyclopædia of Anatomy and Physiology," the first part of which appeared in 1835, Todd wrote that it was due to additions to anatomical knowledge that physiology was becoming transformed from "a series of vague and ill-founded hypotheses . . . to a well-arranged science." And if Bowman's (1842) paper on the relation of the micro-anatomy of the kidney to the function of the organ is a sample of what was in mind here, the student of 1946 may well agree that Todd was not exaggerating. It is also worth noting that, two years after the Physiological Society was founded in 1876, an independent *Journal of Physiology* was launched, in spite of the fact that a *Journal of Anatomy and Physiology* had made its appearance some ten years before. It was not until 1916 that the *Journal of Anatomy and Physiology* divested itself of its physiological qualification and became the *Journal of Anatomy*, which is now the organ of the Anatomical Society.

The separation of anatomy as a discipline distinct from physiology appears, so far as the development of medical science in this country is concerned, to have been accidental. It was primarily due to the influence of Sharpey, the first holder of the chair of general anatomy and physiology at University College, London, and his wise maintenance of the need to develop experimental methods in the investigation of biological processes. To this end he initiated a move to separate from anatomy what he termed "practical physiology," and his example was soon followed in Cambridge. The change was a fruitful one so far as the development of biological knowledge was concerned, but the increasing use by physiologists of the experimental method of gaining knowledge, and its sad neglect by anatomists, most of whom remained servants of the old tradition of direct observation of tissues, rapidly created a wide gulf between physiology and its parent subject.

In recent years, however, some anatomists have also taken up the experimental method. The result has been that anatomy departments in this country have become roughly divided into a group in which experimental work of one kind or another is vigorously pursued, and another in which the established morphological tradition is maintained. Not surprisingly, those anatomists who have taught their subject while at the same time pursuing experimental studies have become widely regarded by their anatomical colleagues and physiologists as pseudo-physiologists. The imputation of something wrong in the situation is unwarranted. As G. W. Corner—now head of the department of embryology of the Carnegie Institution of Washington—once put it, the fear that there will soon be no anatomists at all, if every teacher of anatomy becomes a physiologist, is unreal, for the simple reason that anatomists have always been physiologists. One should not, and in fact cannot, separate questions of structure from questions of function. Anatomical

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* The substance of a lecture given to preclinical students at the opening of the 1946–47 session of the Birmingham medical school.

Penicillin for Germany

According to a Military Government report, quoted by B.U.P., production of penicillin in the British and U.S. zones of Germany is limited to one factory (at Höchst) which is turning out only 50 mega units a month. Production from a new factory which is to be constructed and operated under Allied supervision will, however, end the zones' dependence for supplies on other countries.

Plan for New York as Medical Centre

A plan to make New York a world centre of medical education by combining the resources of 65 big hospitals in the city has been announced by Dr. George Baehr, president of the New York Academy of Medicine. He is quoted by B.U.P. as advocating a central department within the academy for the better utilisation of postgraduate educational and hospital facilities.

Foreign Awards

The following awards have been made to medical men:

Officer in the Order of Orange Nassau.—Surgeon Lieut.-Commander C. G. ROWORTH, M.D. Lond., R.N.V.R.

King Haakon VII Liberty Cross.—Surgeon Captain J. C. SOUTER, M.B. Aberd., R.N.

King Haakon VII Liberty Medal.—Surgeon Commander J. A. KERR, M.D. Glasg., R.N.V.R., Surgeon Commander WILLIAM FLYNN, M.D. Malta, R.N.

King Haakon VII Freedom Medal.—Air Commodore R. R. MACINTOSH, D.M. Oxfd, R.A.F.V.R.

Royal Free Hospital Old Students Association

The reunion dinner of the association is to be held at the Café Royal on April 30. Tickets may be had from the hon. secretaries, Dr. Barbara Mitchell, 6, Church Street, Epsom, or Miss Jocelyn Moore, F.R.C.S., 4, Devonshire Place, London, W.1.

Royal Sanitary Institute

The institute will hold its health congress at Torquay from June 2 to 6. Sections of the congress will deal with preventive medicine, engineering and architecture, maternal and child health, veterinary hygiene, food and nutrition, housing and town-planning, and tropical hygiene. There will also be conferences of medical officers of health, engineers and surveyors, sanitary inspectors, and health visitors. Presidents of the sections and conferences will include Sir Allen Daley, Sir Andrew Davidson, Prof. H. D. Kay, D.SC., Prof. George Macdonald, Prof. R. E. Lane, and Dr. Dorothy Taylor. Further information may be had from the institute, 90, Buckingham Palace Road, London, S.W.1.

Dr. R. R. Race informs us that Prof. Ludwig Hirszfeld is preparing a second edition of his book *Groupes Sanguins* and would be grateful for reprints of English papers on this subject. The address is Wroclaw, Poland, Zakladu Mikrobiologii, Roberta Kocha St. 4. At present up to 4 lb. in weight can be sent, for which a *3d.* stamp is required for the first ounce and a *1½d.* for each additional ounce. The maximum weight for air-mail is one ounce, for which a *5d.* stamp is required.

Diary of the Week

MARCH 23 TO 29

Monday, 24th

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
3.15 P.M. Prof. R. J. V. Pulvertaft: Air-borne Infection.
5 P.M. Prof. John Kirk: Posterior Abdominal Wall.
ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5.30 P.M. *Odontology.* Dr. A. B. MacGregor: Local Penicillin in the Mouth. Dr. G. T. Hankey: Multiple Cysts of the Mandible ? osteitis fibrosa.

Tuesday, 25th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Professor Pulvertaft: Pathology of Diseases of Lymphatic Tissue.
5 P.M. Professor Kirk: Pelvic Wall.
ROYAL SOCIETY OF MEDICINE
8 P.M. *Medicine.* Dr. Adolf Schott: Painful Disability of the Shoulder in Coronary Disease. Dr. Jean Watkinson, Prof. Alexander Haddow, Dr. Edith Paterson, Dr. Inez Ap Thomas: Leukæmia Treated with Urethane. Dr Neville Oswald: Collapse of the Lower Lobes of the Lungs in Children.
LONDON SCHOOL OF DERMATOLOGY, 5, *Lisle Street*, W.C.2
5 P.M. Dr. G. B. Dowling: Lupus Vulgaris.

Wednesday, 26th

ROYAL SOCIETY OF MEDICINE
5 P.M. *Endocrinology.* Mr. J E. Piercy, Dr. W. R. Trotter: Toxic Goitre.
ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
3.30 P.M. Dr. M. T. Morgan: Health Inspection of Imported Foodstuffs.
CLARKE HALL FELLOWSHIP
4.30 P.M. (New Hall, Lincoln's Inn, W.C.2.) Dr. J. R. Rees: Mental Health and the Offender.
SOCIETY OF CHEMICAL INDUSTRY
6.30 P.M. (Burlington House, Piccadilly, W.1.) *Nutritional Panel.* Mr. Kenneth Mellanby, D.SC.: Human Water Requirements.

Thursday, 27th

ROYAL SOCIETY OF MEDICINE
8 P.M. *Urology.* Mr. R. A. Mogg: Injuries to the Bladder. Mr. D. S. Poole Wilson: Injuries to the Urethra. Mr. Geoffrey Parker: Battle Casualties Involving the Genito-urinary System.
MEDICO-LEGAL SOCIETY
8.15 P.M. (26, Portland Place, W.1.) Dr. C. E. Newman, Mr. R. H. Graveson, PH.D.: Education and Status of the Medical and Legal Professions.
LONDON SCHOOL OF DERMATOLOGY
5 P.M. Dr. H. W. Barber: Seborrhœic Eruptions.

Friday, 28th

ROYAL SOCIETY OF MEDICINE
2.30 P.M. *Epidemiology and State Medicine.* Dr. J. M. Vine: Malaria Control with D.D.T. on a National Basis in Greece.
5 P.M. *Pædiatrics.* Dr. R. W. Cope, Dr. David Asermann: Anæsthesia in Children.
SOCIETY FOR ENDOCRINOLOGY
12 NOON. (Medical School, Hospitals Centre, Birmingham, 15) Symposium on the Adrenal Cortex.

Saturday, 29th

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES
2.30 P.M. (11, Chandos Street, W.1.) Dr. Hamilton Wilkie: Medical Photography—its Application to Venereal Diseases.

Births, Marriages, and Deaths

BIRTHS

BARKER.—On March 12, at Exmouth, the wife of Wing-Commander C. C. Barker, A.F.C., M.B.—a son.
COSIN.—On March 13, in London, the wife of Dr. C. F. Cosin—a son.
DIXON.—On March 10, at Haxby, York, the wife of Dr. D. G. Dixon—a son.
GRAY.—On March 8, at Edinburgh, the wife of Dr. R. F. Gray—a son.
JAMIESON.—On March 11, in London, the wife of Dr. J. G. Jamieson, O.B.E.—a daughter.
JENNER.—On March 12, at Woking, the wife of Dr. Martin Jenner—a son.
JONAS.—On March 8, at Boxmoor, the wife of Dr. Howard Jonas—a son.
KIEFT.—On March 13, at Woking, the wife of Dr. B. T. Kieft—a daughter.
KING.—On March 8, in London, the wife of Dr. E. J. King—a daughter.
MCCRACKEN.—On March 11, at Newcastle-upon-Tyne, the wife of Dr. J. D. W. McCracken—a son.
REID.—On March 12, at Faversham, the wife of Dr. G. O. S. Reid—a son.
SHEE.—On March 12, the wife of Dr. J. C. Shee—a daughter.
STAREY.—On March 8, at Oxford, the wife of Dr. Christopher Starey—a daughter.
STEVENS.—On March 14, at Redhill, Surrey, the wife of Mr. A. Edgar Stevens, F.R.C.S.E.—a son.
STREET.—On March 10, at Lyndhurst, Hants, the wife of Dr. E. W. Street—a daughter.
TAYLOR.—On March 7, at Tunbridge Wells, the wife of Dr. A. W. Taylor—a son.

MARRIAGES

DEWE—FOX.—On March 8, in London, Douglas Dewe, M.R.C.S., major I.M.S., to June Fox.
MACKENZIE—GRENFELL.—On March 5, at Parkgate, Ian Grant MacKenzie, M.B., to Beryl Bruce Grenfell.

DEATHS

ADAMSON.—On March 13, James Weeden Woodhams Adamson, M.D. Durh., of St. Leonards-on-Sea.
BRADLEY.—On March 9, Alwyn Hewett Bradley, M.B. Lond., of Leicester.
COBBETT.—On March 9, Louis Cobbett, M.D. Camb., F.R.C.S., aged 84.
FENTON.—On March 10, at Beaulieu, Hants, Thomas Gerald Fenton, F.R.C.S.
FLEGG.—On March 13, at Cheltenham, Frederick Arthur Martin Flegg, M.R.C.S.
HAWKINS.—On March 9, at Cheltenham, Herbert Cæsar Hawkins, L.R.C.P.E., J.P., aged 83.
HAY.—On March 12, in London, Kenneth Robert Hay, O.B.E., M.B. Camb.
HILL.—On March 11, Arthur Croft Hill, M.D. Camb., aged 84.
LANGFORD.—On March 10, at Bristol, Frederick Charles Langford, M.B.E., M.D. Durh.
MCSWINEY.—On March 8, at St. Thomas's Hospital, London, Bryan Austin McSwiney, M.B. Dubl., SC.D., F.R.S., aged 52.
MORPHEW.—On March 8, at Cromer, Edward Maudsley Morphew, C.M.G., D.S.O., M.R.C.S., colonel, late R.A.M.C.
NICHOLSON.—On March 13, at Louth, Lincs, John Williams Nicholson, M.R.C.S., lieut.-colonel R.A.M.C. retd., aged 91.
ROCK.—On March 10, Cecil Howard Rock, M.R.C.S., late surgeon commander R.N.
TURNLY.—On March 9, at Heathfield, John Edward Litton Alexander Turnly, M.R.C.S.

current vocational and scientific needs of medical education. Essentially, we are breaking away from unreal subdivisions of interest, due to excessive specialisation, so as to bring our research and teaching activities to bear on topics in their entirety.

It is too soon to say how successful the new scheme will prove in practice. In its operation it must necessarily be regarded as experimental and flexible, and subject to such major and minor revision as experience shows to be useful. The character of our professional examinations, and their standard, will necessarily have to be revised in terms of the changes that have been introduced. Further it must be remembered that artificial barriers between subjects in the medical curriculum are not limited to those that have developed between anatomy and physiology; and in time we hope, for example, to reintegrate into our new scheme non-medical biological teaching—particularly when we come to deal with the recombination of our anatomical and physiological Hons. B.SC. and B.SC. courses.

There is little to fear if in all these changes an anatomical department appears to have relegated a part of its independence to serve the needs of functional studies. Atchley (1946), professor of clinical medicine at Columbia University, has pointed out, in a most illuminating discourse on the orientation of medical education, that it should be "gratefully remembered that anatomy was the science which rescued medicine from witchcraft." Today it seems a minor sacrifice to break down the walls which the subject has built round itself in recent times in order to make a start in organising the undergraduate medical curriculum, not by traditional compartments, but on what Atchley has called "the framework of dynamic units," the dynamic units that are constituted, for example, by the working of the respiratory or cardiovascular apparatus, and the only units which are relevant to the modern clinician. Breaking down its administrative walls in no way impairs the status or individuality of anatomy regarded as the science concerned with the problems of structural organisation. It remains an essential foundation for advances in biological and medical knowledge, and its admixture with functional interests will only add to the promise that lies in its own progress.

References.—Atchley, D. W. (1946) *Science*, 104, 67. Bowman, W. (1842) *Philos. Trans.* p. 57. Corner, G. W. (1930) Anatomy, New York. Flexner, A. (1925) Medical Education, New York.

ASCORBIC-ACID METABOLISM OF BANTU SOLDIERS

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PATHOLOGIST

This paper is part of a comprehensive dietetic survey carried out on African Army personnel. Almost all the subjects studied were Bantu natives drawn from various parts of East Africa.

Our aim was to determine whether the ascorbic-acid intake of the subjects was adequate for their optimum health. This is not a simple matter. Firstly, if direct measurement of the intake shows it to be below that considered adequate in Europeans, it can be argued that the African requires less. The low incidence of scurvy among the subjects has been quoted to substantiate this view; but the non-appearance of scurvy is not good evidence of adequate ascorbic-acid intake. Chronic ill health may appear long before scurvy develops. Secondly, chronic ill health in these subjects is not necessarily due to a deficient intake of ascorbic acid; it is more likely due to other dietary deficiencies and chronic infections and infestations. Thirdly, even if the ascorbic-acid content of the tissues is measured, it is difficult to determine what levels represent an intake adequate for optimum health.

ASCORBIC-ACID INTAKE

All the subjects studied had been on a standard diet for more than two months, and some for several years. We asked 474 men, detained in hospital for a few days with minor complaints, whether during their service they had had access to any additional foods which might contain ascorbic acid. Only 34 of them had had access to such foods, and even these for short and irregular periods. Additional sources of ascorbic acid can therefore be largely ruled out. The Army diet contains 105 mg. of ascorbic acid per man daily, a figure which compares favourably with the recommendations of most authorities. The sources are mainly oranges and vegetables (Anderson 1943).

The daily orange contains about 49 mg. of ascorbic acid. The supply, however, is seasonal, and the substitutes provided often contained much less. The African does not like oranges much because they are sour, and he eats only part of the fruit. For instance, 20 oranges, which had an average content of 44 mg. of ascorbic acid, a figure very near that stated by Anderson (1943), were given to 20 Africans. After the men had finished eating, the discarded portions were analysed for ascorbic acid. Only about 30% of the ascorbic acid had been consumed (highest figure 42%, lowest 18%). The raw vegetable ration contains 25 mg. of ascorbic acid, but, after cooking, the average amount of ascorbic acid daily reaching the soldier was 3–5 mg. The cooks clean the vegetables carelessly, overboil them, clean their pans with alkalis, and throw away the water in which the vegetables are cooked. Thus the daily intake of ascorbic acid falls far short of the calculated amount, the average intake of these subjects being under 15 mg.

RESPONSE OF ANÆMIA TO ASCORBIC ACID

As chronic ill health and low hæmoglobin levels were common in these Africans, it was thought that the low Hb might be related to a low intake of ascorbic acid. Consequently 16 uncomplicated cases of anæmia were investigated. They were selected because they showed no signs of blood destruction, or of blood regeneration such as would occur after an acute illness or a malarial attack. They were subjected to a complete hæmatological investigation, including marrow puncture. All the cases showed the following features:

Mean corpuscular hæmoglobin concentration	range 27·6–44, mean 35·5
Mean corpuscular volume ..	range 76·6–114, mean 93·3
Colour-index	range 0·87–1·29, mean 1·07

The marrows showed a picture of comparative unresponsiveness to the degree of anæmia.

The subjects were then given for seven to ten days a basal diet which contained almost no vitamins, and little protein, but adequate calories and iron. At the end of the period the hæmatological investigations were repeated, but no change in the picture was found. Next, ascorbic acid 700 mg. daily was added to the diet, and after a further seven days the hæmatological investigations were again repeated. This time 6 cases showed a rise of Hb level of not less than 18% and an increase in number of red cells of not less than a million per c.mm., and 3 cases also showed a reticulocyte response between the seventh and tenth days. Although 9 cases showed a response to ascorbic acid, only 3 of them finally attained a figure of 100% Hb with the sole addition of ascorbic acid to the basal diet.

These results,[1] though derived from a small number of knowledge, in the sense of a knowledge of the form and structure of the organs of the body, is essential for the prosecution of physiological studies and for the practice of medicine. Equally, the full investigation of the form of any tissue necessitates a knowledge of its behaviour. As Corner has written :

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[1] These results are stated here only in brief, because they will be reported later more fully by Lieut.-Colonel O. K. Gayer, R.A.M.C.

> "At some periods in the hands of certain investigators the study of structure has taken the lead, at other times the study of function. There tends in fact to be a series of alternations in this respect in any given field ; for example, the study of cell structure, for a century entirely morphological, is now entering upon a physico-chemical phase, while the physiology of reproduction is at the moment pursued chiefly with the instruments and material of the microscopist. The structure of an organ or tissue is worked at until a new light is thrown upon its action ; but afterwards the complexities of its action in turn require a more fundamental investigation of structure. The progress of a science is achieved by such alternations or by an essentially similar process, namely, the fusion of two viewpoints in a single mind. All the sciences converge toward a common point, for all are concerned ultimately with the study of unstable equilibria ; and it is when two branches of this study converge that fragments of the great puzzle begin to fit together and knowledge is achieved."

Further, to add to Corner's analysis, we have to recognise today the implicit fact that, since the separation of anatomy from physiology in the latter half of the last century and their progressive administrative divergence, continued specialisation has led to such diffusion of boundaries that problems which might classically be described as anatomical have become the research interest of physiologists, and vice versa.

TEACHING OF ANATOMY IN BIRMINGHAM

Anatomy, which has undoubtedly suffered most from the individual specialisation of physiology, biochemistry, and biophysics, will be restored to a basically healthy state if we depart from unreal subdivisions of interest. What has therefore been done in Birmingham is to reinstate, administratively, the relationship which existed between structural and functional studies before anatomy and physiology diverged from common ground.

To this end anatomy in future will retain a separate character only in the dissecting-room, and to all intents and purposes no course of lectures will be arranged which is either purely anatomical or purely physiological. Instead, each course which the medical student attends will provide, in as useful a sequence as can be devised, the required anatomical and physiological knowledge and the necessary indications of current developments. When, for example, the student starts to study the structure of the brain or the form of the heart, he will simultaneously become acquainted with what is known of their activities. By concentrating attention on the function and behaviour of the various organs and tissues of the body, we hope to eliminate details of topographical anatomy which have no scientific value and find little or no application in the vocational fields of surgery or medicine.

Further consequences will be the avoidance of unnecessary overlap and discordant timing, which occur in the separate treatment of anatomical and physiological studies, and a fusion of two different approaches to one goal—knowledge of what the body is and how it works.

The lecture courses have been arranged, according to the following plan, in an introductory, a systematic, and a final coördinating series. The total number of lectures for the five terms is about 290, which from the student's point of view represents an average of $1^1/_2$ lectures a day, and a significant over-all saving in lecture time.

I—INTRODUCTORY AND GENERAL SERIES

Structure of body, general histology, cellular physiology, and integrative mechanisms	*First term* 70 lectures.
Biochemistry and biophysics	
General embryology	

II—SYSTEMATIC SERIES

Blood	*Second term* 72 lectures.
Circulatory system	
Lymphatic system, including cerebrospinal fluid	
Respiratory system	
Digestive system	
Neurology	*Third term* 42 lectures.
Locomotor system	
Metabolism	
Neurology	*Fourth term* 66 lectures.
Special senses	
Excretory system	
Endocrinology, including reproductive system	

III—COÖRDINATING SERIES

Surface and radiological anatomy	*Fifth term* 41 lectures and lecture demonstrations.
Growth and developmental physiology	
Environmental physiology	
Genetics	

Anatomists and physiologists contribute jointly to each course of lectures, in some of which as many four different lecturers participate according to an agreed *plan of sequence in the development of the subject.* Histology and embryology are introduced in the introductory series of lectures and reappear in their relevant positions in each course of the systematic series.

Considerable importance is attached to the final coördinating series of lectures, which represents not only a measure of bringing together in a useful synthesis some of the separate matters considered in the main systematic series, but also an attempt to direct the student's attention to matters which will, or should, be of immediate importance when he begins his clinical studies. To this end a course of lectures on the structural and physiological aspects of postnatal development has been included in this series, as has also a course on genetics.

EXAMINATIONS

In Birmingham, as in most other British medical schools, five terms are set aside for the study of anatomy, physiology, and biochemistry, and hitherto it has been the custom to spread topographical study in the dissecting-room over all five. The practice has also been that students sit separate professional examinations in anatomy and physiology at the end of the fifth non-clinical term.

Henceforth, work in the dissecting-room will be confined to the first three terms only. The first term is given up to the dissection of the limbs and thorax, and the second and third to the abdomen and head and neck. Under these new arrangements students will take their professional examination in topographical anatomy at the end of the third term. An obligatory and running viva-voce examination system has also been introduced into the dissecting-room to check subsequent performance at this first professional examination.

Apart from lectures, the student's time in the fourth and fifth terms, by when he should have adequately covered topography, will be spent in practical work in physiology and biochemistry, and in lecture-demonstrations on surface and radiological anatomy and neurology. A second professional examination will be held at the end of the fifth term, and, though mainly "functional" in character, this will include aspects of structural anatomy. As far as possible it will not be broken up into separate papers representing the existing administrative departments.

FUTURE DEVELOPMENTS

We are fully conscious of the responsibility of having taken the step of rearranging the preclinical curriculum in line with the more advanced proposals that have emerged from recent discussions of possible reforms. We have done so because we are convinced of the need for and rationality of the change in the interests of educational economy. We propose pruning our respective subjects of unnecessary detail and relating them more to the

TABLE II—SATURATION DATES CALCULATED FROM DATA IN TABLE I

Case	Daily intake of ascorbic acid (mg.)	Day of saturation according to blood level	Day of saturation according to urinary output
1	700	13	12
2	700	8	19
3	700	9	19
4	700	10	13
5	700	13	19
6	700	12	10
7	700	14	17
8	700	12	19
9	700	8	19
10	1400	7	14
11	500	14	3
12	500	18	8
13	500	16	3
14	500	26	6
15	500	23	4
16	350	—	5
17	350	28	5
18	350	24	6
19	350	26	2

30 sec. The number of hæmorrhages were then counted with the naked eye and gave the following results:

No. of hæmorrhages	0	1–5	5–10	10–20	over 20	
No. of cases	284	121	27	31	11	(total 474)

It will be seen that 69 out of the 474 subjects showed more than five hæmorrhages in the area. Fox et al. (1940), working with Bantu natives in South Africa, considered that the capillary hæmorrhages could be counted against the black skin. With this we do not agree, and our modification of the test probably explains the greater incidence of abnormal readings obtained in our series.

Though the evidence is in some ways unsatisfactory, these results, taken with others, tend to confirm our belief that the low intake of ascorbic acid in the diet had affected the metabolism of the subjects.

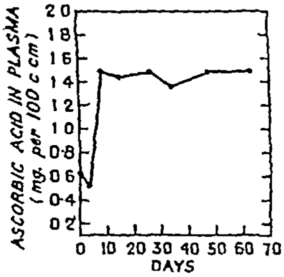

Fig. 1—Ascorbic-acid content of plasma in case 2 when 700 mg. of ascorbic acid daily was added to the diet.

ASCORBIC-ACID CONTENT OF PLASMA

Opinions vary as to whether a single measurement of the ascorbic-acid content of the plasma is an accurate indication of adequate intake. Portnoy and Wilkinson (1938), Ralli et al. (1939), Ralli and Sherry (1941), and others thought that such a measurement was the best criterion of adequate intake, whereas many others hold the opposite view. Prunty and Vass (1943) reviewed the position and concluded that such a measurement was an index of the nutritional state as regards ascorbic acid.

The next question is what figure represents an intake adequate for optimum health. The following figures have been reported by various workers on normal healthy European subjects:

	Ascorbic-acid content of plasma (mg. per 100 c.cm.) Range	Mean
Farmer and Abt (1935)	0·69–2·3	1·24
Taylor et al. (1936)	0·83–2·43	1·61
Greenberg et al. (1936)	0·25–1·48	0·72
Wortis et al. (1938)	0·7 or over	—
Jetter (1938)	1·10 or over	—
Goldsmith and Ellinger (1939)	0·43–1·98	1·11
Croft and Snorf (1939)	0·60–1·12	0·81
Kassan and Roe (1940)	0·13–1·68	0·76
Pijoan and Klemperer (1937)	0·65–2·00	—

It will be seen that the average plasma values in healthy individuals are about 0·9 mg. per 100 c.cm., and that the range of average healthy figures is from 0·13 to 2·43 mg. per 100 c.cm. Approaching the problem from another angle altogether, Prunty and Vass (1943) regarded a figure of 0·4 mg. per 100 c.cm. as the lowest which corresponds to a satisfactory index of ascorbic-acid metabolism.

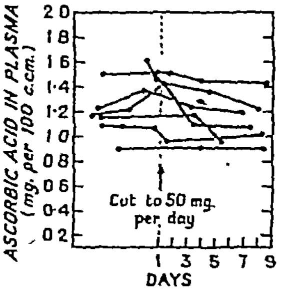

Fig. 2—Ascorbic-acid contents of plasma in 7 subjects who, after saturation with ascorbic acid, were cut down to a maintenance dose of 50 mg. daily.

The technique used in the estimations was that of Farmer and Abt (1935) with two slight modifications: 5 c.cm. of blood filtrate was used instead of 2 c.cm., and a dye solution of which 100 c.cm. was equivalent to 4 mg. of ascorbic acid was used. The results obtained with this technique on a random sample of 19 European officers and N.C.O.'s with an adequate ascorbic-acid intake were as follows:

	Mg. per 100 c.cm.		Mg. per 100 c.cm.		Mg. per 100 c.cm.
Case 1	1·0	Case 7	1·3	Case 14	1·2
,, 2	1·2	,, 8	1·0	,, 15	0·8
,, 3	1·2	,, 9	1·3	,, 16	1·3
,, 4	1·3	,, 10	0·9	,, 17	1·2
,, 5	1·1	,, 11	1·4	,, 18	1·1
,, 6	1·3	,, 12	1·0	,, 19	1·2
		,, 13	1·0		

Range 0·8–1·4 Average 1·1

These figures are higher than those obtained by other workers cited above, probably because of the generous diet.

Estimations of the ascorbic-acid content of the plasma in 361 of the 474 Africans mentioned above gave a mean content of 0·58 mg. per 100 c.cm., with a range of 0·1–0·96 mg. The incidence of different values was as follows:

Content (mg. per 100 c.cm.)	0–0·2	0·2–0·4	0·4–0·6	0·6–0·8	0·8–1·0
No. of cases	2	22	169	134	34

These figures fall well below those of the other workers cited above. It will also be seen that in 24 of the subjects the ascorbic-acid content of the plasma was less than 0·4 mg. per 100 c.cm., which by the most stringent standards would be regarded as indicating an unsatisfactory state of ascorbic-acid metabolism. In 193 of the subjects the level was lower than 0·6 mg. per 100 c.cm. It seems from these figures that about half the subjects had an unsatisfactory ascorbic-acid intake. Bicknell and Prescott (1942) state that plasma values of 0·5–0·7 mg. per 100 c.cm. indicate a state of ascorbic-acid depletion and those of 0·7–1·0 mild deficiency. By these standards all the subjects had at least a mild ascorbic-acid deficiency.

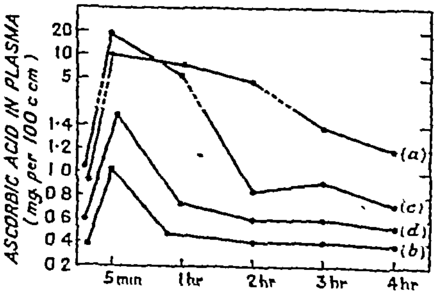

Fig. 3—Ascorbic-acid contents of plasma after administration of 500 mg. of ascorbic acid in (a) normal Europeans; (b) Europeans with ascorbic-acid deficiency (Kastlin et al. 1940); (c) 2 Africans who had had 700 mg. of ascorbic acid by mouth daily for 50 days; (d) 12 Africans on normal Army diet.

The figures are in substantial agreement with those of Fox et al. (1940), but they imply that the lower level cases, suggest that deficient intake of ascorbic acid was a significant feature in the low Hb levels and contributed to the ill health of the subjects.

CAPILLARY-FRAGILITY TEST

Further confirmation of this finding was sought in the capillary-fragility test. This test has been classically used in the detection of ascorbic-acid deficiency states, though the exact relationship between the two is not understood. Its use is recommended by the League Nations Health Organisation (1939). In our opinion test is of doubtful value, because in some cases where have found definite evidence of ascorbic-acid defi- the test has not shown significant correlation. modifications were made in the test owing to the d skins of the subjects. A negative pressure of −300 Hg was applied to the inside of the lip, where there not very much pigment, over an area of 0·5 cm. sq. f

TABLE I—DAILY URINARY OUTPUT OF ASCORBIC ACID

Day	Case																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	0·8	1·4	..	..	1·8	2·0	1·0	1·0	1·0	..	3·0	4·0	4·0	3·0	3·0	6·0	3·0	2·0	47·0
2	1·0	1·6	1·0	2·0	3·0	22·0	2·4	1·5	1·0	2·0	79·0	27·0	46·0	7·0	14·0	0 0	8·0	4·0	78·0
3	2·7	9·0	2·0	2·0	4·0	27·0	7·5	6·0	9·0	3·5	63·0	10·0	31·0	13·0	14·0	6·0	8·0	4·0	..
4	13·0	16·0	4·0	2·0	9·0	36·0	3·4	9·0	13·0	5·7	56·0	20·0	36·0	16·0	31·0	18·0	14·0	7·0	22·0
5	13·0	23·0	19·0	17·0	9·0	30·0	4·0	22·0	22·0	21·0	64·0	20·0	53·0	18·0	54·0	37·0	41·0	14·0	105·0
6	10·0	25·0	26·0	20·0	19·0	21·0	8·5	19·0	25·0	..	63·0	18·0	107·0	37·0	29·0	30·0	111·0	29·0	..
7	25·0	25·0	16·0	23·0	28·0	28·0	4·7	10·0	29·0	40·0	63·0	16·0	105·0	47·0	40·0	22·0	47·0	53·0	41·0
8	27·0	21·0	24·0	21·0	16·0	19·0	13·0	15·0	15·0	15·0	..	..	..	..	..	..	..	..	14·0
9	21·0	30·0	53·0	10·0	5·0	18·0	8·0	12·0	18·0	19·0	66·0	46·0	98·0	32·0	84·0	56·0	39·0	59·0	40·0
10	23·0	23·0	34·0	15·0	7·0	48·0	11·0	11·0	42·0	19·0	79·0	45·0	111·0	53·0	69·0	54·0	8·0	13·0	42·0
11	5·0	26·0	11·0	39·0	10·0	35·0	19·0	35·0	19·0	28·0	90·0	58·0	58·0	66·0	50·0	35·0	52·0	33·0	81·0
12	22·5	26·0	24·0	18·0	18·0	33·0	12·0	15·0	23·0	27·0	86·0	67·0	23·0	48·0	34·0	17·0	61·0	23·0	..
13	37·0	20·0	16·0	37·0	18·0	19·0	14·0	12·0	10·0	..	26·0	23·0	84·0	26·0	19·0	81·0	32·0	73·0	87·0
14	..	12·0	16·0	34·0	67·0	40·0	29·0	9·0	22·0	39·0	32·0	84 0	34·0	21·0	110·0	17·0	25·0	..	70·0
15	..	11·0	22·0	10·0	9·0	15·0	31·0	25·0	15·0	20·0	..	..	..	..	..	..	..	..	94·0
16	54·0	8·0	13·0	8·0	17·0	38·0	17·0	9·0	18·0	23·0	17·0	34·0	56·0	14·0	36·0	53·0	54·0	43·0	89·0
17	58·0	17·0	20·0	10·0	19·0	10·0	7·0	10·0	13·0	31·0	..	..	34·0	..	25·0	40·0	36·0	..	..
18	37·0	19·0	27·0	42·0	21·0	27·0	13·0	17·0	28·0	25·0	..	..	61·0	..	..	36·0	..	31·0	..
19	39·0	27·0	..	30·0	81·0	29·0	50·0	22·0	..	24·0	..	..	45·0	..	52·0	53·0	35·0	36·0	..
20	..	35·0	33·0	44·0	58·0	46·0	50·0	48·0	46·0	..	..	41·0	57·0	46·0	32·0	85·0	57·0	66·0	85·0
21	21·0	42·0	20·0	36·0	47·0	40·0	34·0	44·0	46·0	48·0	..	..	49·0	53·0	74·0	23·0	77·0	..	22 0
22	16·0	40·0	30·0	35·0	26·0	77·0	44·0	16·0	33·0	54·0	..	38·0	..	..	64·0	63·0	..	..	..
23	15·0	42·0	35·0	..	29·0	59·0	32·0	39·0	34·0	37·0	..	53·0	43·0	124·0	46·0	45·0	30·0	57·0	..
24	9 0	..	..	45·0	..	..	..	..	..	11·0	38·0	..	71·0	..	..	..	31·0	31·0	..
25	29·0	50·0	65·0	89·0	62·0	..	81·0	19·0	45·0	23·0	*	43·0	81·0	..	..	..	..	..	..
26	6·0	49·0	75·0	37·0	37·0	78·0	59·0	55·0	31·0	30·0	..	..	74·0	..	22·0	..	35·0	..	111·0
27	13·0	48·0	76·0	13·0	55·0	88·0	48·0	31·0	44·0	27·0	..	..	57·0	..	53·0	..	41·0	..	..
28	46·0	46·0	41·0	24·0	34·0	46·0	36·0	43·0	21·0	20·0	36·0	23·0	51·0	48·0	43·0	105·0	41·0	..	..
29	65·0	56·0	68·0	22·0	33·0	55·0	25·0	54·0	28·0	25·0	60·0	..	55·0	37·0	24·0	51·0	51·0	56·0	..
30	47·0	31·0	32·0	45·0	39·0	51·0	36·0	38·0	33·0	..	170·0	43·0	82·0	42·0	..	73·0	24·0	22·0	..
31	31·0	32·0	54·0	..	78·0	19·0	40·0	28·0	33·0	18·0	..	..	82·0	..	15·0	*	20·0	19·0	20·0
32	45·0	..	..	14·0	..	..	..	..	..	..	..	..	72·0	..	..	54·0	..	..	..
33	76·0	47·0	60·0	..	37·0	28·0	37·0	27·0	13·0	15·0	..	43·0	..	32·0	58·0	228·0	..	..	..
34	..	26·0	41·0	45·0	54·0	42·0	..	44·0	32·0	11 0	74·0	..	..	..	..	292·0	24·0	..	..
35	30·0	47·0	..	34·0	18·0	..	63·0	34·0	54·0	..	70·0	41·0	59·0	41·0	19·0	..	..	..	..
36	77·0	30·0	45·0	54·0	45·0	..	80·0	31·0	20·0	..	40·0	..	..	..	..	..	82·0	62·0	..
37	8·0	46·0	..	43·0	68·0	..	57·0	62·0	27·0	..	..	52·0	48·0	25·0	..	..	..	..	..
38	34·0	32·0	..	..	57·0	..	46 0	70·0	14·0	..	..	11·0	61·0	..	..	..	57·0	..	..
39	46·0	..	..	63·0	..	..	..	..	..	..	..	*	..	..	..	..	..	..	..
40	67·0	56·0	37·0	57·0	56·0	..	58·0	73·0	..	..	..	..	..	..	..	..	..	..	..
41	21·0	29·0	38·0	29·0	30·0	..	58·0	43·0	85·0	..	..	68·0	..	..	..	..	..	..	..
42	..	36·0	41·0	..	15·0	..	62·0	40·0	17·0	..	..	46·0	..	..	..	..	..	..	..
43	64·0	43·0	..	..	35·0	..	31·0	33·0	46·0	..	..	68·0	..	..	..	..	..	..	..
44	.	37·0	..	..	..	..	21·0	35·0	37 0	..	..	50·0	..	..	..	..	..	..	..
45		20·0	..	..	33·0	..	27·0	27·0	..	..	..	94·0	..	..	..	..	..	..	..
46	34·0	..	68·0	..	..	..	..	..	29·0	..	..	54·0	..	..	..	..	..	..	..
47	39·0	56·0	*	34·0	21·0	..	..	46·0	..	..	..	50·0	..	..	..	..	..	..	..
48	43·0	29·0	..	64·0	18·0	..	68·0	31·0	52·0	..	..	..	..	..	..	..	..	..	..
49	..	36·0	..	..	16·0	..	13·0	48·0	31·0	..	..	50·0	..	..	..	..	..	..	..
50	69·0	..	..	49·0	..	..	29·0	..	39·0	..	..	..	..	..	..	..	..	..	..
51	33·0	..	62·0	..	..	..	..	47·0	..	..	..	..	..	..	..	..	..	..	..
52	26·0	11·0	90·0	65·0	20·0	..	..	..	33·0	..	..	..	..	..	..	..	..	..	..
53	49·0	..	100·0	31·0	..	..	51·0	29·0	..	..	..	..	..	..	..	..	..	..	..
54	..	24·0	40·0	..	32·0	..	..	..	29·0	..	..	..	..	..	..	..	..	..	..
55	..	..	50·0	70·0	56·0	..	44·0	51·0	..	..	..	..	..	..	..	..	..	..	..
56	..	26·0	58·0	..	..	..	..	..	28·0	..	..	..	..	..	..	..	..	..	..
57	28·0	..	58·0	..	..	..	40·0	..	*	..	..	..	..	..	..	..	..	..	..
58	28·0	..	30·0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
59	43·0	..	50·0	..	..	..	..	..	16 0	..	..	..	..	..	..	..	..	..	..
60	15·0	..	..	..	..	..	..	..	30·0	..	..	..	..	..	..	..	..	..	..
61	..	..	50·0	..	..	..	..	..	30·0	..	..	..	..	..	..	..	..	..	..
62	..	..	..	..	..	..	..	..	50·0	..	..	..	..	..	..	..	..	..	..
63	27·0	..	..	..	..	..	..	..	40 0	..	..	..	..	..	..	..	..	..	..
64	..	..	..	..	..	..	..	..	100·0	..	..	..	..	..	..	..	..	..	..
65	35·0	..	..	..	..	..	..	..	44·0	..	..	..	..	..	..	..	..	..	..
66	..	..	..	..	..	..	..	..	50·0	..	..	..	..	..	..	..	..	..	..
67	33·0	..	..	..	..	..	..	..	50 0	..	..	..	..	..	..	..	..	..	..
68	*	..	..	..	..	..	..	..	48·0	..	..	..	..	..	..	..	..	..	..
69	98·0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
70	40·0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
71	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
72	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
73	54·0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
74	62·0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
75	156 0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
76	96·0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
77	44·0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
78	40·0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
79	60·0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
80	40·0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
81	40·0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
82	40·0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
83	30 0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

* Cut to 50 mg. a day.

Cases 1–9 were given 700 mg. of ascorbic acid a day; cases 11–15 500 mg.; cases 16–19 350 mg. Case 10 had scurvy and received 1400 mg. a day. The figure shown is the percentage of the test dose passed.

evidence that health was improved. A similar experiment conducted by us produced similar results. There are so many other causes of chronic ill health: deficiency of other food factors, chronic hypoproteinæmia, malarial infestation, and helminthiasis. The multiplicity of these factors should not, in our view, be a justification for omitting to correct each and every one of them in turn.[2]

SUMMARY

The ascorbic-acid intake of 474 Bantu natives in the East African Army was estimated to be under 15 mg. daily.

An attempt was made to correlate this low intake with their state of health by investigating the response of cases of anæmia to ascorbic acid and by measuring capillary fragility. Out of 16 cases of anæmia 9 responded to ascorbic acid, and 14% of the 474 subjects had decreased capillary resistance. It appeared as though ascorbic-acid deficiency was related to their ill health.

The ascorbic-acid content of the plasma was estimated in 361 of the subjects. The mean figure was 0·58 mg. per 100 c.cm., with a range of 0·1–0·96 mg. per 100 c.cm. The figures are well below those regarded as satisfactory in Europeans. The low levels could be raised by the addition of ascorbic acid to the diet. They therefore probably did not represent a physiological low normal level.

Saturation tests were carried out on 19 of the subjects. Intravenous tolerance tests were carried out on 14. It was found that all these subjects were in an unsaturated condition.

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[2] After this work was completed steps were taken by the East African Army medic[illegible] to increase the soldiers' ascorbic-acid intake.

"... the psychiatrist has emerged from the isolation of the asylum and now frequents the general wards and consulting room, but many of the evils of immurement linger. The isolation in viewpoint persists.... Persistence in this attitude can lead only to cultism. Further progress ... will be delayed until the psychiatrist becomes truly a physician, well versed in all disciplines relevant to the ... most complex organ of the body, the nervous system."—Dr. G. WILSON and Dr. C. RUPP, *J. Amer. med. Ass.*, Feb. 22, p. 509.

ESTIMATION OF PENICILLIN IN SERUM

USE OF GLUCOSE, PHENOL RED, AND SERUM WATER

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MANY methods have been described for the estimation of penicillin in blood-serum. The amount of penicillin present in the blood is often too low for it to be detected by the agar-cup or cylinder-plate methods which are in common use by the manufacturers in the assay of penicillin. The method used must be capable of detecting penicillin in almost undiluted blood-serum, and it is preferable that it should be a micro method so that only small amounts of serum are required and undue bleeding of the patient is avoided.

Such micro methods have been described. Staphylococcus has been used as the test organism and has been grown in slide cells (Fleming 1943) or in modified slide cells (Garrod and Heatley 1944); in these the staphylococcus grows in separate colonies which can be directly observed. In another method staphylococcus has been similarly used, but incubation has been carried out in capillary tubes (Fleming 1943). One drawback to these methods is the difficulty sometimes of being certain whether the staphylococcus has developed or not.

Fleming (1944) introduced a modification by using in slide cells and capillary tubes a hæmolytic streptococcus as the test organism and human blood as the indicator. If the streptococcus grew, hæmolysis took place. This was more satisfactory than the methods in which staphylococcus was used, but occasionally there was trouble in that hæmolysis was not complete even in the control tubes. We therefore sought for another method which would combine simplicity with accuracy, and we describe here a method which seems to have advantages.

INVESTIGATION

Hiss's Serum Water

Media containing pH indicators have been recommended for the titration of penicillin (Fleming 1942). The possibility of using Hiss's serum water was indicated to us by Dr. J. Fielding while he was working in our E.M.S. public-health laboratory. Fielding (1947) has published an article on the use of Hiss's serum water as issued by the London County Council, and a description of a capillary-tube technique which he found in use in this laboratory a year ago.

Hiss's serum water is a culture medium which has long been used for testing the sugar reactions of streptococci and other organisms. It is made by boiling 1 vol. of serum with 3 vols. of distilled water, a fermentable carbohydrate, and Andrade's indicator. When this is done at a pH of 7–8 there is no precipitate and the medium is colourless. When the carbohydrate is fermented by microbic growth the medium becomes bright red and a heavy precipitate forms.

Following Dr. Fielding's suggestion, we tried serum water as issued by the L.C.C. and though it gave promising results it did not seem perfect; so the various constituents of the medium were further investigated.

Optimal Amount of Serum in the Serum Water

Media were made up containing from 50% to 1% of serum in distilled water containing 1% of glucose and an indicator. There was little difference in the results after overnight incubation so long as there was more than 10% of serum present. Naturally the higher the percentage of serum the heavier the precipitate when acid was produced. For convenience we have used as a routine serum water containing 20% of serum.

of the Bantu native is physiological rather than that the ascorbic-acid intake of their subjects was too low. To clarify this point, ascorbic acid was added to the diets of 19 of our subjects for 24–67 days and the ascorbic-acid levels in the blood observed (fig. 1 represents a typical response from one of the cases). At the end of this period the intake was cut down to 50 mg. per day in 7 cases to find out whether the levels attained would be maintained on doses which might be regarded in Europeans as sufficient for maintenance. The results (fig. 2) seem to show that the low plasma levels can be raised to levels regarded as normal in Europeans and can be maintained there. Our view is that the low ascorbic-acid levels found in the plasma represent a deficiency and are not physiological. This view is derived not only from these findings but also from the finding of other evidence of dietary deficiency during this survey (Kekwick and Wright 1946).

SATURATION TEST

The measurement of the state of saturation was introduced to overcome the errors thought to be inherent in the single estimation of the ascorbic-acid level in the plasma. The rationale of the test is based on the assumption that, when a test dose is given, the tissues of the body and the kidneys compete for the available ascorbic acid. When the tissues are satisfied, more and more of the test dose is poured out in the urine. Prunty and Vass (1943) have pointed out that there is a considerable daily variation in the proportion of the test dose poured out in the urine, even when the subject is saturated. They believe that any figure of over 30% of the test dose may indicate a state of saturation.

Table I gives the results obtained with three series of Africans, of whom 9 were given 700 mg., 5 were given 500 mg., and 4 were given 350 mg. of ascorbic acid daily. The table shows considerable fluctuations in the daily output. These fluctuations make it difficult to estimate when the subjects became saturated. On the basis of both urinary output and plasma content table II shows the days on which, in our opinion, the subjects became saturated. As regards the blood levels the day of saturation has been taken as that on which the ascorbic-acid content ceased to rise and the curve became flat (see fig. 1). As regards the urinary output of ascorbic acid, it has been taken as the day on which the patient started to pour out consistently 30% of the test dose. The table exhibits a very curious feature. With the higher dosage the blood figures rose more sharply than with the lower dosage. On the other hand, with the urines the observation is reversed, a larger percentage of the test dose being poured out more quickly with the lower dosage of ascorbic acid per day. At the same time as the patient is pouring out a significant percentage of the test dose, the ascorbic-acid content of his blood is low and still rising. It seems that with lower doses the tissues do not take up ascorbic acid, whereas they do so with the more rapidly rising blood levels.

In 5 of the subjects the amount of ascorbic acid was cut down at the end of fifty days to 50 mg. daily. In only 1 case was the excretion of ascorbic acid greater than intake on two days, an indication that these subjects were not over-saturated.

The conclusions to be drawn from these results are not clear. If the saturated state is desirable for optimal health, the intake of the subjects must be regarded as too low. On the other hand, it may be argued that the saturated state is unnecessary. Most authors consider that a healthy subject should be saturated within two days. None of our subjects fulfilled this condition. The inference is that the ascorbic-acid intake is too low. So far as can be seen from these tests the African behaves towards ascorbic acid in much the same manner as does the European.

INTRAVENOUS TOLERANCE TEST

This test is a modification of the saturation test. The amount of ascorbic acid recommended to be given has varied considerably. We have used the technique of Kastlin et al. (1940), in which 500 mg. of ascorbic acid is given intravenously and the ascorbic-acid content of the blood estimated five minutes, one hour, two hours, three hours, four hours, and five hours later. Theoretically, if the subject is saturated, the ascorbic-acid content of the blood will rise to high levels and fall slowly, as the tissues do not take it up rapidly. If the subject is not saturated the ascorbic acid will be taken up greedily by the tissues and the blood level will not rise so high but will soon fall to the original figure. This test was used because it was found during the survey that many of the subjects had a deficiency small-intestine pattern (Golden 1941). This small-intestine pattern is accompanied by a very low sugar-tolerance curve, and it was thought that the subjects might appear unsaturated because they could not absorb the ascorbic acid given by mouth.

Fig. 3 shows the mean curves obtained from (*a*) normal European subjects, (*b*) deficient European subjects, (*c*) Africans who had 700 mg. of ascorbic acid for fifty days before the test, and (*d*) Africans on the normal Army diet. None of the Africans in groups (*c*) and (*d*) passed 40% of the test dose in the urine within the four-hour period. The Africans given large doses of ascorbic acid for a long period occupy an intermediate position between the well-saturated European and the average African.

These three curves taken together indicate that lack of absorption of ascorbic acid played little part in the saturation tests and that the findings shown in table I represent an unsaturated state. Whether the testing of saturation states in Africans, of whom over 30% have a deficiency pattern of the small intestine and deficient absorption of glucose (Kekwick and Wright 1946), is satisfactory with a test dose given by mouth is not finally settled.

DISCUSSION

The physical state of the African in East Africa is a vital matter in relation to the future of his race. His chronic ill health, a potent factor in his inability to work and to take responsibility, is increased by an extremely low dietetic intake. On joining the Army he was given, in most instances, a far better diet than he had ever had before, but he brought with him his deep-rooted likes and dislikes in regard to food and his habits of cooking, preparing, and eating it. The evidence which we have collected suggests that these habits have contributed to maintaining a low intake of ascorbic acid.

The view that he needs less ascorbic acid because he has always had less is, in our opinion, untenable. During this study we have tried to keep this possibility in mind. The actual intake of these subjects should lead to low levels of ascorbic acid in the plasma. This was indeed found to be so. These low levels can be raised by the addition of ascorbic acid to the diet, which indicates that the levels represent a deficient intake rather than a physiological normal. Saturation tests on the subjects further show that the tissues have a low ascorbic-acid content but can be saturated in much the same way as the tissues of Europeans, both by mouth and intravenously. In short, the ascorbic-acid metabolism of the Bantu native appears to be comparable to that of a European, and therefore his need for ascorbic acid as great.

We do not agree with Fox et al. (1940), who consider that an increase of ascorbic-acid intake in the African's diet is unlikely to improve the African's health. It is understandable that they could show neither startling results from adding ascorbic acid to the diet nor significant evidence that health was improved. A similar experiment conducted by us produced similar results. There are so many other causes of chronic ill health: deficiency of other food factors, chronic hypoproteinæmia, malarial infestation, and helminthiasis. The multiplicity of these factors should not, in our view, be a justification for omitting to correct each and every one of them in turn.[2]

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[2] After this work was completed steps were taken by the East African Army medical [illegible] to increase the soldiers' ascorbic-acid intake.

"... the psychiatrist has emerged from the isolation of the asylum and now frequents the general wards and consulting room, but many of the evils of immurement linger. The isolation in viewpoint persists. ... Persistence in this attitude can lead only to cultism. Further progress ... will be delayed until the psychiatrist becomes truly a physician, well versed in all disciplines relevant to the ... most complex organ of the body, the nervous system."—Dr. G. WILSON and Dr. C. RUPP, *J. Amer. med. Ass.*, Feb. 22, p. 509.

ESTIMATION OF PENICILLIN IN SERUM

USE OF GLUCOSE, PHENOL RED, AND SERUM WATER

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MANY methods have been described for the estimation of penicillin in blood-serum. The amount of penicillin present in the blood is often too low for it to be detected by the agar-cup or cylinder-plate methods which are in common use by the manufacturers in the assay of penicillin. The method used must be capable of detecting penicillin in almost undiluted blood-serum, and it is preferable that it should be a micro method so that only small amounts of serum are required and undue bleeding of the patient is avoided.

Such micro methods have been described. Staphylococcus has been used as the test organism and has been grown in slide cells (Fleming 1943) or in modified slide cells (Garrod and Heatley 1944); in these the staphylococcus grows in separate colonies which can be directly observed. In another method staphylococcus has been similarly used, but incubation has been carried out in capillary tubes (Fleming 1943). One drawback to these methods is the difficulty sometimes of being certain whether the staphylococcus has developed or not.

Fleming (1944) introduced a modification by using in slide cells and capillary tubes a hæmolytic streptococcus as the test organism and human blood as the indicator. If the streptococcus grew, hæmolysis took place. This was more satisfactory than the methods in which staphylococcus was used, but occasionally there was trouble in that hæmolysis was not complete even in the control tubes. We therefore sought for another method which would combine simplicity with accuracy, and we describe here a method which seems to have advantages.

INVESTIGATION

Hiss's Serum Water

Media containing pH indicators have been recommended for the titration of penicillin (Fleming 1942). The possibility of using Hiss's serum water was indicated to us by Dr. J. Fielding while he was working in our E.M.S. public-health laboratory. Fielding (1947) has published an article on the use of Hiss's serum water as issued by the London County Council, and a description of a capillary-tube technique which he found in use in this laboratory a year ago.

Hiss's serum water is a culture medium which has long been used for testing the sugar reactions of streptococci and other organisms. It is made by boiling 1 vol. of serum with 3 vols. of distilled water, a fermentable carbohydrate, and Andrade's indicator. When this is done at a pH of 7–8 there is no precipitate and the medium is colourless. When the carbohydrate is fermented by microbic growth the medium becomes bright red and a heavy precipitate forms.

Following Dr. Fielding's suggestion, we tried serum water as issued by the L.C.C. and though it gave promising results it did not seem perfect; so the various constituents of the medium were further investigated.

Optimal Amount of Serum in the Serum Water

Media were made up containing from 50% to 1% of serum in distilled water containing 1% of glucose and an indicator. There was little difference in the results after overnight incubation so long as there was more than 10% of serum present. Naturally the higher the percentage of serum the heavier the precipitate when acid was produced. For convenience we have used as a routine serum water containing 20% of serum.

The Indicator

Andrade's indicator, which is present in the L.C.C. serum water, did not seem entirely suitable; so phenol red, cresol red, and brom-thymol blue were tried. Of these, phenol red gave the best results. This indicator gives its maximal colour change between pH 7 and 8. At pH 6·8 it is bright yellow, and at 7·6 cherry red. A very small amount of acid production, therefore, changes the colour from red to yellow. The use of phenol red also enables the pH of the original medium to be observed between 7 and 8, which is the range suitable for growth of the test organisms. The amount of phenol red added is sufficient to give a distinct red colour to the medium in the thin column inside a capillary tube. A good deal more may be added without interfering with the growth of the test organisms.

The Fermentable Carbohydrate

For the most part we have used glucose. This is fermented by a large range of organisms. Various concentrations between 0·5% and 5·0% were tried, and there was not a great deal of difference when streptococcus was the test organism. We decided that 2% was about the optimal strength. Lactose, mannite, and saccharose were also used, but they had no advantage over glucose when streptococcus was the test organism.

The Test Organism

We had previously been using a hæmolytic streptococcus as our test organism, with blood as the indicator (Fleming 1944). We found this same organism eminently suitable in the glucose, phenol red, and serum water mediums. It seemed to produce acid more quickly than did staphylococcus, and the results were rather more clear-cut. The inoculum used was 5 c.mm. of a 24-hour broth-culture to 1 c.cm. of the medium, but there was considerable latitude in this direction.

The Glass Capillaries

Good results were invariably obtained when capillaries made from soda glass were used for incubation. When we used capillaries made from hard glass there was some change in the pH of all the fluids towards the acid side, making the results difficult to read.

COMPOSITION OF THE MEDIUM

As a result of the foregoing work we adopted a medium of the following composition:

Serum	2·00 c.cm.
10% glucose solution	2·00 c.cm.
Distilled water	6·00 c.cm.
Phenol red, saturated solution ..	0·25 c.cm.

For the most part we have used human serum, but horse, sheep, or ox serum can be used. The medium can be made up in bulk, steamed, and distributed in small volumes, or small quantities of 5–10 c.cm. can be made at a moment's notice and boiled for a minute or two over a Bunsen flame. This is an advantage in a hospital laboratory, where small quantities of human serum are always available. For making small quantities it is convenient to keep 10% glucose solution in sealed 1 c.cm. ampoules which have been autoclaved.

TECHNIQUE OF THE TEST

The test is done in the same manner as previously described (Fleming 1944). A suitable amount of the medium is inoculated with the test organism. Serial dilutions of the serum to be tested (25 c.mm. volumes) are made in the inoculated medium on the surface of a paraffined slide. Each of these drops is touched with the end of a capillary tube, and the fluid runs into the tube, which is sealed * and placed horizontally on a 'Plasticine'-covered slide and incubated. By this method the strongest concentration of the test serum is 1 in 2. If it is desired to use almost undiluted serum, 25 c.mm. of undiluted serum can be mixed with 5 c.mm. of 50% serum water containing 5% of glucose and sufficient phenol red and inoculated with five times as many streptococci.

After incubation the tubes in which the streptococci have grown are bright yellow and show a heavy precipitate. There is often an intermediate tube in which there is the colour change but sufficient acid has not been produced to precipitate the serum. The tubes in which growth has been prevented by the penicillin are red or red-violet. The end-point is sharp, and the results are very easily read.

The test can also be done in small test-tubes with the same medium by merely altering the volumes. The results obtained by micro and macro methods are the same.

The results obtained by using a mixture of glucose, phenol red, and serum water as the culture medium and a streptococcus as the test organism have been checked by the methods previously described and have been found to correspond. We have used this method as routine for some months and have found it the most rapid and convenient.

SUMMARY

A rapid, convenient, and accurate micro method of estimating penicillin in blood-serum is described, with a mixture of glucose, phenol red, and serum water as the culture medium and a streptococcus as test organism.

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OBSERVATIONS ON FIBRINOLYSIS

EXPERIMENTAL ACTIVITY PRODUCED BY EXERCISE OR ADRENALINE

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FIBRINOLYTIC activity in the blood of patients with various conditions was described in a previous paper (Macfarlane and Biggs, 1946). Though no definite evidence emerged from these observations that might identify the stimulus leading to activation of plasmin, the proteolytic enzyme of the blood that is almost certainly responsible for lysis of fibrin, it seemed that trauma, fear, or possibly allergy and hypersensitivity were somehow concerned. Since it was considered that further information on the nature of a common activating mechanism underlying these conditions was not likely to be derived at that stage from a continued study of naturally occurring cases, attempts were made to find some method of inducing fibrinolysis in human subjects by experimental means.

At first the production of fear or anxiety was considered as an experimental stimulus. It was soon realised, however, that it is technically difficult in a civilised community to frighten or worry normal individuals at will to the extent that was required. The only readily available material consisted of sufferers from stage-fright in different forms, examination candidates, and those about to engage in various other contests. Some use has been made of them, but opportunities are not frequent, nor are the subjects particularly willing to submit to experiment when in the condition most likely to give good results. Pending the consequently delayed completion of this part of the work, it was decided to explore the possible effects of experimentally produced allergic phenomena, an investigation that led, indirectly, to observations on exercise and adrenaline that are described here.

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* Sealing is not necessary. The fluid can be run towards the centre of the capillary tube by tilting the tube, and when placed horizontally on the plasticine-covered slide it remains in position. This saves a good deal of time.

METHODS

The methods of collecting citrated plasma and demonstrating fibrinolysis were those used previously (Macfarlane and Biggs 1946). A roughly quantitative estimate of fibrinolysis has been attempted here as follows:

> If all three dilutions of plasma showed lysis within 24 hours, the result was recorded as + + + ; if two lysed, as + + ; and if only one lysed, as +. In any group of observations the "mean fibrinolytic activity" can be obtained by adding up the number of plus signs and dividing by the number of observations. This mean figure can also be expressed as a percentage of 3, the maximum obtainable.

The subjects for these experiments were young adult volunteers, either students or members of the laboratory staff, except where otherwise stated.

EXPERIMENTAL

The discovery of a student who complained of severe urticaria on taking exercise suggested a possible line of investigation of the apparent association between allergic or hypersensitive states and fibrinolysis. In a series of experiments it was found that urticaria could be produced at will in this subject by a certain amount of exercise, and that well-marked fibrinolytic activity developed in his blood, apparently in proportion to the severity of the urticaria.

Further investigation showed, however, that the two phenomena were not related. The urticaria was conditioned by an increase in skin temperature, whereas the fibrinolysis followed exercise independently of temperature. These conclusions were based on experiments in which the effects of exercise or rest in air were compared with those of swimming in cold water or rest in a hot bath, the results being as follows:

Stimulus	*Urticaria*	*Fibrinolysis*
Rest in air	Nil ..	Nil
Exercise in air	++ ..	+++
Exercise in cold water (15 min. at 20° C)	Nil ..	+++
Rest in hot water (15 min. at 43° C) ..	+++ ..	Nil

Attention was therefore directed to the effect of exercise on normal people.

EFFECT OF EXERCISE

Appearance of Fibrinolytic Activity.—A group of 20 normal subjects (16 men, 4 women) took part in a series of experiments that entailed running up and down a spiral stone staircase a stated number of times. The staircase was 39 ft. in vertical height, and the average time for a complete ascent and descent was 50–60 sec. The number of consecutive ascents varied from 2 to 20, the degree of exhaustion of the subject varying not only with the amount of exercise but also with his physical condition. Blood samples were taken before the exercise, immediately after, and after periods of rest. Though blood-pressure, pulse-rate, and mouth temperature were recorded when the blood samples were taken, the results, being variable and apparently not closely related to the other findings, are omitted. The increases in systolic blood-pressure ranged from 15 to 85 mm. Hg.

The results as regards fibrinolytic activity in relation to exercise are given in table I. The control (pre-exercise) observations were all negative except one student in whom a weak positive reaction was obtained, a result that was referred to in the previous paper.* It will be seen that after exercise there is a high incidence of fibrinolysis in the blood samples examined. Of the 33 observations made after three ascents or more, only 2 were negative. A single negative result was obtained among the 29 observations on five or more ascents, the subject concerned being in very good training and little incommoded by his exercise. It will also be seen that there is some proportionality between the amount of exercise and the degree of fibrinolysis recorded.

TABLE I—EFFECT OF EXERCISE ON THE DEVELOPMENT OF FIBRINOLYTIC ACTIVITY IN NORMAL SUBJECTS

No. of ascents	No. of observations	No. with fibrinolysis			
		+++	++	+	0
0–2	28	..	..	1	27
3–4	4	1	..	2	1
5–6	12	9	1	2	..
7–8	5	5	..	..	..
10	10	8	1	..	1
12–20	7	5	..	2	..

In a series of observations on 12 subjects leucocyte and platelet counts were made, besides an estimation of fibrinolysis, before exercise, about half-way through the exercise (8 observations only), and immediately after exercise. The results are given in fig. 1, the values of neutrophils, lymphocytes, and platelets being the means of the percentages of the absolute pre-exercise figures in each subject. There are 4 subjects in each of the exercise groups. Fibrinolytic activity is indicated as a percentage of the maximum that could be recorded in each group. It will be seen from fig. 1 that exercise induces a rise in the absolute number of lymphocytes followed by a later and less definite rise in the neutrophils. The platelets are also increased, but to a lesser extent. Fibrinolytic activity develops early during exercise, showing a significant rise after two or three ascents, or, since these occupy about 1 min. each, after 2 or 3 min. of exercise, and apparently precedes any significant change in the blood picture.

Disappearance of Fibrinolytic Activity.—Three subjects exercised on the staircase for about 7 min., blood samples being taken from each immediately before, immediately after, and at 5-min. intervals during the next 15 min. of rest. Fibrinolytic activity was estimated and leucocyte and platelet counts were made on each blood sample. The results are indicated in fig. 2 by the same method as that used in the previous figure. The results in the 40-min. period, included for completeness, were obtained on 6 subjects who formed part of the group dealt with in fig. 1. It appears from these findings that fibrinolytic activity declines rapidly in the circulating blood after exercise. In no instance was a positive result obtained after 30 min. rest, and even after 10 min. there was a reduction in activity. The blood picture is also restored rapidly towards normal.

Temperature.—To control the possible effect of the increased skin temperature that results from ordinary exercise, observations were made on subjects exercising in cold water. Six volunteers (5 men, 1 woman) swam vigorously for about 15 min. in water at 20° C. At the end of this time all were very cold, and all except the woman, who is an exceptionally strong swimmer, were tired. Blood samples taken before the exercise showed no fibrinolysis, whereas those taken after showed maximal activity in the 5 men and a negative result in the woman. As a control of the effect of cold, 4 volunteers stood for 10 min. in about 4 ft. of water at 20° C. Blood samples taken before and after this procedure were all negative as regards fibrinolysis.

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* A member of the laboratory staff who, though anxious to take part in the experiment, was nervous and had fainted during the proceedings also gave positive control results and was therefore excluded from the series.

EFFECT OF ADRENALINE

The foregoing results, coupled with the probable effect of fear and anxiety as potentiators of fibrinolytic activity, suggest that adrenaline may be involved in the reaction. Experiments were therefore carried out in which injections of adrenaline were given to normal volunteers and to patients in whom its administration was required for diagnosis or therapy. Also in the experimental group were 3 patients in whom splenectomy had been performed in the past for traumatic rupture of the spleen, and 3 cases of hæmophilia, these being included for reasons mentioned below. In all, 22 experiments were made, 8 of them being on 3 normal volunteers.

TABLE II—EFFECT OF INJECTION OF ADRENALINE ON THE DEVELOPMENT OF FIBRINOLYTIC ACTIVITY IN MAN

Time after injection (min.)	No. of observations	No. with fibrinolysis			
		+++	++	+	0
0	22	..	..	1	21
10	8	6	1	1	..
20	19	14	3	2	..
30	10	3	4	2	1
40	3	..	1	1	1
90 and over	3	..	.	2	1

A solution of 1 in 1000 adrenaline was used in all cases, two preparations being used: adrenaline chloride, prepared by Oxo Ltd., London; and epinephrine hydrochloride, made by Premo Pharmaceutical Laboratories Inc., New York. No significant difference in the results obtained by the different preparations was observed. The solution was given by subcutaneous injection into the upper arm, at the rate of about 0·25 c.cm. per min. The dose varied with the subject, the injection being stopped when symptoms began to appear or when the maximum of 2 c.cm. had been administered. The least amount given was 1 c.cm.

Blood samples were taken for white-cell and platelet counts and estimation of fibrinolytic activity, and the pulse-rate and blood-pressure were recorded in each subject before the injection and at intervals after it had been given. A maximal effect on the blood-pressure was observed 10–15 min. after the start of the injection in most cases, the systolic pressure rising by 20–60 mm. Hg. In all 22 cases the blood samples taken 10–20 min. after the injection showed positive fibrinolysis. The results in relation to time are given in table II, which shows that the effect is more lasting than that of exercise, positive results being obtained up to $1^1/_2$ hours after the injection.

The changes in the neutrophil, lymphocyte, and platelet counts in relation to time after injection are shown in fig. 3. The same method of representation is used as in fig. 1, fibrinolytic activity being recorded as a percentage of the maximum obtainable in each group. The number of subjects in each time group ranged from 4 to 11. Fig. 3 illustrates the rapid and extensive rise in the lymphocyte count after the injection. The neutrophils rise more slowly, and the platelets are less affected than the other elements. As is the case with the results of exercise, the period of maximal fibrinolysis precedes by a short time that of the maximal change in the blood picture.

Three patients who had been splenectomised were included in the series because it was expected that such patients might show a lesser leucocyte and platelet response to adrenaline than normal. All 3 showed maximal fibrinolysis, and a rise in lymphocytes equal to or greater than the average, but the injection produced little change in the neutrophil and platelet counts. Three patients with hæmophilia were included because it has been observed that the effect of chloroform as an activator of fibrinolytic activity in hæmophilic plasma is less than normal (Lewis et al. 1946). The response to adrenaline in the cases observed here, however, was substantially the same as regards both fibrinolysis and the changes in the blood picture as that of the "normal" subjects. The "normal" subjects consisted of the 3 volunteers and 6 male patients in whom malaria was suspected, adrenaline being given to assist the diagnosis; in addition 2 observations were made on a patient receiving adrenaline for angioneurotic œdema. The one positive fibrinolysis result obtained in the 22 pre-injection blood samples was in a man suspected of having malaria, later thought to be suffering from lead-poisoning.

FURTHER OBSERVATIONS

In the previous experiments adrenaline had either been injected or had its natural secretion possibly stimulated by exercise, and both procedures were followed by an increase in the cellular elements of the blood and in fibrinolytic activity. Experiments were therefore carried out to determine if the mere addition of adrenaline or an increased number of platelets or leucocytes to blood or plasma *in vitro* led to fibrinolysis.

Adrenaline.—Adrenaline was added to fibrinogen subsequently clotted by thrombin, and to samples of fresh plasma and of whole blood, these mixtures after short periods of incubation being diluted and clotted as in the usual estimation of fibrinolysis. The adrenaline concentrations used in the blood or plasma ranged from that which might be expected in the blood of the experimental subjects up to a final figure of 1 in 10,000. No fibrinolysis took place in any instance.

Leucocytes.—All formed elements were removed from a fresh sample of "active" (post-exercise) blood by spinning at 20,000 r.p.m. for 30 min. in the cold. The clear supernatant plasma, after dilution and coagulation, showed undiminished fibrinolytic activity. Conversely, the leucocyte and platelet content of a sample of normal citrated blood was artificially raised by adding to it a fresh "buffy-coat" suspension derived from a larger sample of the same blood. Though a general increase of about 300% in formed elements was produced, no fibrinolytic activity could be demonstrated in plasma samples treated in the usual way. The lymphocytosis which occurred in the experimental conditions was also artificially reproduced by adding suspensions of fresh lymphocytes derived from a large volume of blood to a small sample of the same blood. No fibrinolysis was observed to develop.

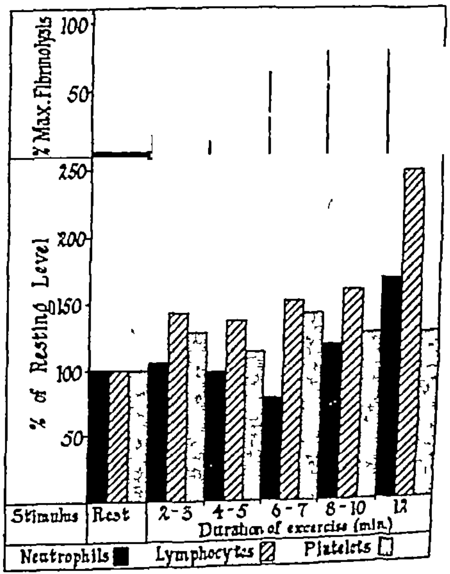

Fig. 1—Effect of various amounts of exercise on development of fibrinolytic activity, and on numbers of leucocytes and platelets, in blood of normal persons.

Adrenaline, Leucocytes, and Platelets Together.—Adrenaline was added to citrated blood with an artificially increased content of leucocytes and platelets, and the mixture incubated. Adrenaline was also incubated with a "buffy-coat" suspension, and with lymphocytes alone, and extracts made of these mixtures were added to citrated blood. In no case was fibrinolysis induced.

DISCUSSION

Strenuous exercise and the injection of adrenaline are stimuli that produce a series of similar effects on the blood of normal persons. Garrey and Bryan (1935) have observed a lymphocytosis that follows short periods of exercise, and Lucia et al. (1937) have recorded a similar change following the administration of adrenaline. A slower rise in neutrophils is also a characteristic result of both stimuli. Our own observations accord with these, and it is now clear that activation of the proteolytic system of the blood is also a common effect. The most reasonable explanation appears to be that the effects observed in exercise are the effects of an increased secretion of adrenaline.

The fibrinolytic activity that has been reported in pathological conditions has usually been associated with states in which increased adrenaline activity might be expected (Macfarlane and Biggs 1946). It therefore seems that adrenaline may be a link in the chain of physiological events that leads to proteolytic activity in the blood of the living subject. That it is probably only a link, however, is shown by the inability of active preparations to induce fibrinolysis in whole blood outside the body. The other parts of the chain must be sought among the vital processes with which adrenaline is concerned in the living organism. Some of its effects, such as the production of a lymphocytosis, neutrophilia, and thrombocytosis, have already been studied. Again, these are changes that do not seem to be directly responsible for fibrinolysis, since the addition or removal of these elements from the blood outside the body has no effect on activity that we have been able to demonstrate.

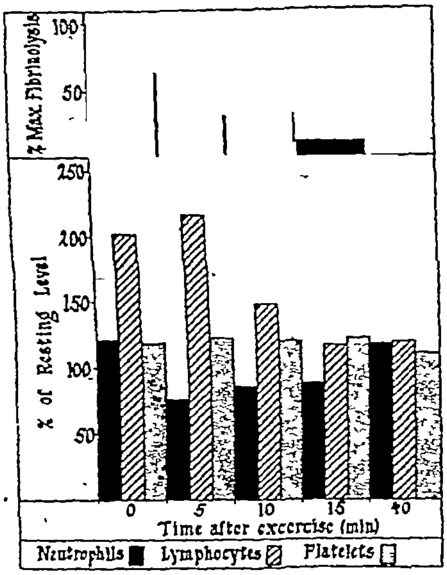

Fig. 2—Changes in fibrinolytic activity, and numbers of leucocytes and platelets, during rest immediately after exercise.

Neither splenectomy nor hæmophilia alters the fibrinolytic response to adrenaline. Ungar (1945) has produced evidence suggesting that the spleen is concerned in the activity of "serum antitrypsin," a substance or factor possibly identical with antiplasmin. Lewis et al. (1946) have found that the development of proteolytic activity after treatment of plasma fractions with chloroform is less than the normal in hæmophilia. We ourselves have some evidence of greater activity of antiplasmin in hæmophilic blood than normal and expected a reduced reaction to adrenaline. The response, however, was normal, and it is clear that further investigation of the abnormalities of hæmophilic plasma is required.

In general, it can be said that fibrinolysis occurs in those conditions in which the subject is exposed to unusual stress. The recognition that there is a definite pattern of response to all such abnormal or excessive stimuli has led to the concept of the "alarm reaction" of Selye (1946). The reaction involves an initial shock phase in which the deleterious effects of the alarming stimulus predominate, and a phase of counter-shock in which these phenomena are reversed. The reaction is accompanied by hypertrophy of the adrenal cortex and involution of lymphoid tissue, and is followed by an increased resistance to a repetition of the same stimulus. Selye included severe exercise, emotional states, and trauma among stimuli producing the alarm reaction, and has observed a rise in non-protein nitrogen during the shock phase. The observation that fibrinolysis occurs almost immediately during exercise or after the injection of adrenaline suggests that it is a feature of the initial phase of the alarm reaction and may be related to the increased nitrogen excretion observed. This and other possible effects of proteolysis occurring as a physiological response to unusual stress must be determined by further experiment.

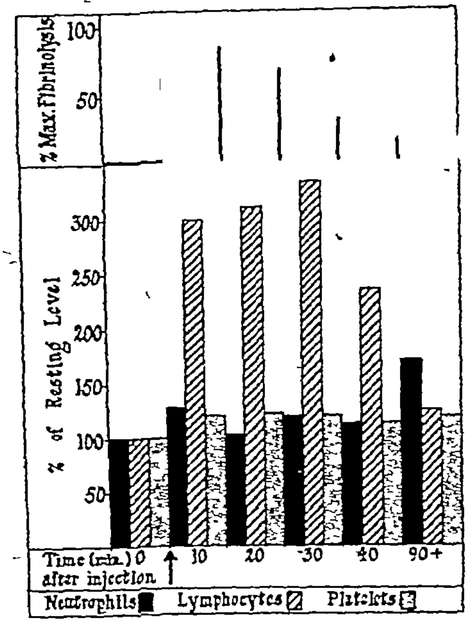

Fig. 3—Effect of injection of adrenaline on development of fibrinolytic activity, and on numbers of leucocytes and platelets, in blood of human subjects.

SUMMARY

Both strenuous exercise and the injection of adrenaline produce fibrinolytic activity in the blood of normal persons.

Both procedures have a similar effect on the blood picture, producing a lymphocytosis, a less marked thrombocytosis, and, later, a neutrophilia.

The addition of adrenaline, leucocytes, and platelets, separately or in combination, to normal blood in vitro does not produce fibrinolysis.

It seems probable that the fibrinolysis associated with exercise, fear, trauma, and some pathological states follows indirectly the stimulation of adrenaline secretion.

Fibrinolysis, indicating the activation of the proteolytic system of the blood, appears to be a component of the initial phase of the alarm reaction of Selye.

We wish to thank the willing and long-suffering volunteers who have submitted to many discomforts during these experiments. We are grateful to Dr. A. J. Shillitoe for help in collecting and examining blood samples. The general investigation of fibrinolysis is financed by the Medical Research Council.

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samples taken before and after this procedure were all negative as regards fibrinolysis.

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90 and over	3	..	..	2	1

A solution of 1 in 1000 adrenaline was used in all cases, two preparations being used: adrenaline chloride, prepared by Oxo Ltd., London; and epinephrine hydrochloride, made by Premo Pharmaceutical Laboratories Inc., New York. No significant difference in the results obtained by the different preparations was observed. The solution was given by subcutaneous injection into the upper arm, at the rate of about 0·25 c.cm. per min. The dose varied with the subject, the injection being stopped when symptoms began to appear or when the maximum of 2 c.cm. had been administered. The least amount given was 1 c.cm.

Blood samples were taken for white-cell and platelet counts and estimation of fibrinolytic activity, and the pulse-rate and blood-pressure were recorded in each subject before the injection and at intervals after it had been given. A maximal effect on the blood-pressure was observed 10–15 min. after the start of the injection in most cases, the systolic pressure rising by 20–60 mm. Hg. In all 22 cases the blood samples taken 10–20 min. after the injection showed positive fibrinolysis. The results in relation to time are given in table II, which shows that the effect is more lasting than that of exercise, positive results being obtained up to $1^{1}/_{2}$ hours after the injection.

The changes in the neutrophil, lymphocyte, and platelet counts in relation to time after injection are shown in fig. 3. The same method of representation is used as in fig. 1, fibrinolytic activity being recorded as a percentage of the maximum obtainable in each group. The number of subjects in each time group ranged from 4 to 11. Fig. 3 illustrates the rapid and extensive rise in the lymphocyte count after the injection. The neutrophils rise more slowly, and the platelets are less affected than the other elements. As is the case with the results of exercise, the period of maximal fibrinolysis precedes by a short time that of the maximal change in the blood picture.

Three patients who had been splenectomised were included in the series because it was expected that such patients might show a lesser leucocyte and platelet response to adrenaline than normal. All 3 showed maximal fibrinolysis, and a rise in lymphocytes equal to or greater than the average, but the injection produced little change in the neutrophil and platelet counts. Three patients with hæmophilia were included because it has been observed that the effect of chloroform as an activator of fibrinolytic activity in hæmophilic plasma is less than normal (Lewis et al. 1946). The response to adrenaline in the cases observed here, however, was substantially the same as regards both fibrinolysis and the changes in the blood picture as that of the "normal" subjects. The "normal" subjects consisted of the 3 volunteers and 6 male patients in whom malaria was suspected, adrenaline being given to assist the diagnosis; in addition 2 observations were made on a patient receiving adrenaline for angioneurotic œdema. The one positive fibrinolysis result obtained in the 22 pre-injection blood samples was in a man suspected of having malaria, later thought to be suffering from lead-poisoning.

FURTHER OBSERVATIONS

In the previous experiments adrenaline had either been injected or had its natural secretion possibly stimulated by exercise, and both procedures were followed by an increase in the cellular elements of the blood and in fibrinolytic activity. Experiments were therefore carried out to determine if the mere addition of adrenaline or an *increased number of platelets or leucocytes* to blood or plasma in vitro led to fibrinolysis.

Adrenaline.—Adrenaline was added to fibrinogen subsequently clotted by thrombin, and to samples of fresh plasma and of whole blood, these mixtures after short periods of incubation being diluted and clotted as in the usual estimation of fibrinolysis. The adrenaline concentrations used in the blood or plasma ranged from that which might be expected in the blood of the experimental subjects up to a final figure of 1 in 10,000. No fibrinolysis took place in any instance.

Leucocytes.—All formed elements were removed from a fresh sample of "active" (post-exercise) blood by spinning at 20,000 r.p.m. for 30 min. in the cold. The clear supernatant plasma, after dilution and coagulation, showed undiminished fibrinolytic activity. Conversely, the leucocyte and platelet content of a sample of normal citrated blood was artificially raised by adding to it a fresh "buffy-coat" suspension derived from a larger sample of the same blood. Though a general increase of about 300% in formed elements was produced, no fibrinolytic activity could be demonstrated in plasma samples treated in the usual way. The lymphocytosis which occurred in the experimental conditions was also artificially reproduced by adding suspensions of fresh lymphocytes derived from a large volume of blood to a small sample of the same blood. No fibrinolysis was observed to develop.

Adrenaline, Leucocytes, and Platelets Together.—Adrenaline was added to citrated blood with an artificially increased content of leucocytes and platelets, and the mixture incubated. Adrenaline was also incubated with

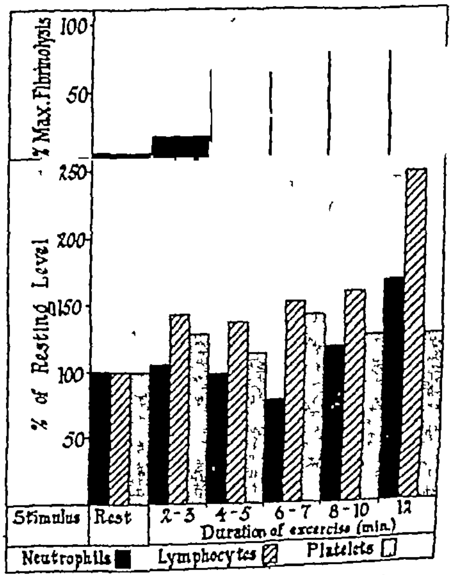

Fig. 1—Effect of various amounts of exercise on development of fibrinolytic activity, and on numbers of leucocytes and platelets, in blood of normal persons.

a "buffy-coat" suspension, and with lymphocytes alone, and extracts made of these mixtures were added to citrated blood. In no case was fibrinolysis induced.

DISCUSSION

Strenuous exercise and the injection of adrenaline are stimuli that produce a series of similar effects on the blood of normal persons. Garrey and Bryan (1935) have observed a lymphocytosis that follows short periods of exercise, and Lucia et al. (1937) have recorded a similar change following the administration of adrenaline. A slower rise in neutrophils is also a characteristic result of both stimuli. Our own observations accord with these, and it is now clear that activation of the proteolytic system of the blood is also a common effect. The most reasonable explanation appears to be that the effects observed in exercise are the effects of an increased secretion of adrenaline.

The fibrinolytic activity that has been reported in pathological conditions has usually been associated with states in which increased adrenaline activity might be expected (Macfarlane and Biggs 1946). It therefore seems that adrenaline may be a link in the chain of physiological events that leads to proteolytic activity in the blood of the living subject. That it is probably only a link, however, is shown by the inability of active preparations to induce fibrinolysis in whole blood outside the body. The other parts of the chain must be sought among the vital processes with which adrenaline is concerned in the living organism. Some of its effects, such as the production of a lymphocytosis, neutrophilia, and thrombocytosis, have already been studied. Again, these are changes that do not seem to be directly responsible for fibrinolysis, since the addition or removal of these elements from the blood outside the body has no effect on activity that we have been able to demonstrate.

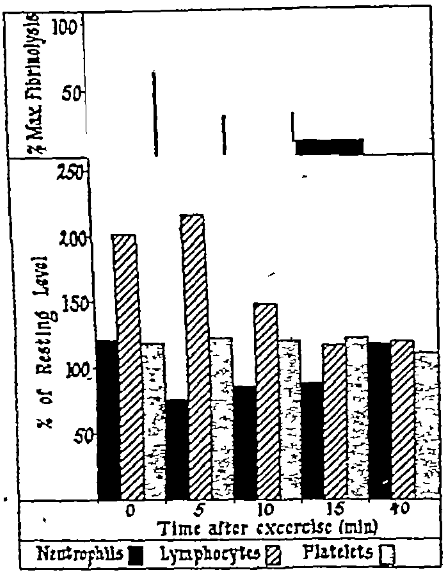

Fig. 2—Changes in fibrinolytic activity, and numbers of leucocytes and platelets, during rest immediately after exercise.

Neither splenectomy nor hæmophilia alters the fibrinolytic response to adrenaline. Ungar (1945) has produced evidence suggesting that the spleen is concerned in the activity of "serum antitrypsin," a substance or factor possibly identical with antiplasmin. Lewis et al. (1946) have found that the development of proteolytic activity after treatment of plasma fractions with chloroform is less than the normal in hæmophilia. We ourselves have some evidence of greater activity of antiplasmin in hæmophilic blood than normal and expected a reduced reaction to adrenaline. The response, however, was normal, and it is clear that further investigation of the abnormalities of hæmophilic plasma is required.

In general, it can be said that fibrinolysis occurs in those conditions in which the subject is exposed to unusual stress. The recognition that there is a definite pattern of response to all such abnormal or excessive stimuli has led to the concept of the "alarm reaction" of Selye (1946). The reaction involves an initial shock phase in which the deleterious effects of the alarming stimulus predominate, and a phase of counter-shock in which these phenomena are reversed. The reaction is accompanied by hypertrophy of the adrenal cortex and involution of lymphoid tissue, and is followed by an increased resistance to a repetition of the same stimulus. Selye included severe exercise, emotional states, and trauma among stimuli producing the alarm reaction, and has observed a rise in non-protein nitrogen during the shock phase. The observation that fibrinolysis occurs almost immediately during exercise or after the injection of adrenaline suggests that it is a feature of the initial phase of the alarm reaction and may be related to the increased nitrogen excretion observed. This and other possible effects of proteolysis occurring as a physiological response to unusual stress must be determined by further experiment.

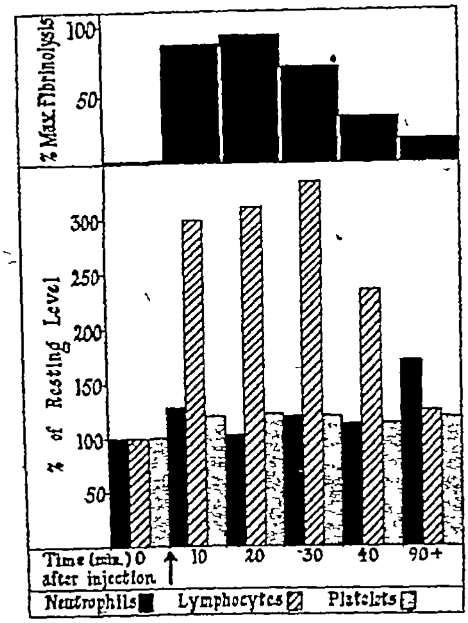

Fig. 3—Effect of injection of adrenaline on development of fibrinolytic activity, and on numbers of leucocytes and platelets, in blood of human subjects.

SUMMARY

Both strenuous exercise and the injection of adrenaline produce fibrinolytic activity in the blood of normal persons.

Both procedures have a similar effect on the blood picture, producing a lymphocytosis, a less marked thrombocytosis, and, later, a neutrophilia.

The addition of adrenaline, leucocytes, and platelets, separately or in combination, to normal blood in vitro does not produce fibrinolysis.

It seems probable that the fibrinolysis associated with exercise, fear, trauma, and some pathological states follows indirectly the stimulation of adrenaline secretion.

Fibrinolysis, indicating the activation of the proteolytic system of the blood, appears to be a component of the initial phase of the alarm reaction of Selye.

We wish to thank the willing and long-suffering volunteers who have submitted to many discomforts during these experiments. We are grateful to Dr. A. J. Shillitoe for help in collecting and examining blood samples. The general investigation of fibrinolysis is financed by the Medical Research Council.

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ANKYLOSING SPONDYLITIS

REVIEW OF 25 CASES

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Ankylosing spondylitis may come within the scope of the orthopædic surgeon, the neurologist, or the general physician, and, being on the borderline of so many departments, is important in the differential diagnosis of many other diseases.

The disease is older than man himself, and there is evidence of it in mummified human skeletons and in bears and apes.

Von Bechterew (1893) discussed 5 cases which began with symptoms in the cervical spine and showed paresis of the limbs. Probably these neurological symptoms were really due to some other condition, such as pachymeningitis, since it is known that several of his patients were syphilitic. Strumpell (1897) and Marie (1898) described the better-known form of the disease starting in the lumbar spine. There is no justification for regarding the two types as being in any way distinct except in their site of onset. Since these classic accounts many papers have appeared on the subject, the most exhaustive review being that of Geilinger (1918).

Accounts of the pathology of the disease are very rare owing to the difficulty of obtaining necropsy material, but Freund (1942) has described his findings in a patient who died from another cause. He found connective tissue had spread from both the bone-marrow and the capsule into the joint space and attacked the cartilage by lacunar erosion. This replacement of cartilage might affect one or both articular surfaces. Fibrous or bony union ultimately took place, and the joint space disappeared. Within the joints various stages of inflammation were seen, the connective tissue showing a round-cell infiltration and congested blood-vessels. Cartilage was replaced by fibrous tissue in the intervertebral disks, which ultimately ossified. This ossification was both protective and adapted to the more static function which the spine undertook as the inflammatory phase passed. No true degeneration of cartilage took place. The change from cartilage to fibrous tissue may be reversible, and bone, fibrous tissue, and cartilage may all be present together.

INCIDENCE

Fletcher (1944) considered this disease to be increasing. This has been my impression also, but it is difficult to prove, as the military Services contain a high proportion of the susceptible age-groups. Junghanns (1932) found, in 10,000 necropsies, 8 cases of ankylosing spondylitis. Hare (1940) found 6 cases in 1179 cases of rheumatic disease. In 1000 cases of rheumatic disease seen by me at a spa there were 12 cases, and among 1000 general medical outpatients there were 2 cases. The orthopædic surgeon should see the highest percentage.

The following remarks refer to 25 cases seen by me: 7 in civilians and 18 in the Royal Air Force.

Sex-incidence.—In this series there are 24 male cases to 1 female, and this may be due to the much lower incidence of W.A.A.F. personnel. Buckley (1931) reports an incidence of 10 males to 1 female, and Swaim (1939) 4 males to 1 female. The sex-incidence is therefore predominantly male.

Age-incidence.—The third decade was the commonest age of incidence, but the first symptom is often manifested some years before the disease forces the patient to seek medical advice. The average age-incidence of this series is 22 years. Fletcher (1944) gives an age-incidence of 38·4 years in a civilian series, and this discrepancy is probably explained by the difference between civilian and Service incidence. In this group the 7 civilians show a higher age-incidence by 8 years.

Familial Incidence.—Geilinger (1918) recorded three families in which more than one blood relation had contracted the disease, and Ray (1932) recorded the disease in identical twins. Two of my patients were identical twins who developed the disease in different countries at the same time. Another two were brothers. A fifth patient had a brother who had died from ankylosing spondylitis, and a sixth patient had an uncle and a brother with the disease. Payling Wright told me in 1945 that he knew of a father and son similarly affected. This family history is significant and is inadequately emphasised in the English literature.

There is no evidence of any *occupational incidence.*

REMOTE AND RECENT PRECEDING DISEASES AND HISTORY OF IRITIS

Iritis has long been associated with ankylosing spondylitis and other rheumatic diseases, but it is often overlooked. Teschendorf (1935) recorded 9 cases and suggested that all cases of iritis should have spine and pelvis radiographed. Fritz (1937) claims the association of iritis with spondylitis is found in 20% of cases, and the figure for my series is 24%. Blair (1942) suggested that a deficiency of sulphur might be a factor in this association, and cited as evidence the fact that cartilage and ocular tissues contain a much higher content of chondroitin sulphuric acid than does any other tissue. The present view of iritis is that it is an inflammatory reaction to many non-specific infections. In my series, association was recorded with other diseases in a similar category: purpura, chronic lupus erythematosus, psoriasis, and nephritis. Edström (1940) had noted nephritis in his cases. More striking was the history of asthma and erythema nodosum in 2 of my cases (one of the two pairs of brothers).

Numerous infective conditions were found to precede more directly the spondylitic process—e.g., gonorrhœa, non-specific urethritis, tuberculosis, tonsillitis, and lung abscess. Some patients had a history of a fall, but these were too few to emphasise.

SIGNS AND SYMPTOMS

The onset of ankylosing spondylitis is insidious and in the early stages difficult to diagnose.

Stiffness of the Back.—The first symptom in most cases is stiffness of the back, with lack of mobility. The patient may notice that, where previously he was able to perform certain actions, he now finds increasing difficulty. An example of this was a medical student who noticed that his ability to play tennis was becoming impaired but only reported this symptom after seeing a case of ankylosing spondylitis demonstrated in the wards. Stiffness of the spine seriously interferes with any bending movements and sometimes with rotation and lateral movements of the neck. Cases show lack of mobility and spasm of the muscles of the back.

Joint Pains.—The second most important symptom is pain, which is later than limitation of movement. Usually as a result of involvement of the sacro-iliac joints, pain begins low in the back and is apt to pass down the back of both legs later; the pains may gradually spread up the entire spinal column. Rarely the disease may begin in the cervical spine.

Root Pains.—As the disease begins to involve the vertebræ, root pains begin to develop and are characteristic, radiating from the back round the abdomen and thorax. In the thoracic-region these pains radiate along the intercostal nerves and are made worse by deep breathing and coughing. The patient finds that he has pain, limitation of movement, and a tight feeling in his chest, particularly when waking in the morning. On locomotion the spinal muscles often go into spasm; more rarely there are local tenderness and atrophy.

The head is usually carried forward and the chin depressed. No rheumatic nodules are found. Pains of this type in the lumbar region may be severe and will simulate chronic abdominal conditions, such as biliary and renal disease.

These are the three classic symptoms of ankylosing spondylitis; but, before passing on to the more general symptoms, it is perhaps best to mention the differential diagnosis of these symptoms. Taken together the stiffness and pain may be confused with: (1) conditions of the soft tissues, such as panniculitis and fibrositis, which arise in the lumbar region but are far less limiting of mobility, more easily treated by massage, and less chronic and insidious; (2) strains of the sacro-iliac joint, which usually follow trauma; and (3) sciatic neuritis.

Many cases of ankylosing spondylitis are thought to be suffering from sciatic neuritis because the pains due to the involvement of the sacro-iliac joints have led to the erroneous assumption that the sciatic nerve is involved. The differential diagnosis is made by careful neurological examination. Ankylosing spondylitis reveals no abnormal neurological physical signs, nor does stretching of the sciatic nerve cause pain. Other causes of low-back pain due to pelvic disease should rarely be mistaken for ankylosing spondylitis if an adequate urinary, rectal, and gynæcological examination is made. The root pains characteristic of this disease are accompanied by a great loss of mobility of the thorax, and this alone should be sufficient clue to the diagnosis. The chest expansion may be nil, and other diseases producing radicular pain, such as spinal-cord tumours and tabes dorsalis, can be excluded by neurological examination.

Finally, pain and immobility of the spine may be secondary to disease of the vertebral column, of which by far the most important to exclude are Pott's disease and osteomyelitis of the vertebræ. Pott's disease of the spine can simulate ankylosing spondylitis very closely, and the diagnosis can only be made more certain by early radiography and by finding tuberculous foci elsewhere. Osteomyelitis is usually much more acute and only rarely takes the form of a chronic abscess of the vertebræ. Paget's disease of the spine is diagnosed by radiography, and secondary carcinomatosis of bone should always be considered.

These three symptoms—stiffness, joint pains, and root pains—taken together are important in this disease, but other more general symptoms must be enumerated. Pyrexia and anorexia may be present, and ankylosing spondylitis must be considered in the diagnosis of pyrexia of unknown origin, particularly in tuberculosis, whether general or local, and in infective endocarditis. In neither of these diseases does one usually find the three main symptoms enumerated above. Lastly, other joints, apart from the sacro-iliac and spine, may be involved; the commonest of these are the shoulder and clavicular joints, the right shoulder being more commonly affected than the left.

When other joints become involved, the differential diagnosis from rheumatoid arthritis becomes important. In rheumatoid arthritis the peripheral joints are most involved; this is never so in ankylosing spondylitis. Rheumatic nodules are never found in ankylosing spondylitis but are present in rheumatoid disease. The older textbooks still associate spondylitis with gonorrhœa, an entirely erroneous generalisation, although gonorrhœa may precede the onset of spondylitis in a few cases. Gonococcal arthritis is an acute pyogenic arthritis, with acute inflammation of joints unlike the more chronic involvement in ankylosing spondylitis. Lastly, osteoarthritis of the spine in elderly persons is a degenerative disease which is easily differentiated by radiological evidence of osteophytic outgrowth and lipping of the vertebræ.

LABORATORY AND RADIOLOGICAL AIDS TO DIAGNOSIS

The most important investigation in suspected ankylosing spondylitis is *radiography* of the spine and pelvis. If radiography reveals obliteration of the sacro-iliac joints, or sclerotic change round these joints, an early case of the disease must be considered. As the disease progresses, the spinal ligaments begin to show patchy or complete ossification. Radiological changes in the hips and shoulder-joints arise very much later.

The *blood-sedimentation rate* is much raised during the active phase of the disease, and in one case an average of these readings over six weeks was 105 mm. in an hour (Westergren).

The *blood acid phosphatase* is also raised in certain cases, though in this series it was never more than twice the normal and never reached the high figures recorded in carcinomatosis of bone.

Robinson (1940) found that *tuberculin-sensitivity tests* were 30% higher in ankylosing spondylitis than in rheumatoid arthritis. Perry (1940a) showed that the antistreptolysin titre was normal.

The *blood picture* in this series showed a mild microcytic anæmia. In two cases an eosinophilia of over 5% was found, but one patient had been on service in India.

PROGNOSIS

The prognosis is surprisingly good, so long as longevity is concerned. Most patients die in the fifth decade. Death is usually from intercurrent infection, but the handicaps of immobility and pain make life a burden to the sufferer from ankylosing spondylitis. Much depends on the patient's psychological adaptation to his condition and the limitation it involves. The disease waxes and wanes for no reason and may suddenly flare into activity with over-exertion; realisation of this is most important in treatment.

TREATMENT

The treatment is unsatisfactory. We must, if possible, treat any antecedent disease or infection and clear any sepsis. Treatment of the disease is largely symptomatic. During the acute stages the patient must be completely rested in bed, and sometimes a plaster bed is useful. After the acute phase has subsided, re-education and moderate mobility must be attempted. Probably the most valuable treatment is that of deep X-ray therapy to the spine. This relieves the pain very satisfactorily, local irradiation appearing to be better than a general spread. Gold therapy is disappointing. Protein-shock treatment relieves the symptoms in the acute stages, and autogenous whole blood and intravenous T.A.B. have both been successful in certain cases. In conjunction with Wing-Commander A. G. Cross it was found in one case that whole-blood injections up to 15 c.cm. intramuscularly helped to improve both the iritis and the pain of the ankylosing spondylitis. Penicillin and sulphonamides are of no value. The patient is often underweight and debilitated and should receive a liberal and balanced diet.

These patients should be helped psychologically; the rigidity and peculiar carriage of the head make them very conscious of their disease and, like people with facial burns, they may tend to avoid society. Every effort must be made to make them forget their disability and lead a normal life. Too much sympathy and dependence must be avoided, and limited exercise in the quiescent phase encouraged. It has been suggested that patients who develop spondylitis are of an abnormal mental make-up. It is not fully realised that chronic illness of this type produces psychological reaction in the most stable temperament, and spondylitic patients are no exception. Breathing exercises are most important to counteract the fixation of the thorax. In the quiescent phase many patients continue active work, and one R.A.F. officer, despite limited head movements, flew a Spitfire in the Battle of Britain.

Swimming and cycling are the most suitable exercises, and hydrotherapy is of use in re-education of the limbs.

DISCUSSION

The incidence of this disease in more than one member of a family is emphasised in this series, and this suggests there may be an inherent susceptibility to develop ankylosing spondylitis. The occurrence in identical twins suggests this, and, in the words of Perry (1940b) describing the incidence of acute rheumatism in identical twins, "there may be genetically determined differences in susceptibility but needing an environmental stress or strain for the disease to become manifest." It is considered that in ankylosing spondylitis the position is the same. The environmental stress is not specific, and there is a parallel in the development of thought about the ætiology of polyarteritis nodosa. The ætiology of the latter long remained obscure, and many infections were blamed in turn, such as gonorrhœa, syphilis, and rheumatic fever, but the work of Spiegel (1936) and Rich (1942) has proved that polyarteritis nodosa is due in some cases to an inherent or acquired local tissue hypersensitivity precipitated by widely differing antigens. There is also some parallel to the association between preceding infections and the onset of rheumatic fever and nephritis. An attempt has been made in this paper to link the association of such diseases with cases of ankylosing spondylitis. It is believed that many of these diseases are closely related.

It has been suggested that ankylosing spondylitis bears some relation to the metastasis of carcinoma of the prostate in the similar distribution of the lesions and the rise in the acid phosphatase. The dramatic effect of stilbœstrol on the carcinomatous prostate suggests its trial in spondylitis.

In this series the acid phosphatase was never raised so high as in prostatic cancer, and this agrees with Buckley's (1945) suggestion that the rise is merely an index of osteoblastic activity. A similar rise is found in rickets. It cannot yet be said that no endocrine disturbance is present, but there is no satisfactory evidence of any imbalance. The predominance in males and the onset of the disease after puberty may be of significance. Ssamarin (1928) removed the parathyroids in one case, but without benefit to the patient.

SUMMARY

Twenty-five cases of ankylosing spondylitis are reviewed.

The ætiological factors of inheritance and environmental influences are discussed.

The incidence of other conditions of possible allergic ætiology, especially iritis, is emphasised.

In diagnosis the essential features are spinal stiffness, joint pain, and root pains. The differential diagnosis is discussed.

Methods of treatment are outlined, particularly the psychological management of the case.

It is considered that the most likely cause is an inherent susceptibility precipitated by some environmental stress. The evidence of possible endocrine factors is discussed.

My thanks are due to the D.G.M.S., R.A.F., for permission to publish this paper, and to orthopædic specialists in the R.A.F. for referring cases to me.

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STABILISATION OF PENICILLIN SOLUTIONS WITH SODIUM CITRATE

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AQUEOUS solutions of penicillin retain their potency at room temperature for a limited period, the stability varying according to the constituents of the different manufactures. Hughes,[1] testing samples supplied by the Therapeutic Research Corporation (T.R.C.), found that the penicillin solution in distilled water remained stable for about seven days. Assays carried out with the same manufacture in our laboratory (T.R.C.330; 4 units per c.cm.) gave the following results: diameter of inhibition rings with the agar-cup method immediately 16 mm.; after twenty-four hours 13 mm.; after forty-eight hours 13 mm.; and after seventy-two hours 13 mm.

Pulvertaft and Yudkin[2] have shown that phosphate has a stabilising effect on the rate of destruction of penicillin by heat, and that the effect is not due to control of pH but to a specific action of the phosphate ion.

I here describe the stabilising effect on sodium penicillin of sodium citrate dissolved in physiological NaCl solution. This property was accidentally discovered when sodium citrate in 0·9% NaCl solution was used as control in experiments with penicillin and citrated blood and produced a remarkable stabilising effect on sodium penicillin. The stabilising effect is not due to any changes of pH. Sodium citrate proved to be less effective than the combination of sodium citrate and sodium chloride.

METHOD

Two batches of sodium penicillin—T.R.C.392 (containing 615 units per mg.) and 330 (units per mg. not specified)—were tested. One tablet containing sodium penicillin "10,000" units was dissolved in sterile distilled water to give a solution of "40" units per c.cm. This was dissolved 1 : 10 in the solution under test, thus providing "4" units per c.cm. For the individual assay 0·1 c.cm.—i.e., sodium penicillin 0·4 unit—was used.

The agar-cup method (Fleming) was applied with petri dishes of 11 and 17 cm. diameter and 27 and 50 c.cm. of nutrient agar respectively. The suspension of a 24-hour standard[3] *Staph. aureus* agar culture, 0·1 c.cm. and 0·2 c.cm. respectively, was spread over the whole surface of the agar plate and, after 15 min. drying in the incubator, holes 9 mm. in diameter were punched. These cups were filled with 0·1 c.cm. of the penicillin solution under test, and the plates then incubated for fifteen hours. After incubation the diameters of the rings of inhibition, minus 9 mm. representing the diameter of the cup, were compared. The solutions to be heated were kept in ampoules.

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[1] Hughes, K. E. A. Penicillin Therapy and Control in 21 Army Group, 1945, p. 327.

[2] Pulvertaft, R. J. V., Yudkin, J. *Lancet*, 1946, ii, 265.

[3] Characteristics of our *Staph. aureus* strain—(1) liquefaction of gelatin: after 3 days at 17° C; (2) hæmolysis: after 24 hours at 37° C; (3) coagulation of plasma: positive; (4) agar colony: circular, orange, glistening; (5) mannitol: acid.

RESULTS

Destruction of Penicillin at 100° C in Citrate and Phosphate.—4 units of sodium penicillin dissolved in 1 c.cm. of a solution consisting of 1 part of $M/5$ sodium citrate and 4 parts of 0·9% NaCl solution, and 4 units of sodium penicillin dissolved in 1 c.cm. of $M/15$ phosphate were tested (1) immediately; (2) after heating at 100° C for 15 min.; and (3) after an hour's heating at 100° C in the water-bath. The rates of destruction of the penicillin solutions were as follows:

	Diameter of Inhibition Ring (av. of 3 assays) in mm.	
	Citrate-NaCl	*Phosphate*
Immediate..	19	19
After heating for 15 min. ..	18	16
After heating for 1 hr.	16	0

It will be seen that under the conditions used in this assay the stabilising effect of citrate-NaCl is greater than that of phosphate.

Rate of Destruction of Penicillin in Salt and Blood Mixtures at 37° C.—Samples of various penicillin-salt mixtures, each containing 4 units per c.cm., were kept in test-tubes at 37° C in the incubator for various periods. Complete sterility was assured in all experiments as proved by controls. The results for (1) a solution of 1 part of $M/5$ sodium citrate and 4 parts of 0·9% NaCl; (2) 0·9% NaCl; (3) $M/15$ phosphate; and (4) blood 4 parts and sodium citrate 1 part were as follows:

	Diameter of Inhibition Ring (av. of 3 assays) in mm.			
Hours	*Citrate-NaCl*	*NaCl*	*Phosphate*	*Blood+citrate*
0	18	19	18	18
12	18	7	14	10
24	18	6	14	10
48	18	0	12	6
72	18	0	12	5

It will be noted that the loss of potency of the penicillin solutions after three days was 0 for the citrate-NaCl mixture, whereas in saline the bacteriostatic level of the penicillin rapidly declined.

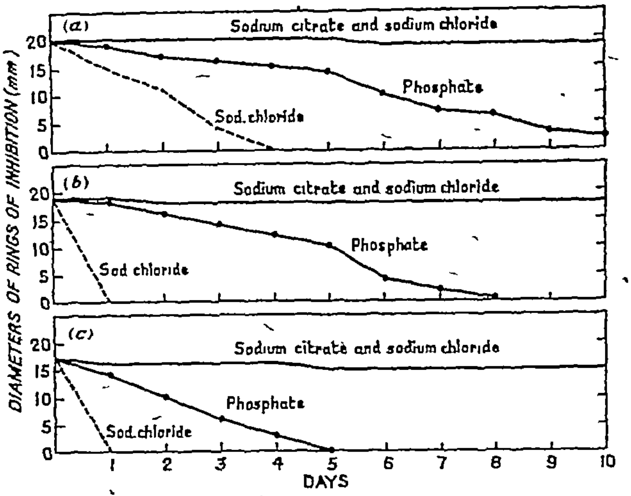
DIAMETERS OF INHIBITION RINGS (MM.) OBTAINED AFTER STORAGE FOR 0–10 DAYS AT ROOM TEMPERATURE

Days	1 unit of penicillin sodium dissolved in 0·9 % NaCl solution with sodium citrate in concentrations of:						
	$M/1$	$M/5$	$M/10$	$M/20$	$M/50$	$M/100$	None
0	15	15	15	15	15	15	15
1	15	15	15	15	15	15	0
2	15	15	15	15	15	15	0
5	13	14	14	14	14	14	0
10	12	13	13	13	13	13	0

Stability of Penicillin-salt Mixtures after Heating at 100° C.—Samples containing 4 units of sodium penicillin T.R.C.330 per c.cm. dissolved in citrate-NaCl and phosphate $M/15$ were filled in ampoules and sterilised at 100° C for 10 min. The effect on the stability, the ampoules then having been kept at room temperature, was as follows:

	Diameter of Inhibition Ring (av. of 3 assays) in mm.	
Days	*Citrate-NaCl*	*Phosphate*
0	20	21
4	20	19
8	19	17
13	18	15
23	18	14

It will be seen that, in accordance with the findings of Pulvertaft and Yudkin,[2] penicillin-phosphate solutions tolerated sterilisation without a considerable loss of potency. In citrate-NaCl solution the loss of activity was very small, even after twenty-three days.



Rates of destruction of penicillin in different concentrations at body temperature: (a) 3 units per c.cm.; (b) 2 units per c.cm.; (c) 1 unit per c.cm.

Assays with Various Penicillin Concentrations.—To ascertain whether changes of penicillin concentration influenced the results, assays were carried out with 1, 2, and 3 units of sodium penicillin per c.cm. of the salt mixtures. T.R.C.330 was used. The mixtures tested were (1) sodium citrate $M/5$ 1 part, 0·9% NaCl solution 4 parts, pH 7·0; (2) 0·9% NaCl solution, pH 6·2; and (3) $M/15$ phosphate, pH 7·0; 1, 2, and 3 units of sodium penicillin were tested separately in each solution. The accompanying figure illustrates the rate of destruction of the penicillin solutions at 37° C.

Effects of Citrate Concentration on Stability of Penicillin.—In an attempt to find the optimal concentration of citrate effecting stabilisation of penicillin, various fractions of molar citrate solutions were tested. The following table gives the results obtained with $M/1$, $M/5$, $M/10$, $M/20$, $M/50$, and $M/100$ citrate solutions combined with 0·9% NaCl solution.

The table shows that there was no correlation between the concentration of the citrate ion and its stabilising effect on sodium penicillin within the limits of this experiment. But further observations using 0·9% NaCl and sodium-citrate concentrations ranging from $M/200$ to $M/1000$ showed that an optimal stabilising effect was produced by concentrations of $M/300$ to $M/400$. After heating at 100° C for 30 minutes, solutions of sodium penicillin containing 5 units per c.cm. were then found to have retained 84% of their potency. The effect of such lower molar concentrations on the stability of penicillin solutions at room temperature is being followed up. It would be tempting to correlate the effect with the Ca or Mg ion; but only one manufacture could be used for the experiments, and the impurities and their amounts are unknown, so any such attempt would be futile.

PRACTICAL APPLICATIONS

It appears that sodium citrate combined with 0·9% NaCl solution has a considerable stabilising effect on sodium-penicillin solutions, and this effect is much greater than that of phosphate as described by Pulvertaft and Yudkin.[2] It is thus possible, by using sodium citrate in saline as solvent, to preserve penicillin solutions at room temperature for long periods. Such solutions can be sterilised by boiling them for 10 min. and kept stable at room temperature in ampoules so prepared.

SUMMARY

A mixture of sodium citrate in concentrations of $M/1$ to $M/100$ and sodium chloride 0·9% in the proportion of 1 : 4 stabilises sodium-penicillin solutions at 100° C and

at room temperature. Preliminary work suggests that, with penicillin-sodium solutions up to 5 units per c.cm., an optimal stabilising effect is produced with sodium-citrate concentrations of *M/300 to M/400.*

The stabilising effect of this saline-citrate mixture exceeds that of phosphate.

I am indebted to Mr. W. Kaufmann, technical assistant to the Glyn Hughes Hospital, for his coöperation and practical help.

GENERALISED SKIN SENSITIVITY

FOLLOWING LOCAL APPLICATION OF ACRIFLAVINE

REPORT OF A CASE

J. Martin Beare
M.D. Belf.
LATE SURGEON-LIEUTENANT R.N.V.R.

Generalised dermatitis following local application of acriflavine is not common; and, since the acridine group of drugs * is among those most commonly used for surface antisepsis, it is of interest to record a case. The subject is of topical interest, too, because within the past year attention has been drawn to local sensitisation to acriflavine. According to MacKenna (1946): "Acriflavine seems no longer to be the innocuous remedy which it was generally supposed to be."

A Royal Naval rating, aged 39, reported on Sept. 14, 1945, with a small superficial ulcer, about the size of a shilling, on the anterior aspect of the lower third of the left leg, which had been knocked a few days previously. He had had no previous skin disease and no previous sulphonamide or flavine therapy. There were no varicose veins present. He was treated twice daily with sulphanilamide powder and gauze soaked in 1/1000 acriflavine in arachis oil over the powder until Oct. 1.

Sept. 24: he had a fleeting, roseolar, and very irritating rash on the trunk and upper parts of the arms and legs. This rash faded within a few hours, but its significance was not appreciated at the time.

Oct. 1: daily application of Castellani's paint was prescribed.

Oct. 8: there being no change in the ulcer, it was decided to try sterile lint under an elastic plaster dressing and leave undisturbed for four days.

Oct. 12: there being still no change in the ulcer patient was put to bed, with the leg raised and splinted, and the ulcer was cleaned with soap and water, and penicillin cream was applied every four hours.

Oct. 21: pus was forming, and dressing was changed to gauze soaked in 1/1000 aqueous solution of acriflavine.

Oct. 26: still no change; dressing changed to sulphathiazole paste.

Oct. 27: signs of acute local sensitisation dermatitis, with vesiculation, redness, and swelling, which was thought to be due to the sulphathiazole paste. Treatment was immediately changed to 1/1000 acriflavine in arachis oil. Next day patient had acute eczematous dermatitis of the whole of the left lower leg. Acriflavine was discontinued, and soft paraffin on sterile gauze was applied.

Nov. 6: suddenly, within a few hours, patient developed a temperature of 102° F, with much constitutional disturbance and a generalised roseolar erythema, affecting the whole body but most marked on the trunk.

Nov. 9: generalised desquamation took place, and the temperature dropped to normal, but a weeping dermatitis remained on both legs and the sides of the head.

Apart from a few relapses, which were less severe than the original eruption, patient gradually improved with various local applications, such as calamine lotion, calamine cream, &c., until Dec. 13, when the skin was normal, except on the left leg, which was still very red below the knee. The ulcer had healed. Throughout the illness the nails and hair remained unaffected.

Nov. 25: skin tests were made with sulphanilamide, sulphapyridine, sulphathiazole, and sulphadiazine powders, each suspended in a small amount of water, sulphathiazole paste, and arachis oil, since it was thought that the condition was probably a sensitisation reaction to a sulphonamide.

Nov. 27: there being still no reaction, the skin tests were repeated, with, additionally, gauze soaked in 1/1000 acriflavine from the stock bottle included among the test substances. Through each of the test drugs a small scratch was made. Next day there was a vesicular eruption where the acriflavine had been applied. This subsided within two days. There were no reactions to any of the other test substances.

Nov. 28: white-cell counts, including differential counts, were within normal limits. There was no suggestion of eosinophilia.

The rating was last seen on Jan 9, 1946, feeling fit, and with no sign of abnormality of the skin.

DISCUSSION

Most of the published work relating to the toxic effects of the acridine drugs refers only to liver damage following intravenous administration in the treatment of gonorrhœa 15–20 years ago (Cullinan 1931, Birch 1931, Heathcote and Urquhart 1930, Davis 1924, Davis and Sharpe 1932, Meleney and Zau 1925). The liver damage was of the same type as that which arises after the parenteral administration of other drugs, such as arsenic and insulin. Other authors have, however, claimed that acriflavine does not commonly cause liver damage when given intravenously (Hanschell 1931, Simpson 1931). The explanation of this difference of opinion probably lies in the now widely accepted theory that infective hepatitis, developing in patients receiving injections of any kind, is due to contamination of the syringe and/or needles, transmission of the organisms responsible for the disease from patient to patient taking place in this way (Bigger 1943, Beattie and Marshall 1944, Salaman et al. 1944, Sheehan 1944, Witts 1945).

Dermatitis of parts of the body exposed to sunlight, after intravenous acriflavine, has been recorded (Assinder 1936, Fessler 1942), but there seem to be few reports of dermatitis following the local application of the acridine drugs—the only example I could find was that of Young and Hawking (1938), who described local acriflavine dermatitis in an Indian patient. These writers said they could find no other reference to such sensitivity, and Browning (1943) remarks that "toxic damage in man from acriflavine or proflavine absorbed from wounds has *not* occurred. Skin *idiosyncrasy* has been met with, though very rarely."

In the present case a fleeting rash appeared after ten days' local acriflavine therapy, and the rash disappeared in a few hours, though treatment was unaltered. At that time the rash was considered irrelevant. When, however, acriflavine was applied for the second time, the local lesion slowly improved, but after seven days signs of sensitivity suddenly appeared on the leg. Then, though the acriflavine dressings were changed to sterile dressings of soft paraffin on gauze, generalised dermatitis developed ten days later.

I wish to thank Dr. I. H. McCaw, Dr. F. F. Kane, and Dr. R. Hall for their interest and help in the preparation of these notes; Miss M. Hislop for her skilled typing; and the Medical Director General of the Royal Navy for permission to publish.

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* Mepacrine, which is the dehydrochloride of a synthetic acridine derivative, is not considered in this report.

Medical Societies

ROYAL MEDICO-PSYCHOLOGICAL ASSOCIATION

THE paper-reading session of the association's quarterly meeting was held on Feb. 21, with Prof. D. K. HENDERSON, the president, in the chair.

Psychiatry and the Population Problem

Dr. C. P. BLACKER indicated the importance of adequate records; it was not difficult, he said, to secure accurate demographic data, such as numbers of brothers, sisters, and children, duration of marriage, and consanguinity of parents. This information would provide material for research and could also be used administratively, for example in forecasting probable requirements for institutional beds, allowance being made for the effect of the ageing of the population. He considered that statistical records should not be too rigidly centralised, but should be available in the various regions, where they would stimulate research.

SURVEY OF SUBNORMAL TYPES

Mr. R. CARADOC JONES discussed a survey carried out some years ago in the Merseyside area. The numbers studied were large, and a control sample of normal working-class families was also investigated; so thoroughly was the social work done that 93% of the sample coöperated. The striking finding was the regular association of higher fertility with every kind of social inefficiency observed. Thus while the average number of living children in the normal working-class families was 3·38, the average number amongst families containing a mentally defective child was 4·69. The difference would have been even greater but for the effect of differential mortality, for while in the normal families an average of 0·74 children had died, in those containing a mentally defective child the mean number of deaths was 2·47. While families containing a socially inefficient child had a higher fertility than the controls, the highest fertility of any group investigated was in the families containing a delinquent child. The data revealed clearly the difference between high-grade and low-grade mental deficiency, the former tending to come from lower social classes; and although few of the parents were classified as mentally defective many of the parents were mentally "subnormal." Another comparison showed that while 39% of the heads of normal families were graded as unskilled labourers, 63% of fathers of children attending special schools fell into this category. Amongst those unemployed for 2 years or more, and among the chronically destitute, 90% were married, compared with 74% in the normal working-class sample. Mr. Caradoc Jones concluded that, broadly speaking, low intelligence of parents is associated with high fertility and defects of all kinds amongst the children.

HIGH-GRADE DEFICIENCY AND DIFFERENTIAL FERTILITY

Dr. J. A. FRASER ROBERTS described the distinction between high-grade and low-grade defectives. The latter are the dwarfs of mental stature owing their condition to a variety of special causes, some genetic, some environmental, while the former are no more than the tail-end of the normal curve. The dividing line between mental deficiency and dullness is purely arbitrary. Mental deficiency cannot be equated to the Binet intelligence quotient (I.Q.), though of course the relationship is close. There is a level below which care and control are practically inevitable; above this is a wide band in which the need for care depends on social maladjustment coupled with intellectual retardation; of these two factors, the I.Q. level can be studied the more easily. In a survey of school-children carried out at Bath before the war it was found that the brightest 4% had an average of 1·70 living sibs, the median 4% had 2·78, and the dullest 8% had 3·72; when allowance was made for uncompleted families the figures became respectively 1·95, 3·51, and 5·03. These results illustrate the typical linear relation between intelligence and number of sibs, the latter falling steadily as the former increases. Although on the average the lower the parents' intelligence the lower is that of their children, actually the bulk of children with I.Q.'s below 70 come from the dull and backward since these are so much more numerous than those with I.Q.'s below this level. Such observations permit an indirect estimate of the expected fall in the mean intelligence of the population; on the data quoted, after allowance for additional factors, this amounts to nearly 3 points of Binet I.Q. per generation. This estimate is, as Sir Cyril Burt lately suggested, too high; but even a fall of 1·5 points would mean an increase in the frequency of those with I.Q.'s below 70 from 2·1% in 1950 to 3·3% in the year 2000, with a corresponding loss of the very gifted. The discrepancy between the indirect estimate of the decline and what Professor Burt has called the direct evidence may be due to several factors, which may also affect in other ways the estimates of very low I.Q.'s in future years. First of these factors is the influence on intelligence of the mother's age or the order in the family; if this influence were large it would account for a considerable exaggeration of the estimated decline. Secondly, greater mobility has meant that people marry those less closely related to them. If genes making for higher intelligence happened to be more usually dominant, then the average intelligence of the population would rise; this would not represent a real gain of good genes but simply their arrangement in a more useful order. Thirdly, mobility helps people to find mates more like themselves, particularly in regard to intelligence. The result is to increase variability; while the average for the population is not changed, there are more very bright and more very dull, so that the expected numbers of I.Q.'s below 70 will be increased, though there will be compensation at the other extreme. Finally, a relatively low intelligence, if coupled with emotional and temperamental stability, may be compatible with a useful place in society. Although the frequency of low intelligence is likely to increase substantially, there may, owing to advances in knowledge, be no such corresponding increase in those requiring care, supervision, and control.

DISCUSSION

Several speakers, while admitting that it was difficult to advance precise arguments for optimism, expressed confidence that counterbalancing forces would avert the threatened decline. Dr. E. O. LEWIS felt that it might be the cultural component in test-results which was specially concerned. Dr. T. A. H. MUNRO, however, held that if it was admitted that the dull were more fertile and intelligence was to some extent inherited, then at least some decline was inevitable; he reinforced Dr. Blacker's plea for better statistics of mental disease. Dr. W. G. MASEFIELD asked whether differential fertility had not been operating for a long time; if so, must not all the Elizabethans have been geniuses?

In reply, Dr. ROBERTS said that while it was probable that differential fertility had operated for a long time, until the decline in the European birth-rate about 1870 it was on a much smaller scale and might have been more than neutralised by differential mortality amongst the young. It was probably only since family limitation became so widely practised by the more intelligent that the process had assumed its present alarming proportions.

"... The maintenance of intellectual integrity, the defence of intellectual liberty, the cultivation of strict veracity and methods of precision, the sharing of new knowledge, the obligation to publish important findings and to include essential references, and the recognition of priority where priority is due—all these are a part of the discipline, in an ethical regard, which men of science observe. ... In common with other men of science, doctors must shortly decide whether they are willing to comply with Governmental insistence on secrecy in fundamental researches ... [and] whether they are willing to accept a similar demand for secrecy ... by industrialists engaged in the production of things necessary to medicine and human welfare. Of intellectual standards, the Hippocratic injunction states succinctly: 'One must occupy oneself with facts persistently' (*Precepts*), and 'There are, in fact, two things, science and opinion; the former begets knowledge, the latter ignorance' (*Law*). As a reminder for the teaching of the clinical schools the latter sentence might suitably be inscribed above the portals of each ward and lecture-room."—Prof. J. A. RYLE, *Brit. med. Stud. J.* Spring Term, 1947, p. 3.

Reviews of Books

Child Treatment and the Therapy of Play

LYDIA JACKSON, B.SC.; KATHLEEN M. TODD, M.B., D.P.M. Introduction by Emanuel Miller, F.R.C.P. London: Methuen. Pp. 110. 8*s*. 6*d*.

A BOOK on play therapy has long been overdue, but here is one describing the rôle of play in the treatment of problem children, rather than a work on the technique of play therapy. The authors plead for a wider use of common-sense ways of adjusting family life; and the connexion between maladjusted parents and unhappy children is clearly shown. Play in children can serve as an outlet for the "reactive-personality" produced in the child—reactive, that is, to environmental difficulties and to emotional strain, whether applied from without or developing within. Regressive play, obsessional behaviour, and the typical hyperactive and scattered play of the unstable child are signs of conflict. Play as treatment may be a cathartic for disturbed emotions; or the child may relive, with the therapist, earlier experiences which have lacked a sense of fulfilment. The rôle of the therapist is indicated, but no clear directions are given on methods of dealing with some of the situations; and though to use description rather than interpretation is to avoid dogma, it makes the book a little dull in places.

Le bacille de Koch dans la lésion tuberculeuse du poumon

G. CANETTI, chef de laboratoire à l'Hôpital Cochin; assistant a l'Institut Pasteur. Orleans: Flammarion. Pp. 168.

L'allergie tuberculeuse chez l'homme

G. CANETTI. Orleans: Flammarion. Pp. 338.

THESE two works together form a treatise on the pathogenesis of the tuberculous lesion, one volume dealing with the lesion, the other with the immunological reaction. Dr. Canetti has not had access to some of the new work published since 1940, and this has deprived him of the help of Prof. Arnold Rich's monumental work which appeared in America in 1944 and covers much of the ground in greater detail. Nevertheless, he is well read in his subject, and has studied primitive tuberculosis extensively in Cochin, where he was head of the hospital laboratory service. He makes a valuable contribution to this neglected aspect of the subject.

In the first book he sets out to study the *Mycobacterium tuberculosis* in its setting in the pulmonary lesions, claiming with justice that much of the work on the pathology of tuberculosis in the past has been one-sided —a study either of the bacillus or of the lesion. His work is based on the investigation of 1500 necropsies on cases of pulmonary tuberculosis, supported by sections of the experimental lesion; and he sets out the therapeutic implications of these studies. He appears to regard caseation as the key to the evolution of the tuberculous lesion, following Huebschmann in placing it early in development, immediately after exudation and before the cellular phase or follicular reaction; but he does not deny that caseation may also follow the latter, as postulated by most pathologists.

He uses an interesting new technique, estimating the number of bacilli per field of the microscope in stained sections—the method which Gaffky first applied to the direct film examination of sputum. By means of a large series of such bacterial section counts he has determined the relative number of bacilli in the different types of lesion. In sclerotic areas the number was extremely small, while in liquefying caseous areas the bacilli were uncountable; in areas of solid caseation, however, they were relatively scarce. A series of cultures were also made to compare the number of viable bacilli with the total of acid-fast organisms counted in the sections with this technique. There are, of course, obvious difficulties in an investigation of this nature and a generous allowance must be made for unavoidable errors, but they are probably of the same order in most instances.

The differences noted in the various types of lesion—follicular, caseous, fibrocaseous, sclerotic, and cavernous —lead on to a discussion on the relative immunological value of these lesions. The caseous lesion is the critical one, and this is discussed at some length. Whatever the biochemical factors which enter into its production, it is regarded as an outward and visible sign of hypersensitivity.

In the second book he follows accepted views in recognising that allergy and anaphylaxis constitute different reactions; and he is concerned, of course, with the former. More than half the work is devoted to an account of allergy as seen in the tuberculin reactions obtained in 4600 patients tested.

The results are classified to show the differences of age, sex, and nutritional state. In latent tuberculosis, graphs are reproduced to show that the percentage of negative reactors steadily declines from the 15–20 to the 40–50 age-groups, and then rises again to the 70–80 group. Strongly positive reactions are more common in women than in men at all ages. Poorly nourished subjects tend also to give stronger reactions. An interesting comparison is also made between the positive reactions of different clinical types of tuberculosis, and the results are classified in three groups. The strongest positive reactions are found in the cases of cutaneous, lymph-gland, and osseous tuberculosis, and the feeblest in peritoneal, pleural, and genito-urinary types of the disease. Between these two groups is an intermediate one comprising the various stages of pulmonary tuberculosis.

A section on the relatively new Von Groer technique of allergometry with tuberculin shows that pleoergy is the general rule in cases with good resistance and *pleoæsthesia* in patients with advancing disease. The last three chapters of the book deal with the mechanism of tuberculous allergy and its relation to the clinical progress of the disease and to immunity, and here Dr. Canetti's long and critical analysis of Ranke's three stages is telling. That theory was always too facile, and the auth sets forth its defects in full.

Anesthesia in General Practice

STUART C. CULLEN, M.D., head of division of anesthesi logy, department of surgery, State University of Iow Hospitals. Chicago: Year Book Publishers. London H. K. Lewis. Pp. 260. 19*s*. 6*d*.

THERE are now many textbooks on anæsthetics. Som cater for the D.A. candidate: material well systematise text comprehensive, facts stated concisely. Others a written for the undergraduate, giving him a groundi in the simple fundamentals of the subject. Dr. Cullen book will appeal to both: it is accurate and scholarl if not comprehensive, and it deals with fundamentals, perhaps not very simply. In his choice of topics he h the needs of the occasional anæsthetist in view. H writes well on airway, inhalation agents and techniqu spinal anæsthesia, shock, pre- and post-operative trea ment, regional anæsthesia, oxygen therapy, and explo sions. He also discusses the use of curare, in which he has great personal interest. This drug, though at present beyon the scope of the general practitioner, is now in the spot light of publicity, and its inclusion in the book is welcome

Diseases of Blood-forming Organs

in the light of Biopsies of Marrow, Spleen an Lymph-nodes. Dr. JULIAN ALEKSANDROWICZ. Cracow Friedlein. Pp. 265.

IN this Polish monograph are set out the author' views on the anatomically connected but functionall separate myeloid, lymphoid, and reticular tissues. H studied them, in health and disease, by simultaneou biopsies of marrow, spleen, and lymph-glands, and h has heterodox and interesting ideas on the classificatio of the various blood and tissue cells belonging to thes three groups. He places plasma cells with monocytes i the reticular group, and myeloma he classifies as "plasmocytic reticulosis." Ferrata cells he regards as mature reticulum cells. He has some experiments to show tha the production of megalocytic red cells depends o physicochemical plasma factors like heparin concentration and carbon-dioxide partial pressure, and not onl on the presence of megaloblastic erythropoiesis. Th illustrations, both coloured and monochrome, are no very clear and sometimes inaccurate. This book wa produced under difficulties during the German occupation and we hope that, now conditions are easier, the autho will publish a summary of his ideas in French or English.

Messrs. Kegan Paul inform us that the price of O. Fenichel's PSYCHO-ANALYTIC THEORY OF THE NEUROSES (*Lancet*, March 22, p. 372) has been altered to 40*s*.

Vitamin Therapy—its uses and limitations

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Pioneers in Hormone Research

THE LANCET

LONDON: SATURDAY, MARCH 29, 1947

Social Pathology

To the universities it must be both flattering and frightening that in an unstable society so many of the pioneers and the planners turn to them for help. The help asked is seldom just guidance or information: more often the universities are desired to do a job themselves or train the workers for it; and always the implication is that they are more competent or more disinterested than anyone else.

In his address on March 6, as principal guest at the centenary meeting of the New York Academy of Medicine, Prof. J. A. RYLE, of Oxford, put the case for the academic status of social medicine. He drew a pattern of analogies between individual medicine and individual pathology on the one hand, and social medicine and social pathology on the other—meaning by social pathology the study of the relation between social conditions and individual disease. Tracing the development of social pathology, from FARR and CHADWICK forward through the achievements of public health and sanitary science, he showed that its methods are observational and latterly in some degree experimental: in observation it uses statistics and planned sociomedical surveys; in experiment it can sometimes study comparable groups of people in partially controlled conditions, as when half a slum population is rehoused on an estate and its health deteriorates because the food it can afford is less. "Individual pathology deals with the quality and effects of diseases, and, in practice, assists diagnosis and treatment, while social pathology deals with the quantity and cause of diseases, and, in practice, assists prevention." Individual pathology is well ensconced within the four walls of the medical school-cum-hospital, but social pathology has hitherto been pursued by the public-health departments or by special institutes, remote in space and often in spirit from university and hospital life.

For two sets of reasons it is now desirable, in RYLE's opinion, that social pathology should come into the university group. In the first place, its own outlook is changing. Its interest is expanding beyond the old concern with infectious diseases and the mechanical environment of man. It now considers all the effects of community life on the health of the individual—nutrition in its various aspects, economic circumstance, educational influences, and the whole psychological pattern of human relationships. These, it finds, act very differently on different individuals; they show much less uniformity of effect than do contaminated water-supplies or epidemics of smallpox. Social pathology can no longer treat its human material as all of a kind; simple arithmetic gives place to complicated statistics, and even these are inadequate. Social pathology must therefore sit down alongside the physicians who study individual patients, the almoners and social workers who study their homes and families, and the psychologists who have some faint clue to the complex of emotional relationships involved.

In the second place, the outlook of social pathology is needed within the medical school as a corrective to the narrowing tendency of hospital medicine. Wards full of patients admitted because their diseases are dangerous to life, difficult to diagnose, or merely interesting through their rarity: these are the stuff of medicine to the student and the teaching physician. Superimpose that selection on the mass of handicapping disease in the community: the peptic ulcers, the rheumatic diseases, the upper respiratory infections—and they scarcely overlap. What too does the ward know of the domestic upset that has resulted from, or has brought about, the illnesses that it does study? How little the specialist physicians, in contrast with the general practitioners, are acquainted with the lives their patients lead and the places where they lead them! The student's perspective is distorted in the ward atmosphere of intensive, largely mechanical, investigation, in which the minutiæ and the rarities of disease receive so much attention, and its human significance so little. True, the latter is all too evident when the student reaches practice; but by that time his mind is cast in the mould his teachers have given it, and a cardiac murmur will always seem to him more important than an over-possessive mother. RYLE sees the hope that the organised study of social pathology, introduced into the curriculum and into the teaching hospitals, will give a broader and more humanistic outlook to the emerging doctors, and fit them better for their important rôle in a changing society.

That is, in outline, his main thesis; and with his aim we are in full sympathy. The importance of the opportunity that the new era offers to medicine cannot be exaggerated; and "new era" is not too big a term, for the whole structure and working of society is changing under our eyes with bewildering speed. Yet our faith is that the new society must still serve, not rule, the development of the individual—his health in the fullest sense. The doctor is his adviser in this matter, and the doctor must also become society's adviser in the same matter. Hence the need for an altered emphasis in the doctor's training. Of the method of securing the alteration, however, we are less sure. RYLE seems to picture public health, with a new inspiration, entering and reforming the medical school. But, if we read him aright, it is still the health of the individual which is paramount, though now to be studied against a wider background; and if so the task is surely for those to whom the individual has always been the focus of interest. Should not social "pathology" and social medicine grow out of hospital medicine rather than from traditional public health? They will no doubt require some of the public-health techniques, such as field studies and the application of statistics; but, unless the new development is based on the physician's training and the physician's prime concern for the individual patient, it will be in danger of serving a wrong philosophy, of becoming a science of herd management. Here we set store by RYLE's own example. His friends rebuked him for leaving the clinical fold. He replied, "I have merely taken the necessary steps to enlarge my field of vision and to increase my opportunities of ætiological study. My allegiance to human medicine is no whit broken." There must be many younger physicians willing to follow that lead, especially in the freer atmosphere which they can hope to find in the new health service. To them we look, in collaboration with their expert colleagues in public-health departments and in laboratories, to play a major part in adapting the study and teaching of medicine to the needs of an industrial society.

Source of the Red Cells

PRESENT ideas on the origin of the red blood cells are still based on the work of DOAN, CUNNINGHAM, and SABIN[1] published twenty-two years ago. They depleted the bone-marrow of pigeons by feeding them on a poor diet, and of rabbits by injecting emulsions of typhoid bacilli, and then watched the regeneration process. They found that the first phase of the red cell arises by division from the endothelium of the intersinusoidal capillaries—the small blood-vessels connecting the larger sinuses that make up the vascular system of the marrow in birds and mammals. From this first generation, hæmoglobinated erythroblasts arise by mitosis and development of hæmoglobin in the cytoplasm; and these cells, pushing into the capillary cavity, dilate its lumen and stretch its wall. The capillary all this time remains closed, and DOAN did not think that it normally opens to the circulation until the nuclei of the erythroblasts have disappeared and the red cells are mature; NIZET,[2] however, has recently produced evidence that red cells are discharged from the marrow in the reticulocyte stage and finally ripen in the circulating blood. In hyperplastic marrows, when there is an exceptional demand for red cells, the capillaries open before the red cells reach the reticulocyte stage, and then erythroblasts at various stages of development are swept into the blood-stream. Unfortunately, DOAN and his co-workers used a technique that was not really adapted for the differentiation of stages of erythropoiesis, since this depends on nuclear rather than cytoplasmic changes. Worse still, they used the name "megaloblast" for the first phase of normal red-cell development, forgetting that this name had been used in Europe since EHRLICH's time for a pathological cell found in pernicious anæmia; so when DOAN's ideas were applied to human pathology they led to a serious confusion which affects some American writings to this day. This confusion has obscured the fundamental value of DOAN's observations on the intravascular development of the red cells.

Since 1925 others have entered the field and proposed other modes of development. Some say that the lymphocyte can transform itself into an erythrocyte. DURAN-JORDA[3] maintains that the red cell is a product of cellular secretion; at first he thought that the plasma cell disintegrates to form a red cell, and the nuclear remnant, with a halo of cytoplasm, becomes the normoblast. Later[4] he propounded an alternative theory that red cells are formed from the granules of the polymorphonuclear eosinophil leucocyte: the cell increases in size, develops about 200 red corpuscles in the cytoplasm, expels them, and ends up as a lymphocyte. These views have not so far been confirmed, and the last is open to the objection that degenerating cell forms were being observed. WADJA[5] has described changes in muscle fibres degenerating after injury which suggest that in the injured fibre the sarcomeres become transformed into erythrocytes; the fibre is changed, in effect, into a red-cell-containing capillary. WADJA does not suggest that this is the sole source of the red cells, but proposes muscle as an additional source, and quotes some interesting parallels from comparative anatomy. These observations are purely cytological, but, since injured muscle is involved, it should be possible to devise a means of obtaining and counting the red cells formed in this way. Both DURAN-JORDA and WADJA lay stress on the difficulty of explaining the fate of the nucleus of the normoblast; FIESCHI and ASTALDI,[6] watching the process in vitro, have shown that it is got rid of by expulsion, fragmentation, or lysis, expulsion being the usual method.

It cannot be said that any of these theories offers a serious challenge to the accepted view that the bone-marrow throughout the body is the source of the red cells. No-one who reads the history of medicine would denounce them off-hand because they seem bizarre, but they clearly need more confirmation—why, for instance, does muscle-tissue hæmopoiesis not appear when the bone-marrow fails, and why does extramedullary hæmopoiesis, when it occurs, favour other tissues? Still, they remind us that the subject, like many others in medicine, is still open. We hope that new information will be sought along physiological lines, or by studying cytological changes paralleled by changes of function; no-one wants to see a return to the sterile morphological controversy that makes up so much of the German writings on this subject.

German Drugs

UP to about 1936 most of the new synthetic drugs were a product of German chemical skill and pharmacological enterprise. For many years it seemed hopeless for British science or industry to compete in this field. But since 1936 the tables have been turned and the chief advances have come from Britain or America. The military occupation of Germany has enabled us to examine the inner working of the once admired and feared German pharmaceutical industry and to study its methods and secrets; the results of these investigations have been published in a series of reports by the British and Combined Intelligence Objectives Subcommittees (BIOS and CIOS).[7] The picture gained from these reports is somewhat unexpected. German chemotherapy, which once led the world, is now lagging behind in some important respects. Speaking generally, the work of the synthetic organic chemists has been of a very high order, but their new compounds have been much fewer than propaganda had led us to believe; the biological testing of these new compounds in the laboratory has been adequate, though it has not kept up with recent advances in Britain and the United States; the clinical testing of products found active in the laboratory has often been surprisingly bad and promising new compounds, such as antimalarials, have been unprotestingly dropped because of an unfavourable clinical test conducted in haphazard fashion on two or three patients. Moreover the initial successes of the German workers, assisted by skilful propaganda, had produced an exaggerated conception of the scale on which these researches were done. About two-thirds of the new products come from a single centre, the research laboratories of the I.G. Farbenindustrie at Elberfeld, and the graduate staff employed there in the search for new remedies numbered only 26 chemists and 11 medical or biological workers.

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[1] Doan, C. A., Cunningham, R. S., Sabin, F. R. *Contr. Embryol. Carneg. Instn*, 1925, 16, 163.

[2] Nizet, A. *Quart. J. exp. Physiol.* 1947, 34, 43.

[3] Duran-Jorda, F. *Lancet*, 1943, i, 514.

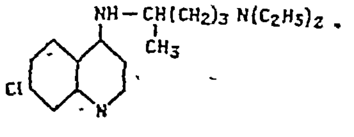
[4] *Ibid*, 1943, ii, 186; *Nature, Lond.* March 1, 1947, p. 293.

[5] Wadja, S. H. *Nature, Lond.* Feb. 22, 1947, p. 251.

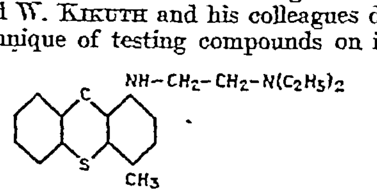
[6] Fieschi, A., Astaldi, G. La Cultura in Vitro del Midollo Osseo, Pavia, 1946.

[7] Cios xx—1; xxiii—13, 17, and 23; xxv—54. Bios 116. Obtainable from H.M. Stationery Office

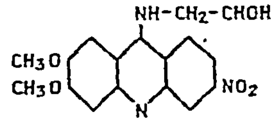
War-time German research has produced nothing to compete with penicillin, streptomycin, 'Paludrine,' and the numerous sulphonamides introduced by Anglo-American work. The best-established German compound of the war years is the sulphonamide, 'Marfanil,' $NH_2.CH_2.C_6H_5.SO_2.NH_2$. supplies of which were captured in North Africa and submitted to in-vitro and clinical tests[8]; these showed it to be useful as a local application to wounds but largely inactivated in the blood-stream. In the antimalarial field, which had long received much attention from German workers, the showing is better. They had discovered a variety of compounds which were highly active in bird malaria, including phenyl-substituted dialkyl amino - alkyls ('Dimeplasmin'), sulphonamides ('Bemural'), and 3-alkyl quinolines ('Endochin'). Unfortunately (as with many compounds discovered in the U.S.A. and Britain), this activity was not confirmed in human malaria. With one series, the 4-amino quinolines, they were more fortunate; and during the early part of the war one of these compounds, 'Sontoquin,' was given small-scale clinical trials at Hamburg and elsewhere. A batch of this preparation was sent to North Africa in 1942 for field trials and was captured by the Allied forces in Algeria and Tunis. The whole series was exhaustively explored on a much larger scale by American workers, who finally selected one member—'Resochin,' 'Chloroquine,' 'SN 7618'—as the best for general purposes. This seems to be superior to quinine or mepacrine, but it is doubtful whether it will prove as good as paludrine, and it will certainly be less cheap.



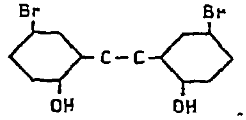
The Elberfeld staff showed particular enterprise in the search for new remedies against schistosomiasis, and W. **Kikuth** and his colleagues developed a new technique of testing compounds on infections of *S. mansoni* in mice. Therapeutic activity was discovered in an entirely new class of synthetic compounds, synthesised by **Mauss**, and the best member of the series, 'Miracil,' is very effective against experimental infections in mice and monkeys. It is hoped to give this compound a clinical trial under British auspices.



In view of the importance of typhus in Eastern Europe, great efforts were made to discover an effective chemotherapeutic remedy for rickettsial infections. The most promising compound discovered was 'Rutenol,' a chemical salt of three parts arsenic trioxide with two parts of a nitro-acridine derivative. This compound is effective in the treatment of mice infected with *R. mooseri*. Its discoverer, **Fussgänger**, also claimed that it was effective in human cases of epidemic typhus or Wolhynian fever, but the tests lacked proper controls, and in the two years since the German claims became known to Anglo-American workers there has been no confirmation of its clinical efficacy. It is unlikely to be as valuable as *p*-aminobenzoic acid in rickettsial infections.



Another substance for which the Germans made big claims is dibromsalicil, developed by **Richard Kuhn**, a former Nobel prizewinner, at Heidelberg. This and other salicyl derivatives prevent the growth of bacteria in vitro and have had some success as local applications to infected wounds. But there has been no confirmation of their value outside Germany and it seems improbable that they will compete with penicillin and streptomycin.



A Great Physiologist

PHYSIOLOGY is not so much a subject as a point of view; and Sir **Joseph Barcroft**, if he did not explicitly preach this text, lived it. The genius of simplicity brought him to the heart of the most complex problem, and the use of this gift earned him a place among the great physiologists. Whatever he touched fell into perspective and was illuminated—illuminated so clearly and with such a delightful play of wit and simile as to reawaken the fascination of discovery in the most disillusioned. He was not a specialist, but brought his zest for scientific adventure to the exploration of many fields—the physiology of the blood, the spleen, the kidney, the fœtus, and the processes of ruminant digestion. He was not a hacker of the jungle, but made rather for the peaks; he seemed to delight in showing others the view, and to be on the lookout for those who could see it as he did. He did not pretend to know what was in each valley, but his recruits were there and rarely failed to find something worth while. His *Architecture of Physiological Function* was an attempt to find for physiology as a whole that coördinating central idea which he had revealed in so many of its parts. His interest latterly in the physiology of the fœtus represented, perhaps, a final effort to come to closer grips with the fundamental mystery. With his passing, a spiritual link with the great period of English physiology has dissolved.

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[8] Mitchell, G. A. G., Rees, W. S., Robinson, C. N. *Lancet*, 1944, i, 627. Leading article, *Ibid.* p. 635.

Annotations

FUTURE OF GENERAL PRACTICE

"How can we modify this Act to preserve more of the past of general practice?" has been the loudest question lately in medical gatherings. It is refreshing to turn to Prof. Robert Platt's remarks on the future of general practice, made in a recent address.[1] He looks to the Act, and to the profession operating it, to make possible great improvements. He has the courage to say "there is a great deal wrong with general practice," and to list its faults. The doctor has insufficient time to do his job well. He works too much in professional isolation. There is no recognised standard in general practice; that is to say, a practitioner's work is so screened from the eyes of his colleagues that he lacks the stimulus of knowing that it will be judged. He complains of an inferior status vis-à-vis the specialist. Finally, he has not been trained on proper lines.

The Act is capable of adjusting the numbers of doctors to the amount of work that is to be done in a way that "private enterprise" never did. Platt sees no harm in basic salary combined with tapered capitation fee as a means to that end. In the health centres there is a remedy for professional isolation; a doctor will talk shop, with mutual advantage, to another doctor in the same health centre, where he would, for prestige' sake, have remained silent in the presence of a competitor, and he will know that at any time his case-records may have to be made available to his colleagues. These are powerful and unbureaucratic encouragements to maintaining a high standard of work.

The status difficulty has its roots in the bias of medical education. Platt holds it ridiculous that the practitioner of the future is trained wholly by the specialist. Surely he is right. Even if the content of this training were altogether appropriate, the respectful student could not help emerging from it with the impression that specialists are a superior order of beings. So they are, in some respects; but mostly they are not, in others. If the teaching staff included some competent general practitioners, broad in their outlook and wise in their experience of men, able to look the specialists in the face and prick their bubbles on occasion, the student's perspective would be truer, and the short-sighted stampede of the young into specialism would cease. To this end Platt offers the same suggestion as we did[2]—namely, that one or more health centres should be established as an integral part of every teaching school. The members of their staffs should be chosen for their ability to conduct general practice well, and for their capacity to teach the students who (singly for preference) would accompany them throughout their working day. We can think of no single innovation which could do more than this to raise the standard and realise the true function of general practice in the next generation.

BLOOD-FLOW IN BONE

THE failure of their many attempts at obtaining arteriograms of bone vessels in living subjects led Lamas and his colleagues[3] to investigate the intra-osseous circulation. They argued that a relatively slow blood-stream would be expected because none of the three physiological functions of the long bones—mechanical support of the body, storage of calcium salts, and hæmopoiesis—need a rapid circulation; hæmopoiesis and calcium storage are in fact facilitated by a slow blood-stream. Nor does movement of a bone, unlike that of muscle, require an extra supply of blood. When a dye was injected into the external iliac arteries of dogs they found that it took four seconds to reach a wound in the foot, seven seconds to reach the skin, and a whole minute to reach the bone-marrow (none reached compact bone). On the other hand, the dye was removed much more quickly from the marrow than the soft tissues; in less than three minutes it disappeared from the marrow, whereas it was visible for ten minutes in the skin. Studying the minute anatomy of the long bones they found that the nutrient artery describes many curves before entering the bone, and, after dividing into ascending and descending branches which run through the marrow, it ends in wide blood-spaces close to the epiphyses; these blood-spaces are in close contact with veins of wide calibre and very thin walls. This arrangement of blood-vessels reduces the pressure and speed of circulation in the arteries, and enables the veins to carry substances quickly away from the blood-spaces—hence the efficacy of therapeutic injections into the marrow. The slowness of the flow through the nutrient arteries is supported by the plethysmograph measurements of blood-flow in the normal humerus made by Edholm et al.[4] From their figures it is estimated that the amount of blood normally flowing through the whole skeleton probably does not exceed 100 c.cm. a minute, though it may be vastly more in Paget's disease.

Though all the long bones have a highly efficient venous drainage, the sternum is the bone of choice for transfusions and infusions because of its convenient situation, because it has excellent short venous connexions, through the internal mammary and innominate veins, with the superior vena cava, and because the compact part of the bone is very thin and easily pierced with the needle, the site of election being the upper part of the manubrium. The firm anchorage that the sternum gives for the needle was found useful in North Africa, where wounded were transported long distances with an intrasternal drip-transfusion running. It can also be made use of in the continuous administration of penicillin. Thus Giraud and Desmonts[5] injected 20,000 units of penicillin, in 250 c.cm. of serum, in two hours by this route, and two days later gave 40,000 units in 250 c.cm. of serum in five hours without encountering any difficulties.

ADSORPTION OF ENDOGENOUS TOXINS

FEW now believe that the various toxic chemicals, such as indole, skatole, tyramine, guanidine, putrescine, &c., formed by the decomposition of protein in the large bowel cause systemic disease or even the symptoms associated with constipation, though it has lately been suggested that their action may be partly responsible for the degenerative changes of old age. Most prefer to think that the barrier offered by the bowel wall and the detoxicating action of the liver together form an efficient protection against intoxication.[6] Nevertheless, since the substances are responsible for the unpleasant odour of fæces, their removal would be a great blessing to patients who are incontinent or have an artificial anus. Kaolin and activated charcoal have been much used for the purpose, but neither has provided the complete answer.

The ideal adsorbent should be completely effective in removing odour but should not interfere with intestinal synthesis of vitamins or with the absorption of foodstuffs and drugs. Martin and Wilkinson[7] tried to find a suitable adsorbent which will adsorb the toxic chemicals in the pH range of the gut. They found that 'Amberlite IR-4,' a synthetic resin, was very effective against indole and skatole, while all the amines tested (putrescine, cadaverine, tyramine, histamine, and guanidine) were strongly adsorbed by activated permutite. Kaolin, in their opinion, "cannot compare with permutite as an adsorbing agent for amines"; they also found that it adsorbed no skatole. These in-vitro results were supported by toxicity experiments on mice, in which the toxic compound was given alone to one group and also to a group which received the adsorbent at 10% of the basic diet. The results clearly showed the effectiveness of the adsorbing agents in counteracting the toxicity of these putrefactive chemicals. Thus the death-rate resulting from a dose of 0·4 g./kg. of indole was reduced from 50% to 20% by the inclusion of 10% amberlite IR-4 in the diet and from 50% to 10% when another 5% of amberlite IR-4 was given in suspension. Permutite given in the same amounts reduced the death-rate caused by 0·5 g./kg. of guanidine acetate from 50% to 20%.

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[1] *Publ. Hlth, Lond.* January, 1947, p. 99.

[2] *Lancet*, Feb. 8, p. 228.

[3] Lamas, A., Amado, D., Da Costa, J. C. *Amatus lusitanus*, 1946, 5, 241.

[4] Edholm, O. G., Howarth, S., McMichael, J. *Clin. Sci.* 1945, 5, 249; see *Lancet*, 1946, ii, 568.

[5] Giraud, G., Desmonts, T. *Pr. méd.* 1946, 54, 61.

[6] Best, C. H., Taylor, N. B. Physiological Basis of Medica Practice, London, 1943, p. 851.

[7] Martin, G. J., Wilkinson, J. *Arch. Biochem.* 1947, 12, 95.

The possibility of interference with vitamin absorption from the gut was clearly borne in mind by these investigators. They reported in another paper [8] that amberlite IR-4 does not adsorb aneurine or riboflavine at the pH of the human stomach or intestine and that vitamin C, though strongly adsorbed at an acid pH, is again completely desorbed at the higher pH of the intestine. In addition, rats showed no signs of nutritional deficiency when amberlite IR-4 or permutite were fed at 5% levels. In this connexion Melnick et al.[9] have shown that fuller's earth reduces the availability of vitamin B_1, while kaolin does not.

Whether amberlite IR-4 or permutite is superior to activated charcoal remains to be seen, but it seems likely from these experiments that a multiple adsorbing agent could be devised which would prove more effective in the adsorption of putrefactive substances from the intestinal tract than those now in clinical use.[10]

MANUAL REMOVAL OF THE PLACENTA

THE cautious attitude of British obstetricians to manual removal of the placenta has been based on a lively fear of "obstetrical shock" and intra-uterine sepsis. There was good reason for this attitude two decades ago, when there was no chemotherapy and blood or plasma for transfusion was not immediately obtainable. Even with these safeguards, however, the risks of manual removal have not disappeared. According to Sewall and Coulton,[11] this is because manual removal has only been employed when the patient is already shocked and anæmic; and they attribute the bad results of the operation to the bad timing of its performance. They support their view by recording 45 consecutive manual removals under their own or their residents' care in which the mortality was zero and only one patient, already suffering from bronchitis and pyelonephritis, gave rise to anxiety. No special technique was used, and the indications for the operation were blood-loss in 15 cases, expected blood-loss in 22 cases, and retention of the placenta in 8 cases. Chemotherapy was employed in 22 cases. Shock was absent in the whole series, though what is described as subclinical shock was noted in 3 cases.

The average time from the beginning of the third stage until manual removal was performed was 8 minutes in the cases undergoing manual removal for blood-loss, and 14 minutes where the removal was done prophylactically for fear of blood-loss. In other words, these workers waste no time in manually removing the placenta. They urge that Credé's expression should not be persisted with too long. Protracted and vigorous attempts at Credé's expression are extremely liable to cause shock, and Sewall and Coulton think they also make subsequent manual removal hazardous. They therefore use a trial expression once. If this is not successful, they wait for 20 minutes and repeat it; and if the second attempt fails the placenta is removed manually. When there is bleeding, manual removal is used much more quickly. In 5 cases the uterus was packed; and it is claimed that packing does not increase morbidity—with prophylactic sulphonamides, of course.

Forty-five swallows do not make a summer, and the enthusiasm of these Massachusetts workers is not likely to change our more conservative attitude; but their experience does strongly support their view that if manual removal is going to be employed it should be resorted to more quickly than it has been in the past. In a fit woman not yet suffering from the effects of blood-loss it is a relatively simple operation. In a shocked and anæmic woman it is hazardous and possibly lethal, and its morbidity may well be attributed to the poor state of the patient rather than to the inherent vice of the operation.

"HOME" OR HOME?

NOBODY would wish to deny that many homes managed by voluntary societies achieve a high standard in the care of children deprived of a normal home life. A memorandum submitted by the National Council of Associated Children's Homes[1] reminds us that some 40,000 children—nearly half the homeless children in the country—are in the care of voluntary homes and hospitals, and that many approved schools, foster-homes, and remand probation homes are also administered by the voluntary societies.

In discussing the several methods of caring for such children, the council's opinions are noticeably at variance with the Curtis report. They agree that each child's case must be considered on its merits, but think it dangerous to assume that adoption is in the main better than boarding-out, or boarding-out than community residence, or that community residence is better than either. About adoption they hold highly cautious views, hinting at "unforeseen developments arising later from unwise upbringing or incompatibilities of temperament." In their opinion "adoption will not prove an adequate solution of the problem of the homeless child." They are equally dubious about the advantages of boarding-out: "at its best boarding-out for the homeless child is but a partial solution of the problem. Some of the responsibilities of child care are inescapable and cannot be contracted out." They believe that there will always be a "large residuum for which some other arrangements must be made." The section on the voluntary homes, however, presents this method of dealing with children in its most favourable light: the drawbacks emphasised by the Curtis Committee—the lack of a strong personal relationship with an adult, for individual children, and the depression of responsibility and initiative associated with institutional life—are not mentioned. Light is focused strongly on the admitted advantages of the homes: the good food, comfortable quarters, the devoted staff.

These opinions, of course, must carry weight since they are so well sponsored; and it is easy to realise how strongly the sight of groups of happy well-nourished secure children must affect the judgment of those who wrote it. Nevertheless, material nourishment does not make up to the child for the absence of personal love, and even security may be bought too dearly if it hinders development of initiative. The alarm the council express at the risks of adoption are surely far-fetched: even in happy families, born to each other's society, unforeseen developments arise from unwise upbringing; nor are incompatibilities unknown. But what the family gives is something few people would willingly surrender for the care offered by even the best voluntary home.

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[8] *Gastroenterology*, 1946, 6, 315.
[9] Melnick, D., Hochberg, M., Oser, B. L. *J. Nutrit.* 1943, 30, 233.
[10] See *Lancet*, 1941, i, 215.
[11] Sewall, C. W., Coulton, D. *Amer. J. Obstet. Gynec.* 1946, 52, 564.

[1] The council's office is at the National Children's Home, Highbury Park, London, N.5.

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FUTURE OF GENERAL PRACTICE

"How can we modify this Act to preserve more of the past of general practice?" has been the loudest question lately in medical gatherings. It is refreshing to turn to Prof. Robert Platt's remarks on the future of general practice, made in a recent address.[1] He looks to the Act, and to the profession operating it, to make possible great improvements. He has the courage to say "there is a great deal wrong with general practice," and to list its faults. The doctor has insufficient time to do his job well. He works too much in professional isolation. There is no recognised standard in general practice; that is to say, a practitioner's work is so screened from the eyes of his colleagues that he lacks the stimulus of knowing that it will be judged. He complains of an inferior status vis-à-vis the specialist. Finally, he has not been trained on proper lines.

The Act is capable of adjusting the numbers of doctors to the amount of work that is to be done in a way that "private enterprise" never did. Platt sees no harm in basic salary combined with tapered capitation fee as a means to that end. In the health centres there is a remedy for professional isolation; a doctor will talk shop, with mutual advantage, to another doctor in the same health centre, where he would, for prestige' sake, have remained silent in the presence of a competitor, and he will know that at any time his case-records may have to be made available to his colleagues. These are powerful and unbureaucratic encouragements to maintaining a high standard of work.

The status difficulty has its roots in the bias of medical education. Platt holds it ridiculous that the practitioner of the future is trained wholly by the specialist. Surely he is right. Even if the content of this training were altogether appropriate, the respectful student could not help emerging from it with the impression that specialists are a superior order of beings. So they are, in some respects; but mostly they are not, in others. If the teaching staff included some competent general practitioners, broad in their outlook and wise in their experience of men, able to look the specialists in the face and prick their bubbles on occasion, the student's perspective would be truer, and the short-sighted stampede of the young into specialism would cease. To this end Platt offers the same suggestion as we did[2]—namely, that one or more health centres should be established as an integral part of every teaching school. The members of their staffs should be chosen for their ability to conduct general practice well, and for their capacity to teach the students who (singly for preference) would accompany them throughout their working day. We can think of no single innovation which could do more than this to raise the standard and realise the true function of general practice in the next generation.

BLOOD-FLOW IN BONE

THE failure of their many attempts at obtaining arteriograms of bone vessels in living subjects led Lamas and his colleagues[3] to investigate the intra-osseous circulation. They argued that a relatively slow bloodstream would be expected because none of the three physiological functions of the long bones—mechanical support of the body, storage of calcium salts, and hæmopoiesis—need a rapid circulation; hæmopoiesis and calcium storage are in fact facilitated by a slow bloodstream. Nor does movement of a bone, unlike that of muscle, require an extra supply of blood. When a dye was injected into the external iliac arteries of dogs they found that it took four seconds to reach a wound in the foot, seven seconds to reach the skin, and a whole minute to reach the bone-marrow (none reached compact bone). On the other hand, the dye was removed much more quickly from the marrow than the soft tissues; in less than three minutes it disappeared from the marrow, whereas it was visible for ten minutes in the skin. Studying the minute anatomy of the long bones they found that the nutrient artery describes many curves before entering the bone, and, after dividing into ascending and descending branches which run through the marrow, it ends in wide blood-spaces close to the epiphyses; these blood-spaces are in close contact with veins of wide calibre and very thin walls. This arrangement of blood-vessels reduces the pressure and speed of circulation in the arteries, and enables the veins to carry substances quickly away from the blood-spaces—hence the efficacy of therapeutic injections into the marrow. The slowness of the flow through the nutrient arteries is supported by the plethysmograph measurements of blood-flow in the normal humerus made by Edholm et al.[4] From their figures it is estimated that the amount of blood normally flowing through the whole skeleton probably does not exceed 100 c.cm. a minute, though it may be vastly more in Paget's disease.

Though all the long bones have a highly efficient venous drainage, the sternum is the bone of choice for transfusions and infusions because of its convenient situation, because it has excellent short venous connexions, through the internal mammary and innominate veins, with the superior vena cava, and because the compact part of the bone is very thin and easily pierced with the needle, the site of election being the upper part of the manubrium. The firm anchorage that the sternum gives for the needle was found useful in North Africa, where wounded were transported long distances with an intrasternal drip-transfusion running. It can also be made use of in the continuous administration of penicillin. Thus Giraud and Desmonts[5] injected 20,000 units of penicillin, in 250 c.cm. of serum, in two hours by this route, and two days later gave 40,000 units in 250 c.cm. of serum in five hours without encountering any difficulties.

ADSORPTION OF ENDOGENOUS TOXINS

FEW now believe that the various toxic chemicals, such as indole, skatole, tyramine, guanidine, putrescine, &c., formed by the decomposition of protein in the large bowel cause systemic disease or even the symptoms associated with constipation, though it has lately been suggested that their action may be partly responsible for the degenerative changes of old age. Most prefer to think that the barrier offered by the bowel wall and the detoxicating action of the liver together form an efficient protection against intoxication.[6] Nevertheless, since the substances are responsible for the unpleasant odour of fæces, their removal would be a great blessing to patients who are incontinent or have an artificial anus. Kaolin and activated charcoal have been much used for the purpose, but neither has provided the complete answer.

The ideal adsorbent should be completely effective in removing odour but should not interfere with intestinal synthesis of vitamins or with the absorption of foodstuffs and drugs. Martin and Wilkinson[7] tried to find a suitable adsorbent which will adsorb the toxic chemicals in the pH range of the gut. They found that 'Amberlite IR-4,' a synthetic resin, was very effective against indole and skatole, while all the amines tested (putrescine, cadaverine, tyramine, histamine, and guanidine)

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[1] *Publ. Hlth, Lond.* January, 1947, p. 99.

[2] *Lancet*, Feb. 8, p. 228.

[3] Lamas, A., Amado, D., Da Costa, J. C. *Amatus lusitanus*, 1946, 5, 241.

[4] Edholm, O. G., Howarth, S., McMichael, J. *Clin. Sci.* 1945, 5, 249; see *Lancet*, 1946, ii, 568.

[5] Giraud, G., Desmonts, T. *Pr. méd.* 1946, 54, 51.

[6] Best, C. H., Taylor, N. B. Physiological Basis of Medical Practice, London, 1943, p. 851.

[7] Martin, G. J., Wilkinson, J. *Arch Biochem.* 1947, 12, 95.

During the whole treatment physical therapy must be in constant use. Patients need not be confined to bed for more than a few days after rib-resection, but at no time must observation or attention to detail be relaxed. Treatment must be active the whole time under the direct care of the surgeon.

THE NURSE AND THE SISTER

THE duties of the nurse, we are often reminded, have never been analysed: there is no clear answer to the question "what is a nurse?" If the principle of the two-year basic course in nursing, followed by a course for a senior qualification, is accepted it also becomes necessary to distinguish between the duties of the nurse and the duties of the sister. Some help in this is afforded by a recent analysis from America.

Dr. J. J. Golub,[1] director of the Hospital for Joint Diseases, New York City, plans to train what he calls "practical nurses" in a course lasting only a year, and to use such girls when trained to supplement registered nurses—the equivalent of our sisters—on the wards. The registered nurse, he says,

> "must continue to occupy the position of leadership in the profession. She may do bedside nursing. . . . She may be a hospital floor supervisor, or the head nurse of a nursing unit or a wing of a hospital, supervising the work of several other nurses; she may be director of a department of nursing or of a hospital's school of nursing; she may become a teacher of nursing; she may undertake special studies with the object of specialising in public health, anæsthesia, industrial nursing, medical social service, or hospital administration."

There are many nursing procedures, however, which need not be performed by a registered nurse, and he goes on to analyse 150 nursing practices which he assesses as suitable only for the registered nurse, or else as capable of being done by the practical nurse. All which fall under the heading of "control and supervision" are assigned to the registered nurse; they include supervision of all nursing services and ward staff, charting, preparation of patients for surgery, postoperative care and care of patients during recovery from anæsthesia, preparation of emergency trays, care of poison cupboard and medicines, supervision of linen and supplies, the serving of special diets, isolation technique, and reports on accidents and unusual occurrences. Under the heading of administration, however, only 2 out of 15 duties are assigned to the registered nurse: these are the writing of reports on staff shifts, and the task of reporting a patient's condition to the doctor. The practical nurse is given the jobs of receiving new patients, disposing of their clothes and valuables, looking after them at the time of discharge, preparing accounting reports on ward charges, answering telephone calls, taking messages, answering patients' signals, receiving visitors, delivering mail, arranging flowers, requisitioning supplies, drugs, and linen, and filling in routine slips for the examination of specimens. The practical nurse also undertakes the entire 24 duties listed under the headings of housekeeping and transport, which include regulation of heat and light for patients, supervising porters and ward maids, the lifting, turning, and carrying of patients, and the transfer of patients to the theatre and back. All the duties of assisting the physician—with dressings, transfusions, bladder irrigations, and other ward operations—fall to the registered nurse, the practical nurse only being required to furnish equipment and supplies.

The section of most interest is that headed "care of the patient": here, out of 64 procedures, 46 fall to the practical nurse and only 18 to the registered nurse. Those reserved for the registered nurse include preparation of fracture, traction, and cradle beds; nasal and rectal feeding; preparation of instrument trays; hot packs; cupping; the dressing of bedsores; eye, ear, and nose irrigations; the care of drips; and the giving of medicines and injections. The practical nurse, however, can undertake bathing and bedmaking, the serving of food, the feeding of infants and preparation of their food, the giving of bedpans and simple enemas, temperature-taking, poulticing, the care of the head, and routine treatment for scabies and the exanthems. Dr. Golub also suggests that the practical nurse could assist in other hospital departments, such as the nurseries for newborn infants, the special-diet kitchen, the occupational therapy department, and the theatre.

His analysis does not of course apply fully to British hospitals, because the nursing techniques differ a little. But in general the picture is the same; and it is enlightening to be told that of 150 common nursing practices 97, or 65%, do not need the attention of a highly qualified sister, but can be safely undertaken by girls with a much simpler practical training.

PSYCHO-ANALYSIS ILLUSTRATED

NOT only the general public but many doctors are curious to know what goes on in the psycho-analyst's consulting-room; for here is a branch of medicine which cannot be demonstrated to a class of eager students, or even to the solitary clinical assistant. Dr. Berg[1] has therefore done many of us a service by ringing up the curtain on those secret sessions and telling us exactly what one patient said and—which is more to the point—what he replied, or didn't reply. He does it cheerfully and competently, cleverly postponing his revelations, and presenting his tale with the skill of the natural storyteller. What the reader thinks about psycho-analysis at the end of it will no doubt depend on the bent of—or bends in—his own personality. In the case discussed, analysis was successful; and the situations revealed were of the kind which Freud has taught us to expect. Yet even Dr. Berg finds analysis puzzling at times. In theory, a man should benefit from an honest attempt at self-knowledge, from peeling off his layers as Peer Gynt peeled the onion; in practice, some do but some don't. Even if current interpretations of mental mechanisms are accepted fully, it is clear that an understanding of them will not, in itself, put the mind at ease. As Dr. Berg says, "insight alone is rarely sufficient to bring about more than very slight amelioration, and sometimes with the fullest insight amelioration of symptoms is the slightest." He attaches much importance to the emotional release which in this successful case accompanied the growth of insight; and the reader is tempted to wonder whether the emotional release without the insight might not be equally effective; or at least whether the same favourable result could somehow be achieved with less trouble and expense.

ROYAL SOCIETY

IN the list of 24 new Fellows of the Royal Society we are glad to see the names of several members of the medical profession and several others closely concerned in its work. Surgery is represented by Mr. Geoffrey Jefferson, F.R.C.S., professor of neurosurgery at Manchester, whose election will give much pleasure to his fellow clinicians. There are two biochemists (Prof. E. J. Conway, M.B., of Dublin, and Prof. H. A. Krebs, M.D., of Leeds), a member of the staff of the Imperial Cancer Research Fund (Dr. James Craigie), a physiologist (Dr. W. S. Feldberg, of Cambridge), and a geneticist (Prof. C. H. Waddington, SC.D., of Edinburgh). Among the three women now elected we are particularly happy to find Miss Muriel Robertson, D.SC., head of the department of protozoology at the Lister Institute.

THE Minister of Labour and National Service has nominated Mr. G. P. BARNETT, one of H.M. deputy chief inspectors of factories, to be chief inspector in succession to Mr. H. E. Chasteney, whose death was announced in our issue of March 8.

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[1] *Hospitals*, Chicago, January, 1947.

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[1] Deep Analysis. By Charles Berg, M.D. Lond., D.P.M., physician to the British Hospital for Functional Mental and Nervous Disorders. London: Allen and Unwin. Pp. 261. 12s. 6d.

Boarding-out too has its dangers, as everyone knows; but in some cases it leads to happy adoption. Yet some voluntary societies (as Lady Allen of Hurtwood has pointed out[2]) discourage adoption, and one at least insists on a boarded-out child returning to the home at 16 for trade or occupational training, even though the foster-parents have come to regard him as their own child and wish to have a hand in settling his future. This is carrying responsibility almost into the realm of officiousness. Certainly adoption needs to be arranged with the greatest care, and foster-parents for boarded-out children must be chosen scrupulously; and certainly the sight of a houseful of sleek and happy children is more impressive to the casual visitor than a page of figures showing children successfully boarded-out. But the well-being of children is a subtle thing, not to be assessed easily from appearances. It would be unfortunate if this memorandum shook confidence in the Curtis Committee's findings.

GLOBIN OR PROTAMINE INSULIN?

GLOBIN insulin was originally introduced as a delayed-action insulin intermediate in time of action between soluble insulin and protamine zinc insulin. There was the further advantage that globin was cheaper and more readily obtainable than protamine. In spite of these claims it has not yet been widely adopted in Great Britain, though our American colleagues have been more enthusiastic. In a renewed attempt to clarify the issue, two American workers[3] have compared the action of these two insulins in 84 diabetics, several of whom were studied on more than one admission, thus giving a total of 97 hospital admissions. During the investigation the patients were kept in hospital and received a constant diet. Frequent blood-sugar estimations were made. When all the relevant data were assessed—blood-sugar curves, hypoglycæmia, and the patient's general state—it was found that, on the same doses, 65 were controlled better with globin, 25 with protamine zinc, and 7 equally well with the two insulins. Composite curves drawn from the average blood-sugar levels at different times of the day showed that the fasting blood-sugar was the same with the two insulins, but at every other time (i.e., 9 and 11 A.M., 1, 4, 7, and 11 P.M.) the blood-sugar was higher in patients receiving protamine-zinc insulin than in those receiving globin insulin. With globin insulin the blood-sugar returned to normal limits before lunch, supper, and midnight, which it never did with protamine zinc insulin. Glycosuria was significantly less with globin than with protamine zinc insulin; and, though the incidence of hypoglycæmic reactions was low with both insulins, only one mild reaction was recorded with globin, compared with three mild and two moderate reactions with protamine zinc.

It is often said that globin insulin is unsatisfactory because, if given in the morning, it does not control the blood-sugar during the following night. Roberts and Yater do not bear this out, for the fasting blood-sugar was the same in patients receiving the same number of units of globin and of protamine zinc insulin. In this country a combination of soluble insulin and protamine zinc insulin is often prescribed, on the principle that the rapidly acting soluble insulin will control the blood-sugar until the protamine zinc insulin comes into action. This combination often works in practice, but many patients find it more difficult to give themselves a single injection consisting of different volumes of two insulins than two separate injections of soluble insulin, morning and evening. Another disadvantage of protamine zinc insulin is that when given in the morning it may induce hypoglycæmia during the following night, when it may not be discovered until the patient has been in coma for several hours. With globin insulin this risk is minimised since hypoglycæmia is most likely to occur during the afternoon. There will always be diabetics who cannot be satisfactorily controlled with single daily injections of either globin or protamine zinc insulin. For these Roberts and Yater suggest two injections daily of globin insulin—one (70%) in the morning and the other (30%) about 3 P.M.

MANAGEMENT OF EMPYEMA

THE treatment of empyema has suffered from the failure to distinguish the various forms of pleural infection. This was clearly brought out in a discussion at the Royal Society of Medicine opened by Mr. R. C. Brock and Mr. T. Holmes Sellors on Feb. 5. It should be obvious that an acute and diffuse inflammation in the early stages requires different handling from a long-standing localised purulent collection, but since the introduction of chemotherapy there has been a tendency to concentrate on the sterilising effect and ignore the final healing processes.

The influenza pandemic of 1918 brought out very clearly the dangers of ordinary drainage in the early stages of empyema, and Graham's work showed that the patient already suffering from an acute pulmonary inflammation could ill support the addition of an open pneumothorax. The lessons then learnt resulted in delayed drainage being employed after preliminary and repeated aspiration had reduced the volume of the original pleural infection. An intercostal tube and closed drainage had a considerable vogue along with various methods of tidal irrigation and drainage, but the basic principles of treatment were not always fulfilled and results were often poor. Failure to remove the products of inflammation completely or to establish adequate and continued drainage were—and still are—responsible for chronic empyemata and consequent grave disability. The healing process or obliteration of the cavity has been greatly helped by physical treatment which by stimulating inspiratory efforts encourages lung expansion. Breathing exercises can play a very valuable part in chest work, but the most assiduous attention and concentration are required if they are to achieve their aim—the restoration of complete respiratory function.

The sulphonamides and penicillin have had a dramatic influence on the primary cause of empyema—pneumonia—but how far they have affected the incidence of empyema is still doubtful. In most cases penicillin will control the virulence of the pleural infection, and it is here that the drug is most valuable. The pleural fluid can often be sterilised by the injection of penicillin in suitable concentration after aspiration. Repeated aspiration and injection, persisted with along the lines suggested by Fatti and his co-workers,[1] can produce good results, but in the later and more localised forms of empyema the value of penicillin therapy is more doubtful, unless it is supplemented by orthodox drainage methods. Neither penicillin nor any other known drug will close an empyema cavity, though it may sterilise the contents. Established abscesses contain masses of debris and fibrin which cannot be removed through an aspirating needle or even an intercostal tube. Here it is more satisfactory in the long run to follow the standard principles of surgical drainage. In draining a localised pleural abscess the actual rib-resection should afford room not only for a wide-bore tube but for removing all fibrin masses and inspecting the interior—in short, for an efficient pleural toilet. The drainage-tube must be carefully sited to permit of gravity drainage and kept in position until the empyema cavity has been completely obliterated. During closure pleurograms enable the surgeon to visualise the shape and size of the cavity and make adjustments as required.

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[2] *Times*, Oct. 21, 1946.

[3] Roberts, J. T., Yater, W. M. *Ann. intern. Med.* 1947, 26, 41.

[1] Fatti, L., Florey, M. E., Joules, H., Humphrey, J. H., Sakula, J. *Lancet*, 1946, i, 257, 295.

doctor and one dispenser to work on Sunday. The hour after lunch is most convenient because the dispenser can make up medicines brought in by other doctors having morning visits.

Apart from the ordinary surgery hours, each doctor would have one or more special sessions each week to which others at the centre may refer cases. Each case would be seen by appointment, the appointment book being left open for any of the doctors to make an entry.

The dental surgeon would have his own department, but would share the waiting-room and minor surgical department (for extractions), and share the staff, one member giving her whole time to him.

The physiotherapist would have his own department and share waiting-room and staff. Dispensers would be organised so that two were on duty from 9 A.M. to 7 or 8 P.M., meal-times being staggered so that one was always on duty. Receptionists and nurses would have staggered hours too, so that one at least was on duty each day for the six weekdays. Secretaries and cleaners would work the hours usual for offices.

Arrangements must be made for a rota of duty hours for doctors for emergency calls out of hours. As an anæsthetic is occasionally required, or the doctor on duty is busy with a case when another urgent call comes, two doctors should be on duty at a time, the second acting as deputy or assistant to the first. Illness, epidemic, and holidays must be covered by drawing on the locum pool. If doctors are to be adequately employed it is quite unfair to expect them to do another's work.

Communication with the doctor on duty should be by telephone, with facilities granted by the Post Office telephones. The doctor's telephone should be that of the health centre only. Calls out of hours should be taken by the Post Office and connected to the doctor on duty. The Post Office would be supplied with the lists from each centre. This arrangement is used in America and could easily be adopted here.

Monthly meetings of the doctors, at which the senior would preside, would undertake the ordinary business of the centre. Other workers at the centre would be able to bring any business which concerns them.

THE CENTRE

Two waiting-rooms will be needed (*a*) for ordinary surgery hours, and (*b*) for special consultations, dentist and physiotherapist. Each will require lavatories. During children's sessions one room should be used for children and one for adults.

The waiting-rooms should be large and airy. Patients don't look at pictures and hardly ever read notices. They abhor the wireless. There should be plenty of chairs and a small table with pen, ink, and blotter. The name of the two doctors at surgery should be on their respective doors of waiting-room (*a*). The patient should show his card to the receptionist and receive a numbered disk in return so that his turn is assured. The disks for the two doctors should be coloured differently, the colour being indicated under his name on the door. The receptionist takes out the record card of each patient and carries a batch to the doctor when signalled to do so.

In waiting-room (*b*) the other receptionist—or secretary or dispenser when only one is on duty—admits the patient, takes the name, confirms the appointment, finds the record card, and in due course notifies the doctor or dentist concerned. The patient is then shown into the appropriate room. There should be a telephone in each room for intercommunication.

Four consulting-rooms will be needed—two opening on to waiting-room (*a*) and two convenient for waiting-room (*b*). An examination-room should be placed between each pair of consulting-rooms, with access to both. There should be an X-ray and physiotherapy room, three rooms for the dental surgeon, one minor-surgery theatre, one rest-room with two beds, one pathological laboratory, and a large office.

The staff and the doctors would each have a room, with lavatory attached. A caretaker's flat should be incorporated, while outside should be a car-park and an under-cover bicycle park.

Health centres should be no farther than two miles apart in the large towns and should be placed where there are good transport facilities.

A PLANNED PSYCHIATRIC SERVICE

"PSYCHIATRY is the personal aspect of medicine." The regional medical advisory committee of the Nuffield Provincial Hospitals Trust have lately received a report from their subcommittee on psychological medicine in which this personal aspect is considered in its three manifestations—somatic, psychological, and social. Regional planning of psychiatry, the subcommittee suggest, can be considered under the heads of day-to-day practice, preventive psychiatry, and treatment.

In day-to-day practice there are five main types of case, needing different types of building and equipment. The serious mental disorders need mental hospitals; the neuroses need outpatient clinics, neurosis centres, psychiatric units, and wards or beds in general hospitals; defectives need colonies; difficult or delinquent children need children's departments staffed with social workers and educational psychologists as well as psychiatrists; and, finally, cases of psychopathic personality—habitual offenders, drunkards, and other social misfits—may need all these services for themselves or their children, as well as the help of well-trained social workers to maintain links between the psychiatric service and other social organisations.

These services can be dispensed mainly from three types of centre—the mental hospital, the associated psychiatric department in a neighbouring general hospital (offering both inpatient and outpatient care to adults and children), and the neurosis centre. The report, taking the incidence of serious mental disorder as 3·9 per 1000, and the optimum size of a mental hospital as 1000, suggests that 250,000 is a convenient body of population to be dealt with by such a triad. In the Berks, Bucks, and Oxford region there are three triads of the kind, at Oxford, Reading, and Aylesbury. Some 1100 new mental-hospital beds, it is estimated, are needed, and the subcommittee suggest that these should be provided in a new mental hospital in the Windsor-Slough-Maidenhead area; this, in conjunction with established general hospitals and a small new neurosis centre, would provide a new triad for this heavily populated area. The existing triads would also need completing in some respects: Oxford and Reading need psychiatric units in general hospitals, and Reading still lacks a neurosis centre. Proposals for a colony for neurotics have been studied with sympathy, but the subcommittee do not at this stage recommend that such a colony should be set up. For mental defectives, however, they feel a new colony, admitting some 2000, should meet the needs of the region.

The difficulties of providing psychiatric treatment for children are more complex. They suggest that a child-guidance centre, mainly educational, under a psychologist, and controlled by the education authority, can act as a filter for children who, though referred for poor school work, are in fact psychiatrically ill; these could be sent on to a child psychiatric clinic under the health authority. Psychiatrists from the clinic should attend as consultants but not as administrative officers at the child-guidance centre, and educational psychologists could be exchanged on the same terms with the psychiatric clinic. Each would thus have a share in the work of the others, and maintain close personal touch. The

Special Articles

A GROUP PRACTICE

S. C. ALCOCK
M.B. Edin.
PRESIDENT, BERKS PUBLIC MEDICAL SERVICE

THE new health service will mean vast changes in the administration of medicine, but the doctor's work will remain precisely the same. After some years' experience there may be alterations in the nature of the work performed by individual doctors, but at the moment we are only concerned with the commencement of the scheme.

Doctors can be divided into three classes: (1) specialists, (2) general practitioners, and (3) whole-timers. Under the new scheme the whole-timers will continue to do the same work in the same places as at present and the specialist will be based on a hospital. It will be left to the general practitioner to staff the new health centres, and these places will in fact become the new doctors' surgeries. The main change in the new scheme therefore will be to separate the doctor's residence and his place of work.

General practice has altered in the last 25 years so as to provide a group-practice service which has largely replaced the single-handed practitioner. In some smaller towns the group or partnership comprises all the practitioners in the town. This change in the manner of general practice has led to another important change. With the widening field of medicine a stage has been reached when it is beyond one man to cover the whole field. The larger partnerships have thus become partnerships of minor specialists as well as general practitioners; indeed the general practitioner coming into a large partnership often starts his life with extra qualifications or diplomas, or special experience in one of the branches of medicine.

This general trend will determine the type of work and the nature of the staff of the new health centre.

ADDITIONS TO THE ORDINARY G.P. WORK

It is to be hoped that a national service will bring closer together the three main sections of the profession—the consultant, the G.P., and the M.O.H. This being so, the scope of the G.P. will be widened. The obstetricians who are to attend labours will be able to do their own antenatal examinations, while child welfare will be passed to the pædiatrician. Those surgically inclined will require a theatre for minor operations and a rest-room. Doubtful fractures and malpositions of the fœtus should be confirmed by radiography on the spot, without in any way attempting to replace the function of the specialist radiologist. Facilities for simple blood chemistry and microscopy must be provided too. There will be a place for the dental surgeon and the physiotherapist at the health centre. The dental surgeon will need to share the operating-theatre and the radiographic facilities, besides having his own department.

SIZE AND TYPE OF UNIT

The size of the unit will depend solely on the number of G.P.'s employed there. There will be no provision for outside specialists, because there will not be enough of them to visit all health centres, nor the apparatus they require for their detailed investigations.

In the less populous areas the size of the unit will vary from one doctor upwards to the ideal number of about six. In the compact areas of the great cities this number may conveniently be exceeded considerably, but I believe six to be the best number to start with in the towns and usually in the cities. Where fewer than six doctors are working, there would have to be a corresponding reduction in staff and accommodation, but the centre here described should be regarded as a model to approximated as nearly as facilities permit.

Minor differences in the type of centre will occur in the great cities. I cannot imagine that the same type building or furnishings will succeed equally in Mayfair and Whitechapel. The day is rapidly approaching when they will, but it is not here yet, and planners must keep in mind that the primary object of a health centre is to get people to go to it.

PERSONNEL

Where six doctors are to work together, and where the medical interest of each differs to some extent, it is impossible to imagine that they can work as individual practitioners. The health centre must therefore be a large partnership where patients are accepted by the centre and not by the individual doctor. This would not in any way preclude a patient attending the doctor of his choice whenever that doctor is available. For the organisation to succeed there must be a chief doctor who will assume responsibility for the working of the entire unit and everyone in it. Even with the other doctors there should be some system of gradation of seniority, especially in respect of the mature doctor and the newcomer straight from hospital. These considerations would entail differences in remuneration.

Though the special interests of the doctors need not be similar in each health centre, I suggest a suitable arrangement would be:

1 surgeon.
1 physician.
1 gynæcologist-obstetrician.
1 pædiatrician.
1 anæsthetist.
1 oculist.

One or two of them will undertake the minor radiology or minor pathology.

It must be remembered that all these doctors are essentially G.P.'s. The surgeon would not undertake major surgery; the gynæcologist-obstetrician would not do his own cæsareans; nor would the oculist do much more than refraction work. I believe, however, that all these doctors should have an opportunity to work as registrars or clinical assistants at the hospitals. Dispensing would be undertaken at the centre and thus the personnel can be determined as:

6 doctors.
1 physiotherapist.
1 dental surgeon.
3 dispensers }
2 receptionists } one to act as manager.
2 secretaries }
2 nurses }
Cleaners and caretaker.

ORGANISATION OF THE WORK

The main purpose of the health centre is to provide a place where patients are able to see their G.P. This means the arrangement of consulting hours. After 25 years I have found that 2 consulting hours a day for 3 days a week is convenient for patients and gives the doctor ample time to see special cases—i.e., those referred by other members of the centre—and to visit his patients too. With six doctors working in pairs, consulting hours would be thrice daily as follows:

	Morning	*Afternoon*	*Evening*
Monday	A.C.	A.E.	C.E.
Tuesday	B.D.	B.F.	D.F.
Wednesday ..	A.C.	A.E.	C.E.
Thursday	B.D.	B.F.	D.F.
Friday	A.C.	A.E.	C.E.
Saturday	B.D.	B.F.	D.F.

The obstetrician and pædiatrician should have afternoon sessions, since these are most convenient for women and children and most inconvenient for workers. Arrangements for the others must fit in with their other commitments—e.g., at hospital. There must be a rota for one latest statistics. Nor do I recall any evidence of, or reference to, a higher incidence among females over 15 years of age in any way comparable with the figures quoted above.

It may be that, among the strains of *C. diphtheriæ* now prevalent in Germany, there are some towards which the population has had little chance of gaining immunity and to which adults are as susceptible as children. The protection conferred by artificial immunisation gives a relative immunity to younger members of the community, so leading to the abnormal age-distribution. It may not be altogether far-fetched to postulate a higher degree of female susceptibility, as there are undoubtedly diseases, not all of them infectious, where a differential incidence between the sexes is well marked.

Unfortunately the present difficult circumstances preclude the typing of *C. diphtheriæ*. The director of the local bacteriological laboratory, Dr. K. Schlirf, of the Landes Hygiene Institute, is familiar with the work of MacLeod and his colleagues but, through lack of time and materials, cannot carry out the necessary investigations. He believes the common strain to be *gravis*, but his opinion cannot be based upon up-to-date work.

If the foregoing suggestions are true, a similar situation in respect of age- and sex-distribution is likely to develop in England. This raises the question how often artificial immunisation should be repeated to maintain reasonable protection of the population at all ages.

SUMMARY

Notified cases of diphtheria in Land Oldenburg during the autumn and winter 1945–46, grouped according to age and sex, showed a higher incidence over than under 15 years of age and among women than men.

These findings were not due to abnormal external conditions but had been observed for some years in Germany.

The question is discussed whether this is due to artificial immunisation of children, increasing the number of carriers and so affecting a rather susceptible adult population, or to the presence of a strain of *C. diphtheriæ* readily attacking all age-groups, against which artificial immunisation had protected the younger members of the community.

The possibility of special susceptibility of females is also discussed.

Similar findings may be reported later in the United Kingdom.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED MARCH 15

Notifications.—Smallpox, 2; scarlet fever, 1336; whooping-cough, 2407; diphtheria, 184; paratyphoid, 5; typhoid, 6; measles (excluding rubella), 11,269; pneumonia (primary or influenzal), 1076; cerebrospinal fever, 107; poliomyelitis, 5; polioencephalitis, 0; encephalitis lethargica, 1; dysentery, 73; puerperal pyrexia, 148; ophthalmia neonatorum, 78. No case of cholera, plague, or typhus was notified during the week.

Smallpox.—Of the 2 cases of smallpox, 1 was notified at Grimsby, and the other in London.

Deaths.—In 126 great towns there were no deaths from enteric fever. 2 (0) from scarlet fever, 3 (1) from diphtheria, 19 (0) from measles, 22 (1) from whooping-cough, 97 (9) from diarrhœa and enteritis under two years, and 80 (10) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 317 (corresponding to a rate of 30 per thousand total births), including 40 in London.

Smallpox

Up to March 24 1 further case was notified. This was in a man under observation as a ward contact with the earlier London case. The patient was revaccinated on March 9. On March 20 a sparse eruption developed. On March 21 he was transferred to the Surrey County Isolation Hospital.

In England Now

A Running Commentary by Peripatetic Correspondents

WITH the recent ministerial pronouncement that a thatched roof has as many virtues as one of slate or tile, no-one will be surprised if we are asked to forgo damp-proof courses to save impervious materials, have mud floors to ease the timber scarcity, and make candles the normal source of lighting to reduce the call on electric fitments and power. Indeed, we may be persuaded to return to the old conservancy system of the privy or the family pail, particularly so if the Ministry of Agriculture joins forces with the Ministry of Health in a combined operation to enliven the compost heaps of England. Here, by one enactment, would be brought about a greater garden fertility and an increased vegetable production, so leaving our cramped shipping space for the importation of peaches, grapes, and nectarines, which seem to have replaced potatoes, turnips, and carrots in the greengrocery shops of this topsy-turvy world.

* * *

The elderly farm-worker shook his red-tasselled night-cap at the predicted thaw. I took his cue and prepared a lengthy visiting-list for the morrow. The day came cold and dull, and over a chilly picnic lunch snow was seen falling on the hills. By the time the weekly country surgery for the upland villagers was over the snow was driving and drifting. Within a mile I had to call six P.O.W.'s to clear an ever-increasing drift. Seven miles home, but a fifteen-mile round still to be done. The blizzard was now a fine horizontal hail which stung the face between car and farmstead. As darkness fell the headlamps showed only a fast-moving wall of snow, which called for halts to find the roadway.

Wednesday revealed a heavy fall steadily increasing. An early message to the only garage with a jeep quickly brought the proprietor and the chariot to the door with his assurance that he was glad to help a medical man. A parturient mother five miles away proved that the night's fall had blocked all four possible roads, and after two hours spent exploring either bank of the river I did the ten miles in four hours with spades and willing helpers. in spite of blizzard conditions. An evening hospital call—a strangulated hernia—coincided with the last of the snowfall.

A market-day round of the town on foot next morning proved that all transport was at a standstill. But a call from a man with a shoulder injury brought the jeep out again and four miles of drifts were negotiated to the rendezvous—a crossroad inn—where eight weary bread-carriers who had somehow been stowed behind were disgorged. The return was uneventful, though my sitting casualty looked rather white, and he revived on hot sweet tea from the halfway village store.

A sunny Friday called for a journey with the midwife to a hypertensive *multigravida*. Five miles through a snowbound countryside beside the half-frozen river teeming with duck, with the sun frigidly outlining the distant Welsh hills; then a mile and a half plodding over the deeply covered field-paths. After deliberation the mother agreed to the proposed journey, which no ambulance could attempt. A slow undulating tramp for an 11-gravida who had not passed her doorway since the January fall of snow.

The week closed with a call from an unknown Northern tertigravida, who was at term, with a bad history. No nurse could reach her. The forest lane to her new home had been snowbound for six weeks. A visit to the road-surveyor brought the promise of a bulldozer. By tea-time the three-mile up-hill job was done and my jeep reached the door. As I write she is in labour, having been collected by more orthodox means down the snow-cleared lanes.

This brilliant Sunday morning brought some thaw, and a failing heart was reached after three miles of highway and five of gated field, stockyards, and orchards. In the 100-acre field the jeep was in her element. Reconnaissance was good—my gardener was born in the parish.

This afternoon a post mortem for the coroner, on a body brought seven miles by bearers and twelve by military lorry (a climatic casualty), was interrupted by three calls from an April-due primigravida—a journey of eight miles, four by tractor-marked surfaces followed by subcommittee advise against psychiatric organisations exclusively for children, because they lead to specialism within a specialty and perhaps to loss of a balanced view of children's disorders and difficulties.

They wish to see departments of preventive psychiatry set up, analogous to the present local-authority departments of health—that is, primarily administrative, statistical, and social, but not clinical. They touch on the possible appointment of a medical officer of mental health, but without enthusiasm. If appointed, they say, he should not hold a position of authority in hospital administration. Psychiatry should be taught, they consider, in a psychiatric teaching unit in the university, on the same footing as internal and social medicine. The unit should be concerned mainly with postgraduate teaching and research, but should also teach undergraduates in the hospitals which provide the psychiatric service.

The subcommittee rightly insist that there must be no watertight compartments: though the units in the service should be largely autonomous, their policy and the broad general lines of their form should be discussed and decided at the regional level. A single group of doctors should serve the component hospitals of each triad, and should interchange work with each other and with the doctors of the mental-deficiency colony. Their common meeting-ground would be the psychiatric department of the general hospital. The plan is essentially simple, but it provides for that close nexus between the component parts of a regional psychiatric service which so far has been lacking—and not only in Berks, Bucks, and Oxon.

Public Health

AGE AND SEX DISTRIBUTION OF DIPHTHERIA

IN OLDENBURG, GERMANY

J. V. WALKER
M.D. Birm., M.R.C.P., D.P.H.
LIEUT.-COLONEL R.A.M.C.

BETWEEN Oct. 1, 1945, and Feb. 28, 1946, 3538 cases of diphtheria were notified in Land Oldenburg, an area somewhat larger than Lincolnshire, with a population of about 750,000, and for the most part flat and low-lying, mainly given over to agriculture and dairy farming, with two cities of about 100,000 inhabitants, one of them severely damaged by war operations. It may be taken as a typical region of the North German plain, and the age- and sex-distribution of diphtheria described below are shared by the adjacent area administered from Aurich.

The distribution according to age and sex was as follows:

Age (yr.)	*0–5*	*6–15*	*16–25*	*26–35*	*36–45*	*46–65*	*Over 65*
Males	392	276	319	121	71	52	11
Females	353	363	881	376	171	143	9
Total	745	639	1200	497	242	195	20

Of the total number of notified cases, 2154 (60·9%) were 15 years of age and over, as compared with 30·9% in 1945 in U.K.[1] At all ages over 5 years until the latest age-group, females were more numerous than males, giving the following percentages:

Age (yr.)	*0–5*	*6–15*	*16–25*	*26–35*	*36–45*	*46–65*	*Over 65*
Percentages	47·4	56·8	73·4	75·7	70·7	73·3	45·0

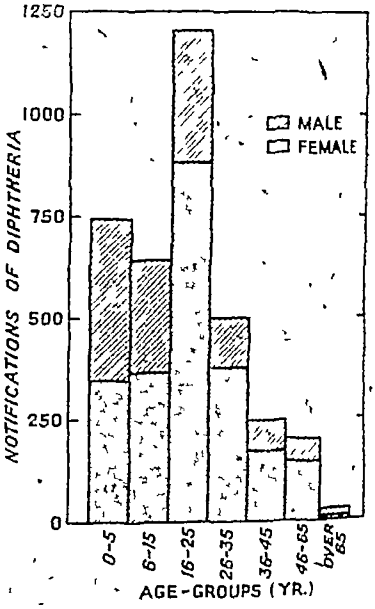
The relative distribution according to age and sex may be better appreciated from the accompanying figure.

The fatality-rate presented no unusual features; was higher for the most part than in U.K. in 1945[1]:

Age (yr.)	*0–5*	*6–15*	*16–25*	*26–35*	*36–45*	*46–65*	*Over 65*
Fatality-rate in Oldenburg	14·2	2·3	2·1	2·2	4·6	5·6	35·0
Fatality-rate in U.K., 1945	7·7	3·5	1·4	3·8			

The fatality-rate showed no significant features between the two sexes (6·4 males, 4·6 females).

During the period concerned diphtheria was common and was evenly distributed throughout the Land, at no place reaching epidemic proportions. The weekly notification-rate reached a maximum of 28·5 per 100,000 of population for the week ended Nov. 10 and again rose to 27·3 per 100,000 for the week ended Jan. 5. Between these periods it averaged about 20 per 100,000, and since January the rate has steadily fallen.



Age- and sex-distribution of diphtheria cases in Land Oldenburg.

Though living conditions in north-west Germany were, throughout the period under discussion, highly abnormal, there is no evidence that the epidemiology of diphtheria was particularly influenced by any factor, and the age- and sex-distribution described above have been, according to the medical officers of health of the area, observed during the last few years. Until the later thirties diphtheria was uncommon in Oldenburg and did not until its recent recrudescence show its present features. Hitherto it had been much more frequent among children under the age of 15 years than among adults.

DISCUSSION

Two matters of epidemiological interest arise: the high incidence of diphtheria among adults relative to children, and the preponderance of female cases. The German medical officers of health explain both by reference to artificial immunisation of children. This has been introduced in recent years and is fairly widespread, 60% of children under the age of 15 years in Land Oldenburg having been immunised. It is argued that this has led to a higher incidence of virulent carriers among insusceptible children, with consequent greater risk to non-immune adults. Since during the earlier part of the century the disease was uncommon, immunising subinfection was uncommon also, and so the adult population is less naturally immune than in U.K. Moreover, since women have more to do with children than have men, the differential sex-incidence is explicable by the same cause.

Whether this can be accepted as a wholly satisfactory explanation is open to question. In some parts of the Land the proportion of immunised children is as low as 25%, but the age- and sex-distribution is the same everywhere. In England artificial immunisation has been practised since the early thirties and intensively since 1940, but no similar age-distribution is apparent in the

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1. *Lancet*, 1946, i, 754.

4. The significance of nursing and the importance of the nurse's part as a citizen and as a key person in the National Health Service and in her own hospital should be stressed, so that the nurse in training has a sense of pioneering, of adventure, and of social importance.

5. A diversity of post-certificate courses up to university level should be planned to succeed the basic course, and these would precede promotion and specialisation.

As to anatomy, physiology, and psychology, these terms should disappear from the basic course (if only because they lose their meaning unaccompanied by the experimental studies which nurses cannot undertake). In their place the structure and function of the living body and mind should be studied, and should be taught in non-technical language by experts (not necessarily doctors or nurses, unless they are in fact experts) willing to give the very large amount of time and energy necessary for this type of teaching. The best illustration I know is Sir Arthur Keith's *Engines of the Human Body*, lectures given to a juvenile audience at the Royal Society; and what a lot of trouble he must have taken over them!

The application of this knowledge should be at the bedside. It should include recognition of surface markings necessary for treatment: e.g., location of orifices; recognition of failure of function due to structural defect and damage (the mouth no longer self-cleansing, the skin unable to maintain its resistance against pressure, the heart no longer an efficient pump, the blood depleted of its oxygen); recognition of behaviour influenced by fear, suspicion, and pain (the patient operated upon for cataract suddenly plunged into outer darkness).

All these are matters for an expert educational body, which could draw upon the special knowledge possessed by members of the General Nursing Council. Most nurses would probably agree that the time has come to link up the education of nurses with the general educational system of the country.

G. B. CARTER.

SIR,—You put forth a proposition which opens up an important question:

> "Education, alike for medicine and for nursing, should, we suggest, be directed towards the good of the sick—not towards advancing the status of nurse or doctor."

But the status of the nurse is in fact in danger at present. The tendency is to regard her from the industrial standpoint and to concentrate attention on such matters as hours, wages, and what is virtually output, as though she were a producer; and to limit her education at the same time to just what is necessary to carry out bedside nursing.

But a nurse is not a producer; she belongs in a very good sense to the class of the guardians of the people. Accordingly she herself and all connected with her welfare should resist the attempt to lower her status to that of the artisan. On this view the broadest life, the widest outlook, and the best education should be hers; nothing ut good should flow into eye and ear; and the aim f her teachers should be to produce first a good nurse nd next a good woman.

If the difficulty in recruiting nurses were approached rom the standpoint, "What can I put into her?" nstead of "What can I get out of her?" then the ifficulty would most likely dwindle and disappear. f the worst thing in the past were to treat her as a nun, he worst thing at present is to look upon her as an rtisan.

The complaint cited in your page, sir, that the nurse of today is not being trained primarily to care for the sick, comes, one notes, from an American source. To the best of my knowledge and belief there is no deterioration in the nurse's care of the sick in this country. It might be maintained that if nursing were raised to the highest status there would still not be enough nurses. In that case two classes of nurse would be necessary, one with the equivalent of an honours and one with a pass degree: but one hopes that this would not occur.

H. ST. H. VERTUE.

TYPHOID-PARATYPHOID (VI) VACCINE

SIR,—It was interesting to read in the *Bulletin of Hygiene* last September (p. 615) the résumé of an article by Ruiz Merino[1] on a new typhoid-paratyphoid vaccine with brilliant green, for which better results are claimed both in animals and in humans than with alcoholised, phenolised, or other types of vaccine. If this and other advantages are confirmed the vaccine will undoubtedly be a great help in the fight against enteric fever, particularly in the tropics.

Some time ago, in an attempt to find out if an effective typhoid vaccine with potent Vi antigen could be produced without alcohol, which was very expensive at that time, I tried several chemical and physical methods to kill the organism without affecting the Vi antigen. The simplest and most effective method found (brilliant green was not tried) was to sterilise the bacterial suspension with merthiolate, which was subsequently used in weaker concentration to maintain sterility—the principle used by Felix in his alcoholised vaccine. The effective concentration for killing the bacterium was found to be 1 in 10,000, and the preservative strength 1 in 20,000 to 1 in 30,000. Rainsford tried higher concentrations and discarded the vaccine as unsuitable.

The vaccine was stored in the cold, and at intervals of about a fortnight it was agglutinated against pure Vi-agglutinating sera and was found to keep its Vi-agglutinability undiminished up to 4 months, with only a slight drop during the next 3 months. It compared very favourably with alcoholised vaccine prepared by Felix's method and stored under identical conditions. Its protective and agglutinogenic properties have, however, not yet been fully determined. A small number of people were inoculated with it, and its Vi-agglutinin response appeared to compare favourably with that following the injection of alcoholised vaccine.

No claim can yet be made that this vaccine is superior to others, except on the grounds that it is simple to prepare and reactions to injection are few, and only mild and transient.

Under post-war conditions it is not now possible to carry out any extensive investigation with this vaccine here, and we hope that workers more favourably situated may be interested in it.

Department of Bacteriology, College of Medicine, Singapore. N. K. SEN.

TREATMENT OF TUBERCULOSIS

SIR,—Your correspondent, Dr. J. V. Hurford (Feb. 15), is concerned lest undue emphasis be put upon my statement respecting the recovery of many patients from tuberculosis, who before radiography had been unaware of its presence and had not received any institutional treatment. He suggests that I base my opinion on the radiographic evidence of primary tuberculous infection rather than on post-primary progressive tuberculosis.

From a serial radiography of patients with tuberculosis I have learnt that we cannot assess the gravity of past disease from the present radiographic appearances. Though we can be amazed at the spectacular spread of the progressive disease, we can be perhaps even more amazed at the disappearance, or almost complete disappearance, of spectacular radiographic "lesions." We can see "minimal" calcified foci in the lungs of most patients who are suffering from acute bone tuberculosis. We have seen patients with such "healed" lesions develop progressive and even fatal tuberculosis. For these reasons I opposed the opinion of the advocates of mass radiography that such lesions should be ignored as if they indicated established immunity: they should call for advice and added care against any influence which might lower the resistance.

I fully support the views on the "old-fashioned" sanatoria so ably expressed by Dr. J. H. Crawford (Feb. 8) and Dr. Temple Clive (Jan. 25). The claim put forward, that with increased surgical and other interference the five-year survival-rate has increased, has little to support it. The number of deaths from pulmonary tuberculosis has been progressively declining with improvement in social conditions; it fell from 53,858 in 1910 to 27,176 in 1928—i.e., before these "heroic" measures were adopted. With the increased

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1. Ruiz Merino, J. *Rev. Sanid. Hig. publ., Madr.* 1946, 20, 469.

four of virgin snow. A fully dilated os, with no midwife, and the patient staying with friends, proves necessity the mother of invention.

So I turn another page of my B.-W. diary only to carry forward the unvisited mother of the mid-week. A message that the infant has a cold brings a fresh problem. The four roads are still closed, but the railway has been cleared, so I propose the midday train. By telephone a farmer has promised a tractor at the siding and the railway company a goods engine if I miss the return train. As I doze in the warm corner seat I wonder what the red-tasselled head will think of a visit by jeep tomorrow.

* * *

In thinking of the details of a national health service one sees that what is lacking is a comprehensive body of agreement as to what we want—in short, a philosophy. Without this we are but tinkering at various and differing parts of a system, dealing with a loose brick here, adding a cornice there, like a pack of jobbing builders. Our aim, as I see it, is to make it safe to live; but ultimately happiness and peace in living is more important than mere physical integrity. In our efforts to produce a healthy body do we think enough of the man within it? If he will, he can make hay of all our planning. Perhaps we had better take counsel with him.

* * *

From earliest Childhood, Albert South
Was given to Placing in his Mouth
Whatever Objects, square or round,
He saw reposing on the Ground.
His mother wept, his father said,
(Sending him, in Disgrace, to Bed),
" Don't pick up candy from the floor—
You don't know *where* it's been before."
His kind relations, each in turn
Bawled in his ear and beat his stern
But made no progress, even so,
Against his Oral Libido.
I cannot tell that Albert paid
The slightest heed to what they said;
He scavenged still, grew rude and wild,
More like a Pig Bin than a Child,
Turning from wholesome Bread and Butter
To Toffee Apples from the Gutter;
Until at last he chanced to meet
A Box of Tablets in the street.

* * *

The pills went down, the pulse went up:
He did not come to dine or sup—
And when his Relatives arose
They found him lying Comatose.
The great Consultants held out hopes
And squinted down Ophthalmoscopes,
Owning that Albert had them beaten
Unless 'twas something that he'd eaten—
Until that night, before the News,
They heard a Notice from the screws
That Mrs. B, the fast old witch,
Had dropped some pills in Putney, which,
Consumed unbid by medicos,
Might dorsiflex the taker's toes,
And persons having Information
Should Telephone the Nearest Station.
The Great Consultants all looked grim,
And each in turn remarked " That's him!"
And tried to resurrect young Bert
With Picrotoxin, and a Squirt.

MORAL

Learn from the Fate of Albert South
Not to put Salvage in your Mouth
(For Wholesome Children make no bones
About their Erogenic Zones)
But place it in the Bin close by—
And, should you ever Qualify,
When treating folk like Mrs. B
Don't let the Chemist make too free;
Don't dish out tablets by the Gross,
But stick her on a Weekly Dose,
For Doctors who their Powers abuse
May be Announced before the News.
(I wouldn't write this Sort of Stuff
If my Stipendium were Enough.)

Letters to the Editor

THE STUDENT NURSE

SIR,—The General Nursing Council's efforts to [illegible] what is " proper training " are hampered because [illegible] authorities have never decided what is the work of a nurse and how many nurses are required to do it. This is not to whitewash the G.N.C., for they should long have realised the difficulty and acquired the ne[illegible] powers to deal with it, or as you put it matched power with responsibility. In consequence we are faced with muddled situation whose dominating feature is that " student " nurses must undertake to perform the routine work of the hospital in return for teaching which may be quite inadequate and has never been properly planned on sound modern educational lines. The result is that a high proportion leave (up to 60% in many hospitals), and it looks as if we shall never know what a paradise for patients (and staff) a hospital run with fully trained personnel might be.

These methods date from 1860. All we have done since is to call the probationer a student nurse and pile upon her a more and more detailed study of anatomy and physiology and other things, without any reconsideration of what she wants it for or whether she wants it at all. On the one hand we have the dismal pronouncements of those who want nurses to be devoted and dutiful (and dull), and would cut out from their training everything thrilling in modern medical science—at a time when it is more exciting than at any time in its history. On the other hand we have the nurse educationists, who, feeling the limitations of their own anatomical education, would load the nurse with every facet of the vertebræ and the functions of the obscure thymus in the vain hope that thereby professional status will be advanced.

It is obviously impossible to change the present state of affairs overnight, but the time has surely come when the question of a curriculum and training programme for nurses belongs to national educational policy. It has become too large a matter for the General Nursing Council. I suggest that the Interdepartmental Committee (whose report is eagerly awaited), now sitting under the chairmanship of Sir Robert Wood, of the Ministry of Education, should form the nucleus of a commission entrusted with the task of preparing a training programme and curriculum for nurses. In this connexion the report on practical nursing of a working committee appointed by the United States Office of Education[1] and recently published is well worth study. Such a commission would have to take into account the fact that if patients are to get the attention they need there is room within the nursing profession for women of both simple and advanced educational attainments. Also that the hospital community, like a hotel or a household, requires much personal and domestic service which should be skilled but is not specifically nursing. These and many other considerations, still imperfectly understood, would influence the content of the curriculum and the manner of training.

In my judgment the curriculum and training programme, whatever the type of candidate, should have *the following features*:—

1. It should be intrinsically interesting and satisfying, even exciting to those who study it; therefore it must be flexible.

2. It should be possible, especially in the basic course, to make a distinction between teaching given to excite interest and stimulate further observation and study in those capable of it, and fundamental facts and skills on which the safety of the patient and the efficiency of his treatment depend.

3. Only the fundamental facts and skills should be the subject of compulsory examinations; these should be devised in the simplest possible manner but should demand high marking for pass.

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[1] Practical Nursing. An Analysis of the [illegible]
with Suggest[illegible]
(Misc. No. 8)
Division, Offi[illegible]
Government [illegible]

But the usual protein hydrolysates intended for therapeutic purposes are prepared from proteins of high biological value, such as casein, lactalbumin, and meat, by enzymic digestion with which there is no destruction of any essential amino-acid. If an acid hydrolysate is used (mostly for parenteral use) it is fortified with tryptophane and cystine to make up for that lost during hydrolysis.

In the light of these facts the remarks of the Gillmans about protein hydrolysates in general are hardly justifiable. It is likely that in infantile pellagra the primary requisite is something contained in 'Ventriculin,' in the absence of which the administration of large amounts of protein or protein hydrolysates may further tax the already damaged liver. It would have been interesting to try ventriculin together with a good pancreatic digest of casein or papaic digest of meat.

Bombay. G. B. RAMASARMA.

OF NOT SMOKING

SIR,—Your annotation of March 15 ran: "It is not easy to gauge the priority which tobacco may justifiably be given. . . . Unfortunately, there is no yardstick for the measurement of tobacco's virtues." You clearly did not consider it necessary to indicate what are tobacco's virtues.

In my view, based on 12 years as a cigarette-inhaler followed by 20 as a non-smoker, there is no virtue in tobacco-smoking, just as there is none in opium-smoking. Addicts of drugs, including tobacco, delude themselves that their drug possesses unique psychological virtues—e.g., the sustaining of morale. What the drug really does is to appease temporarily their craving; and craving for a drug is a psychopathic urge generated as a late action of certain drugs. As it is appeased, so also is it generated.

The facts that tobacco is a toxic and comparatively powerful drug of addiction [1] and that it is therapeutically useless warrant the conclusion that there is no justification for any expenditure on it whatsoever; also that it is our duty, as keepers of the nation's health, to abolish tobacco-smoking, on health as well as on economic grounds.

Wallasey. LENNOX M. JOHNSTON.

HAIR-BEARING SINUS

SIR,—In their article on the pathology of postanal pilonidal sinus (1946, ii, 484) Mr. Patey and Professor Scarff described a hair-bearing sinus found in a barber's hand. I recently encountered a somewhat similar case.

A man, aged 52, for many years a barber, came to hospital complaining of a painful swelling between the middle and ring fingers of the right hand. About six weeks previously he had noticed some hair-clippings lodged in a depression or fissure in the skin of the web, and had tried to remove them, using forceps, with apparent success. A week or so later he developed a painful swelling in this area, which had since varied a little in size. There was a red and tender swelling on the dorsum just short of the distal edge of the web between the 3rd and 4th fingers, surmounted by a small yellow area where a collection of pus was threatening to discharge. Extending proximally from it for about $^1/_2$ in. in the subcutaneous tissues was a firm and slightly tender track, which felt exactly like the tissue reaction around a retained wood splinter.

The hand was explored under general anæsthesia; using a tourniquet, the track was excised without much difficulty. During the dissection, however, it seems likely that the track was opened, for three fragments of hair, each about 3 mm. long, were discovered. Section showed a typical foreign-body granuloma with aggregations of giant-cells. No hair was found and (contrary to the findings of Patey and Scarff) there was no track lined with squamous epithelium or containing hair-follicles.

The patient had no hesitation in attributing his trouble to penetration of the skin by hair clippings, probably during the finger manipulations employed in shampooing, and he had known at least one of his fellow barbers to have an exactly similar lesion.

I am not convinced, however, that postanal pilonidal sinus results from penetration of the skin by hair from without.

Glasgow. M. R. EWING.

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1. Johnston, L. M. *Lancet*, 1942, ii, 742.

STEVENS-JOHNSON SYNDROME

SIR,—The articles of Dr. Nellen and Dr. Murray in your issue of March 15, and your annotation of March 22, prompt me to record two other cases of Stevens-Johnson syndrome, one of which supports your remarks on the possible confusion with smallpox.

CASE 1.—A boy, aged 10 years, admitted to Mile End Hospital on Oct. 23 and discharged on Dec. 3, 1930. The rash was of the target variety, described as erythema iris, containing a central vesicle or bulla. There was an outer bluish-red area encircling a paler zone, the central bulla again being surrounded by a ring of erythema. The lesions were most numerous on the legs, arms, and hands, being particularly plentiful over the anterior aspects of the knee-joints. Some lesions were present on the face and scrotum and there was severe involvement of the mouth and eyes. The trunk was only slightly affected. Recovery was gradual and uneventful, and as far as I can recollect there was no evidence of pneumonia.

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Mile End Hospital, London, E.1. W. GORDON SEARS.

use of sanatoria for so-called "minimal" lesions, particularly those not associated with symptoms, we shall see an even greater survival-rate of patients treated. True, in the sanatorium, which is concerned essentially with mental and physical rest, we can expect this; but we know that the lesions in some of these patients would have healed without any treatment, and (through ignorance) without the stigma of tuberculosis.

The mere detection by mass radiography of more cases of gross disease will contribute little to preventive medicine, since we already know of more such cases than we can do anything for. It is amazing what massive infection the person with a good resistance can withstand, and it is the contributions to the latter which will give us a reduction in the death-rate. We are assured by Dr. R. R. Trail (March 15) that even after discharge from a well-run modern sanatorium "the average patient has a bleak outlook. . . . Lessened function and ostracism soon undo the benefits of the sanatorium."

I believe that great mischief is done in the dictation of treatment by radiography; for the film is often interpreted by chest experts who have had no basic training in radiology and who often shun the coöperation of their colleagues. The radiographic appearances are treated *instead of the patient; and because of the doctrine* of "symptomless tuberculosis" the patient stands the risk of treatment for adventitious radiographic effects.

The more radiographs I see, the more I value the clinical evidence. Within the past month I have seen an induced paralysis of the right diaphragm in a patient who on admission had no symptoms, no cough, no sputum, no tubercle bacilli but a good appetite, and whose radiograph before the operation showed the right apex obscured by a ringlet of hair which produced a pseudo-cavity with much reaction around. Such events may be rare, but they are not without significance when evaluating the passages quoted in my letter of Dec. 28, though Dr. L. E. Houghton (March 8), "hoist with his own petard," now seeks retreat. The answer to the question put to me by Dr. F. A. H. Simmonds (Jan. 11) will be found in the quotations I have given.

Birmingham. JAMES F. BRAILSFORD.

ATELECTASIS FOLLOWING OPERATION

SIR,—I read with great interest Mr. Stringer's article of March 8. The investigation he describes was like one that I had begun myself on somewhat similar lines, but my investigation was interrupted by military call-up.

I have always felt that the seeds of postoperative pulmonary collapse are sown, so to speak, in the first few hours following operation, as Mr. Stringer has demonstrated. The clinical diagnosis of collapse cannot be made at all for at least 24 hours after operation, and often not for 48 hours. It is during this period that so much can be done, if the possibility of collapse is realised, to help the patient and prevent the unpleasant effects of atelectasis. In my opinion every patient who has had an anæsthetic lasting for more than a short time should be considered a candidate for collapse and *should be watched carefully. I heartily agree* with the suggestion of routine radiography 12 hours after operation, though it might possibly be somewhat troublesome to carry out; immediate treatment will usually relieve the collapse at once.

I do not agree that bronchoscopy need be considered in these cases, a much simpler treatment being to hand. A recent case illustrates what I mean.

I was attending, as a physician, a diabetic patient who was being operated upon for repair of a hernia. By 48 hours after operation the temperature had risen to 100° F. The man was intelligent and coöperative; he said he felt perfectly well, and in particular emphasised that he had no cough. On examination of the lungs, however, there was definite dullness with poor air-entry at one base. I then performed the manœuvre which I have used several times in these cases, laying the patient on his sound side, pressing hard on the affected side, and instructing him to cough vigorously. He at once coughed up a teaspoonful of purulent material, much to his surprise. I repeated the manœuvre two or three times and then examined the lung bases. The dullness had almost disappeared, and there was now air-entry; the patient admitted that he felt distinctly clearer in the chest. The temperature was normal next day and never rose again. I instructed the nurse to repeat the manœuvre 4-hourly for 24 hours, as is my custom in this type of case. The dull[illegible] had by this time completely disappeared, and the air-entry was normal. There is nothing new in this procedure, though I have been surprised how little it seems to be known.

Finally, I would like to emphasise again that patients with pulmonary atelectasis do not have a cough in the early stages; and it is waiting for the patient either to cough or to say he has a cough that causes delay in diagnosis.

Liverpool. RONALD ELLIS.

NURSING AND THE DOCTORS

SIR,—As I am myself a ward sister in just such an institution as your correspondent, "Sister-tutor," I would like to say something in defence of the E.M.S. hospital. Sister-tutor is indeed unlucky in hers. The nursing staff here are extremely happy in their country surroundings, and many of them are sorry when they have to return to their parent hospital and town life. They certainly share cubicles here, but are comfortably housed, and the sanitary arrangements are quite adequate. Living conditions everywhere in this country are just as difficult as they were during the war—in many cases more so. We in hospital are fortunate in many ways: the incident of the night nurse, here, who returned in the middle of her "nights off" to get warm during this cold spell, proves this I think. Again, our medical staff here, both senior and junior, are always helpful and considerate towards the nursing staff. Is not the case of the surgeon who failed to turn up to the lecture perhaps rather an isolated one?

WARD SISTER.

PROTEIN NEEDS

SIR,—In their article on the treatment of infantile pellagra T. and J. Gillman[1] say:

"The recent literature contains reports of the ineffectiveness of the majority of protein hydrolysates in the treatment of hypoproteinæmia in dogs (Madden et al. 1945). Severe hypoproteinæmia with œdema and anæmia has even been *produced* in pigs by feeding casein digests in a particular dietary setting (Cartwright et al. 1945). In the light of these findings the 60% case-mortality in our series of cases treated with protein digests is not difficult to understand."

It is a pity that such sweeping statements should be made without proper reference to the earlier work cited. Madden and co-workers[2] used a large variety of protein digests in their experiments and concluded that "certain protein digests given by vein may favor good production of plasma protein, as well as nitrogen and weight equilibrium over long periods in dogs subjected to plasmapheresis. These digests may be equally effective when given subcutaneously or intraperitoneally and more effective orally. Certain other digests may not be well utilized." What was evident from this and other investigations was that for optimum plasma protein formation the most important factor is the amino-acid make-up of the preparation, which in turn depends *upon the nature of the protein and the* methods employed for digestion and subsequent processing. An inadequate protein like gelatin or zein or an acid hydrolysate of casein as the sole source of protein can neither support growth nor promote plasma-protein production. Even if two proteins or amino-acid mixtures are equally effective for growth, one of them may be superior to the other as far as plasma-protein production is concerned. Madden and his associates have been trying to elucidate the specific amino-acid requirements *of plasma*-protein formation.

In the other paper referred to, Cartwright and his colleagues[3] were mostly concerned with a comparison of the anæmia produced in swine by feeding them a protein deficient in tryptophane and the anæmia caused by pyridoxine deficiency. For producing tryptophane deficiency they used zein and an acid hydrolysate of casein. Although casein is rich in tryptophane this is mostly destroyed during acid hydrolysis. *Using such* a hydrolysate and zein, they were able to produce severe anæmia, hypoproteinæmia, and œdema in experimental animals.

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[1] *Lancet*, 1946, ii, 446.
[2] *J. exp. Med.* 1945, 82, 181.
[3] *J. clin Invest.* 1945, 24, 268

But the usual protein hydrolysates intended for therapeutic purposes are prepared from proteins of high biological value, such as casein, lactalbumin, and meat, by enzymic digestion with which there is no destruction of any essential amino-acid. If an acid hydrolysate is used (mostly for parenteral use) it is fortified with tryptophane and cystine to make up for that lost during hydrolysis.

In the light of these facts the remarks of the Gillmans about protein hydrolysates in general are hardly justifiable. It is likely that in infantile pellagra the primary requisite is something contained in 'Ventriculin,' in the absence of which the administration of large amounts of protein or protein hydrolysates may further tax the already damaged liver. It would have been interesting to try ventriculin together with a good pancreatic digest of casein or papaic digest of meat.

Bombay. **G. B. Ramasarma.**

OF NOT SMOKING

Sir,—Your annotation of March 15 ran: "It is not easy to gauge the priority which tobacco may justifiably be given. . . . Unfortunately, there is no yardstick for the measurement of tobacco's virtues." You clearly did not consider it necessary to indicate what are tobacco's virtues.

In my view, based on 12 years as a cigarette-inhaler followed by 20 as a non-smoker, there is no virtue in tobacco-smoking, just as there is none in opium-smoking. Addicts of drugs, including tobacco, delude themselves that their drug possesses unique psychological virtues—e.g., the sustaining of morale. What the drug really does is to appease temporarily their craving; and craving for a drug is a psychopathic urge generated as a late action of certain drugs. As it is appeased, so also is it generated.

The facts that tobacco is a toxic and comparatively powerful drug of addiction[1] and that it is therapeutically useless warrant the conclusion that there is no justification for any expenditure on it whatsoever; also that it is our duty, as keepers of the nation's health, to abolish tobacco-smoking, on health as well as on economic grounds.

Wallasey. **Lennox M. Johnston.**

HAIR-BEARING SINUS

Sir,—In their article on the pathology of postanal pilonidal sinus (1946, ii, 484) Mr. Patey and Professor Scarff described a hair-bearing sinus found in a barber's hand. I recently encountered a somewhat similar case.

A man, aged 52, for many years a barber, came to hospital complaining of a painful swelling between the middle and ring fingers of the right hand. About six weeks previously he had noticed some hair-clippings lodged in a depression or fissure in the skin of the web, and had tried to remove them, using forceps, with apparent success. A week or so later he developed a painful swelling in this area, which had since varied a little in size. There was a red and tender swelling on the dorsum just short of the distal edge of the web between the 3rd and 4th fingers, surmounted by a small yellow area where a collection of pus was threatening to discharge. Extending proximally from it for about $^1/_2$ in. in the subcutaneous tissues was a firm and slightly tender track, which felt exactly like the tissue reaction around a retained wood splinter.

The hand was explored under general anæsthesia; using a tourniquet, the track was excised without much difficulty. During the dissection, however, it seems likely that the track was opened, for three fragments of hair, each about 3 mm. long, were discovered. Section showed a typical foreign-body granuloma with aggregations of giant-cells. No hair was found and (contrary to the findings of Patey and Scarff) there was no track lined with squamous epithelium or containing hair-follicles.

The patient had no hesitation in attributing his trouble to penetration of the skin by hair clippings, probably during the finger manipulations employed in shampooing, and he had known at least one of his fellow barbers to have an exactly similar lesion.

I am not convinced, however, that postanal pilonidal sinus results from penetration of the skin by hair from without.

Glasgow. **M. R. Ewing.**

STEVENS-JOHNSON SYNDROME

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Mile End Hospital, London, E.1. **W. Gordon Sears.**

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[1] Johnston L. M. *Lancet*, 1942, ii, 742.

COMPRESSION OF MEDIAN NERVE IN CARPAL TUNNEL

SIR,—Both Professor Harris and Mr. Roaf advocate immobilisation for compression of the median nerve in the carpal tunnel, and Professor Harris adds to the treatment the additional compression of a hard object in the palm. Experience shows, however, that when nerve-compression reaches the point of causing muscular wasting it cannot be cured by rest alone, for rest does not permanently remove the cause. Pressure neuritis of the slipping ulnar nerve does not recover unless the nerve is transposed, nor will either rest or exercises relieve the muscular wasting due to a costoclavicular syndrome. Indeed, in both these instances motor recovery is often incomplete after operation because operation has been undertaken too late. Similarly the swollen and fibrosing median nerve will not recover if after rest it is to be exposed to the same compression and the same traumatising movements as before—and working women cannot give up manual work for the rest of their lives. The danger of immobilisation is delay, for the longer the lesion is allowed to continue the less complete will be recovery of sensation and movement.

London, W.1. W. RUSSELL BRAIN.

DOCTORS' SALARIES

SIR,—As final-year medical students we naturally hope to receive a decent rate of pay for our work on qualification, but we strongly deprecate the attitude of those who suggest that being a doctor, *per se*, entitles one to about ten times the total wage of the majority of workers.

Many a man has to provide all that his family needs on £5 a week—how dare your correspondents consider themselves entitled to spend this much on food alone for two people?

Chief Assistant's wife must surely regard his letter as a slight on her competence as a housekeeper. We have catered for ourselves for four years, and therefore have a real knowledge of the cost of food. Now that one of us is married, she is able to feed herself and her husband on £2 10s. a week without undue difficulty; and this sum includes the cost of canteen meals.

ELIZABETH GORST
London, N.1. KATHLEEN CORBISHLEY.

THE PERIODICALS

SIR,—I am sorry to see your defence (March 15, p. 348) of the Periodical Proprietors Association's high-handed action in depriving the public of even those periodicals which would have escaped Mr. Shinwell's ban. This action seems to have been taken solely in the publishers' interests, and without any regard for those of readers.

One would like to have thought that THE LANCET at least would have considered its readers and its services to science in general as more important than its allegiance to the P.P.A., and would have defied the latter's ban, resigning membership if necessary. Certainly Thomas Wakley would not have submitted so meekly.

Witham, Essex. J. W. NICHOLAS.

_ Dr. Nicholas seems to misunderstand the sequence of events. The Government, faced with an indubitably dangerous situation, decided that industrial use of electricity must be virtually suspended for the time being. Exception was made for hospitals, catering establishments, and "newspapers," all of which were held to provide essential services; but no exception was thought necessary for periodical journals. The Government's instructions on the subject had no legal sanction, but were obeyed by all the many industries affected, including all printers. No journal therefore could continue its usual service to its readers. The possibility remained of publishing token issues produced without the use of electric power; but the Periodical Proprietors Association thought that if there must be a ban it should apply in the same way to all, and therefore approved the Government's instruction that hand-produced issues were not permitted. So far as we know, neither the association nor anyone else was acting "in the publishers' interests": for almost all journals the saving in costs of printing and distribution during the fortnight's suspension was far outweighed by the corresponding loss of advertisement revenue. As to the propriety of ignoring the instructions by way of protest, opinions will continue to differ. The fact that all ordinary newspapers were appearing as usual made it clear that the Government did not really intend or wish to muzzle the press; and at a time when the country as a whole was suffering so much damage we felt that complaints about the relatively small loss and inconvenience to our readers and ourselves would be out of proportion. If ever we are persuaded that the liberty of the press is seriously threatened we shall not be backward in its defence.—ED. L.

THE MEDICAL SCHOOL

SIR,—Your leader of Jan. 4 says that "the medical schools of Britain are capable of attaining and maintaining the highest technical standards." As a war-time student at one of London's most illustrious schools I certainly do not want to under-estimate the severe stresses under which our teachers have manfully been labouring. But I venture to ask why the vast potentialities of our medical schools, with their top-line specialists, first-rate laboratories and lecture-theatres, and hand-picked cases, are still so far from being realised.

I would point first, to the indifference of teachers to our individual presence or (understandable) absence at ward-round or lecture, and to our early difficulties in approaching the patient in his bed; secondly, to the fact that we have no systematic instruction in medicine or surgery (I can remember being hurriedly initiated by sister into the devious arts of scrubbing-up, five minutes before the beginning of the first operation at which I was due to assist); and thirdly, to the system whereby gold-medallist applicants for house-appointments are turned down in favour of rugger blues (by the simple expedient of asking one candidate how he would prepare a turpentine stupe, and the other which drug he prefers in penicillin-sensitive pneumococcal pneumonia). The idealism which uplifted so many of us at the inception of our careers becomes now a bitter relic of its former self.

We are not asking to be spoon-fed. We know we must go out and get knowledge for ourselves before it will stick. But it is a fallacy to believe that, now we have left school, we fare better if left to our own devices, and no longer need frequent signposts to the founts of wisdom. Spoon-feeding for the infant is admirable. A help-yourself service for the adult is economical. But neither is suitable for the adolescent. And it is the immature and the faltering among us who stand in most need of guidance.

May I put forward a few tentative suggestions?

(1) Let us have a say, however small, in decisions affecting our curriculum.

(2) Let us have smaller firms as soon as possible, with more frequent tutorials of the "fireside-chat" category by the registrar, houseman, or honorary, so as to approach the ideal of individual tuition, with which no other professional course is more inadequately provided. In this way will students feel themselves part of a cognate group working at a common task.

(3) Let us have system in our lectures, and, more important still, in outpatients. If full-time courses can be arranged in fevers, midwifery, and psychiatry at specialised institutions, why not in ear, nose, and throat, in ophthalmology, and in dermatology, reserving the parent hospital perhaps for more general work?

(4) Let us have more student house-appointments—a taste of responsibility to give us some idea of the difficulties of the staff, to turn our present parasitic apathy into symbiotic satisfaction, and possibly to turn out something useful. Aimlessly loafing through the hospital, vaguely drinking soul-destroying cups of coffee, tolerated at best by those around us who are fortunate enough to be employed, we would welcome with enthusiasm such opportunities to justify ourselves.

(5) Please, can we sit down somewhere in medical rounds of more than three hours' duration?

AMOS.

_ It has been suggested that shooting-sticks with rubber crutch shoes would make an ideal seat for students in ward rounds.—ED. L.

Parliament

ON THE FLOOR OF THE HOUSE

THE Budget is looming ahead. The House has therefore been considering the main bills and estimates concerned with the Services, and there have been debates on man-power and defence problems as a whole. In a world of military uncertainties the need for strong defence forces needs little argument, and we have big commitments not only in the United Kingdom and Western Europe but also in the Middle East and the Far East; yet we, and many countries of the world, are suffering from a man-power famine even though since the end of the war there has been a run-down of 3½ million workers in the munition industries and over 4½ million men and women have returned from the Forces to civilian life. A crucial item which allows for no diminution is our contribution to forces in the United Nations Organisation. Mr. Alexander, speaking as Minister of Defence, told the House that our Government are pressing, in the Security Council, for "swift and decisive" action to organise the forces which, under article 43 of the charter, are to be put at its disposal to prevent aggression. When National Service is the law of the land we shall have a stable force at our disposal to be our contribution to the United Nations Force. The Labour rebels who are against conscription thus find themselves refusing aid in setting up the international police force which is the essential guarantee of world peace and security. The defence of Great Britain and the Commonwealth will become, when countries of the Security Council and other nations are joined with it, the defence of the world.

But inside the framework of these great needs there are possibilities of economy of man-power in the work of new committees, partly military and partly civilian, which the Services have set up. Civil experts and military experts must look at Service questions from outside the four-square rules and regulations of Service procedure. Warfare now is total, so consideration of Service economy must be total also, and the civilian may have to muscle-in—sometimes in regions to which he has been unaccustomed.

MEDICUS, M.P.

FROM THE PRESS GALLERY

Control of Penicillin Bill

IN moving the second reading of the Penicillin Bill, in the House of Lords on March 18, the Earl of LISTOWEL briefly outlined the powers of the Bill.[1]

The controls to be imposed, he pointed out, were limited to the supply of the drug to the public and there would be no interference with the wholesale trade or the supply to doctors, hospitals, nursing-homes, organisations for medical research, or Government departments.

Lord STRABOLGI read a letter from Dr. E. W. Fish, which ran:

> "There is one danger which this Bill does not cover. If penicillin lozenges for the mouth may be prescribed in any quantity the practitioner thinks fit, there may be a large number of people who will give prescriptions for perhaps 100 at a time, and if their patients use them, possibly spasmodically, for some chronic complaint such as tonsillitis, or even a tendency to dental caries, the mouth and throat of such a person would be an ideal breeding ground for the resistant strain of streptococcus which might infect somebody else and prove fatal. I do not see how this could be prevented, except through the medical press pointing out the danger. One could, of course, limit the permitted sale of lozenges to some two dozen at any one time, or on any one prescription, but it would be difficult in factories where the nurse hands them out, I believe, under the doctor's orders, and Fleming felt, perhaps more strongly than I did, that no attempt should be made to go further than the present Bill provides."

Lord Strabolgi asked the Government if it would be possible to strengthen the Bill in these terms.

Lord AMULREE was satisfied that the medical profession would welcome the Bill but raised two points. Some firms were charging a greatly enhanced price for cosmetics which contained quantities of penicillin so minute as to be valueless. This was likely to bring the drug into disrepute. Again, penicillin snuff was good for the after-effects of colds and catarrh, and similar maladies. If this snuff was safe, Lord Amulree did not think there was the same reason for restricting its sale to a limited amount on each prescription. Penicillin snuff tended in a short time to lose its properties, and it was therefore hard to make a patient go back to his doctor for a fresh prescription each time he caught a cold. Surely it should be possible to get a repeat supply on the original prescription?

The Earl of MUNSTER drew attention to the words at the beginning of clause 2:

> "The substances to which this Act applies are penicillin and such other anti-microbial organic substances produced by living organisms as may be prescribed by regulations. . . ."

What, he asked, were those other organic substances which could be prescribed by regulations of four Government departments?

The Earl of LISTOWEL agreed that the point raised by Lord Amulree about the sale of what might be called "pseudo-penicillin" preparations by chemists was an additional argument in support of the Bill. In reply to Lord Strabolgi's point, he suggested that the responsibility for not prescribing too large a quantity of penicillin tablets at one time must fall upon the medical profession and was not one for the Government to enforce by statute. Lord Munster had also raised an important point. The Bill dealt with substances which were still largely in an experimental stage. The most advanced of these preparations, apart from penicillin, was streptomycin, on which the Medical Research Council were now conducting tests. The Government had come to the conclusion that too little was known about the properties of streptomycin to mention it specifically in the Bill. But provision was made for the making of regulations under the Bill when it was proved in accordance with laboratory tests that a certain substance had properties similar to penicillin and therefore should be subject to control.

QUESTION TIME

Production of Streptomycin

Dr. BARNETT STROSS asked the Minister of Health what weight of streptomycin was being manufactured each month in Britain; and what type of clinical trials were now being carried out by the Medical Research Council on the treatment of tuberculosis.—Mr. JOHN EDWARDS replied: The present production is very small but the Minister of Supply hopes that by June it will be about 250 grammes per month. The Medical Research Council has organised clinical trials at selected hospitals in certain types of tuberculosis cases.

Penicillin for British Zone

Mr. SOMERVILLE HASTINGS asked the Chancellor of the Duchy of Lancaster whether he was satisfied that the amount of penicillin supplied from official sources to the British zone of Germany, namely, 95 mega units a month, enough for 50 or 60 cases only, was sufficient for all needs apart from the treatment of venereal disease; and how many applications for supplies of this drug had been received by the public-health branch of the Control Commission from the German Public Health Advisory Committee which had not been acceded to. —Mr. J. HYND replied: No applications for penicillin have been made to the British authorities by the German Public Health Advisory Committee for some months past. I am advised that supplies made available by the relief societies alone have been sufficient to meet recent demands. It is likely, however, that the widening experience now being acquired by German doctors in the application of the drug will lead to a demand for larger quantities and it is planned to increase substantially the present monthly official allocation for non-V.D. cases.

Mr. HASTINGS: Will the Minister make it clear to the German doctors that more penicillin is available if it is required?—Mr. HYND: We are taking steps to encourage German doctors in the use of this drug and to obtain knowledge of its proper use. We anticipate that we will be able to meet any commitments likely to be made.

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[1] See *Lancet*, March 22, p. 379.

Obituary

JOSEPH BARCROFT

KT., C.B.E., M.A. CAMB., D.SC., HON. M.D., HON. F.R.C.O.G., F.R.S.

Sir Joseph Barcroft, the Cambridge physiologist, died suddenly on March 21 while returning home from his laboratory. He will be warmly remembered and widely missed, not least in the medical profession. Though his medical degrees were honorary, they were very properly bestowed on a man who gave so much of his mind and heart to clinical problems and did so much to inform and assist doctors. His scientific reputation is one that will endure and grow.

He was born on July 26, 1872, the son of Henry Barcroft, D.L., of Newry, Co. Down. The family were Quakers, and he was sent first to Bootham, the Friends' school at York. Thence he went to the Leys School, Cambridge, where he was one of a group of prefects almost all of whom attained distinction later: they included Henry Dale and John Clapham (simultaneously presidents of the Royal Society and the British Academy), F. A. Bainbridge the pathologist, H. C. Gutteridge the authority on international law, and Gibberd one of the last senior wranglers. At King's College, Cambridge, Barcroft took a first in both parts of the natural sciences tripos and was elected to a fellowship in 1900. For several years he worked as a master at the Leys School, but thereafter devoted himself entirely to physiology as university reader under J. N. Langley. He was elected F.R.S. in 1910; and succeeded in 1925 to Langley's chair, which he held till 1937. From 1941 until his death he was director of the Agricultural Research Council's unit of animal physiology.

As a physiologist Barcroft had three or four research careers, each enough to assure him fame. They began with his classical work on the oxygen carriage of the blood; and every student now learns about his blood-gas apparatus, his oxygen-dissociation curves, his classification of the varieties of anoxia, and his experiments disproving oxygen secretion in the lungs. Opposing J. S. Haldane in a long controversy, he maintained that the passage of gases through the alveolar-epithelium is a simple physical process, and that even under adverse conditions the lungs cannot take up oxygen unless the oxygen pressure in the air is higher than that in the blood. In support of this conclusion he exposed himself to low oxygen pressures for long periods inside a glass box at Cambridge and made experimental observations with a team which he took to the Andes for the purpose. His *Lessons from High Altitudes* is a study of acclimatisation.

During the war of 1914–18 he was asked to advise on poison-gas. Ready as ever to immolate himself if need be, he walked with his dog through a gas chamber filled with KCN in a concentration known to be lethal to dogs. The dog died, but Barcroft cycled home to advise against the manufacture of cyanide gas-shells. His association with the War Office, begun in 1917 as a member of its chemical warfare committee, continued as a member of the Army Medical Directorate consultative committee from 1928 to 1943.

Meanwhile his studies on altitude had attracted his attention to the spleen, and in a series of beautifully planned researches, with H. W. Florey, J. G. Stephens, and others, including observation of the spleen through celluloid windows, he demonstrated, inter alia, its storage function. From 1921 onwards he had been developing the concept of a blood-volume divided, in proportions fluctuating from moment to moment, between circulating and depot blood; and though the earlier literature contains some suggestions of this idea, and also some evidence for it, it was he who proved and published it adequately and made it a part of current doctrine. The concept was a major contribution to physiology.

It was probably this work on the blood-volume that led, via the blood-supply of the pregnant uterus, to Barcroft's studies of the fœtus, which in turn have done much to persuade others of the importance of prenatal physiology. Physiology begins with conception, but until recently nobody seemed to be much interested in what happens in utero, though the study of that period of life provides clues which can help to resolve many postnatal mysteries. In biological research the main difficulty is to reduce variables, and this difficulty is to some extent surmount in intra-uterine studies, because one can select s of development in which the organism has not y acquired its postnatal complexity. For example, effects of carbon-dioxide excess can be determined various centres in the brain are properly developed, one can note the reactions of the circulatory sys when it is not yet under the control of a nerve-supply. A generation hence, physiology textbooks are likely to begin with a long section on embryonic and fœtal function, and it is to be hoped they will give due credit here to the greatest figure among the pioneers.

Last October Barcroft published the first volume of his *Researches on Pre-natal Life* (Blackwell Scientific Publications), and in its preface he wrote:

> "This work partakes very much of the nature of a will —I hope not my last. . . . The general aim . . . of this book is to trace the development of function in the mammalian fœtus, never losing sight of the fact that one day the call will come and the fœtus will be born. Not only has the fœtus to develop a fundamental life which will suffice for intra-uterine conditions, but at the same time it has to develop an economy which will withstand the shock of birth, and will suffice, nay more than suffice, for its new environment."

From 1937 to 1939 Barcroft and D. H. Barron at Cambridge had coöperated with A. E. Barclay and K. J. Franklin at Oxford in cineradiographic studies of the fœtal circulation, and their joint efforts secured objective records where hypothesis had been dominant for three centuries. In *The Brain and its Environment* (1938) he had built on Claude Bernard's conception of the "milieu interieur," the book being largely based on the effects of environmental changes on the fœtal nervous system. More directly addressed to the practising doctor were his Sharpey Schafer lecture at Edinburgh in 1941 on Four Phases of Birth, and his Linacre lecture at Cambridge in 1942 on the Onset of Respiration at Birth, with comments on resuscitation.

As a lecturer Barcroft had early proved his skill, and his many addresses to many audiences were not least among his services. He had the gift of explanation; he spoke to an audience in the interesting way in which he would speak to a friend; and he used an imaginative humour. "I have no wish," he remarked, "to deny that the spleen is an important cemetery for red blood corpuscles any more than I have to tilt against anyone expressing the view that London is the largest cemetery in England." Again, on Physical Unfitness in relation to Density of Population: "Something is wanted comparable to 'hunger' which impels people to take exercise. Probably in some obscure form it is there, but it needs cultivation in a sense which hunger does not. Probably the healthier the youth of this country the more anxious they will be to be out and about, so that you start with the advantage of a benign circle." One of many brilliant addresses published in these columns was his Stephen Paget lecture of 1934, discussing Experiments on Man—a subject on which he had ample right to speak.

Sherrington in his *Man on his Nature* remarks that "we dismiss wonder commonly with childhood. Much later when life's pace has slackened, wonder may return. The mind then may find so much inviting wonder, the whole world becomes wonderful." Perhaps Barcroft's outstanding characteristic was that he never lost this childhood's wonder, and thus he secured a constant driving force for many grown-up thoughts. He always seemed to be able to step out of the ruts of contemporary ideas and research and roam freely, alone or with some chosen companions, seeing wonders that were invisible to others. Then he would return to report on what he had seen and done—talking in that simple, exciting, slightly breathless way he had, making all he had discovered seem so self-evident, poking fun at himself, and generously paying tribute to his collaborators. Like other people, he was not omniscient; indeed his reputation occasionally suffered because he was not afraid, in discussions, to put forward some idea which others knew to be unfounded. Yet he had the knack of seeing the "story" in a problem, and his terrifying disregard for details—some details—was justified by his proving so often right. He seemed to back his h [illegible] against the perverseness of nature, but his success was really due to his ability to see the problem in its simplest elements where others saw only a mass of work to be done.

As an experimenter he was imperturbable, and he followed the principle that each experiment should attempt to answer only one question: he was content with a small plus provided it was permanent, and in this he showed his patience, his thoroughness, and also his vision. He had his long-distance plan and achieved it gradually but with certainty. When, at nearly 70, he took over his new appointment with the Agricultural Research Council he began planning investigation of the digestion and metabolism of ruminants. He would say, "Of course I know nothing about it"; but somehow he seemed to know enough to launch work which has already yielded many important results. With his death a vital spark has gone out of British physiology.

He treated everyone with a courtesy and understanding which seemed to be based on an inner conviction that the good in them was the only thing worth bothering about, and this made him a fine collaborator. 'He seemed," says a colleague, "to be searching for somehing fundamental, both in his work and in people, which he felt ought to be there. Something certainly kept him resh and enthusiastic to the end."

Prof. A. V. Hill writes: "By the death of Sir Joseph Barcroft the world has lost one of its really great men. Viewed from a single aspect, the greatness of his stature may not be so apparent; but taking his whole life together, his outstanding contributions, practical and fundamental, to science and medicine, his services to Britain and her allies in two wars, his deep influence on all who knew and loved him, and the harmony of all his adjustments (befitting a good physiologist!) make no lesser estimate possible.

"The integrity and loyalty, the courage and humility, the wisdom and simplicity of 'J. B.'s' character: his thoughtfulness for others combined with inflexibility of aim and principle; his seriousness of purpose adorned with the grace of gaiety and laughter; his intuitive understanding of men and affairs; his experimental skill and persistence: the enchantment of his home, the romantic qualities of his speech and writing, the magic which set people at once to profitable jobs around him; the charm and steadfastness of his friendship, the generosity of his helpfulness: these all, and one could say much more, gave him a unique position among physiologists and an exceptional place in general affection and esteem. Workers in physiology, nutrition, and agriculture, and in human and veterinary medicine, soldiers and airmen, mountaineers, and sailors whether in big or little ships, all are in debt to J. B. 'After all,' he wrote in 1913 in the preface of *The Respiratory Function of the Blood*, 'the pleasantest memories of a cruise are those of the men with whom one has sailed. The debt which I owe to my colleagues. . . . will be evident enough to any reader of this book. It leaves me well-nigh bankrupt—a condition well known to most sailors.' That kind of bankruptcy is indeed well known reciprocally to all who have sailed with J. B.

"In the same preface he wrote: 'At one time . . . most of my leisure was spent in boats. In them I learnt what little I know of research, not of technique or of physiology but of the qualities essential to those who would venture beyond the visible horizon.' Those qualities, call them intuition or what you like, were evident in all he did; but they were backed by splendid patience, by fine judgment, and indomitable hard work. The same imaginative qualities and the same capacity for new work lasted unabated to the end. Nearly ten years after formal retirement he was chairman of the Food Investigation Board, head of a unit of the Agricultural Research Council for research in animal physiology, chairman of the sectional committee of physiology and medical science of the Royal Society—and active in many other ways. He died suddenly, aged 74, going home from his work: happy in his ending, except for the sorrow he has left behind.

"It is impossible to think of J. B. apart from his home. Lady Barcroft, the daughter of Sir Robert Ball the astronomer, inherited her father's sense of fun, and the laughter which, like a nosegay, decorated their joint lives made them the most perfect partners and the most perfect hosts. They realised that the most serious things can often be better said and done gaily—and they said and did them so. They provided, for many years, a centre for the physiologists of Cambridge and (on occasion) of a wider circle. Lady Barcroft is a joint creditor with J. B. in what we owe.

"I do not know how many pupils J. B. had, but it must be hundreds, from most of the countries in the world. Their careers generally show more than a sign of his handiwork. He was regarded with the same esteem in the United States and many other countries as in England. He loved, and was loved in, King's. He was a great ambassador for the fellowship of scientific men everywhere: he will be mourned throughout that fellowship and throughout the world.

Sir Joseph Barcroft was appointed C.B.E. in 1918 and knighted in 1935. He received honorary degrees in science from Harvard, from Queen's University, Belfast, from the National University of Ireland, and from Trinity College, Dublin, and in medicine from Sofia and Louvain universities. The Royal Society bestowed on him its Royal, Baly, and Copley medals, and he was Fullerian professor of physiology at the Royal Institution from 1923 to 1926.

Of his two sons, one is Dr. Henry Barcroft, professor of physiology at Queen's University, Belfast.

GEOFFREY DUCKWORTH

M.R.C.P.

Dr. Geoffrey Duckworth, physician in charge of the skin department of the Bolingbroke Hospital, and physician to the St. John's Hospital for Diseases of the Skin, died at his home at Wimbledon on March 18. In 1929 he qualified from St. George's Hospital and he took his M.R.C.P. three years later. After serving as registrar to both the inpatient and outpatient departments of St. John's Hospital he was appointed to the staff ten years ago. In all the affairs of the hospital he showed great interest, and he will be missed from its committee meetings, which he regularly attended. He was also a member of the staff of the Royal Hospital and Home for Incurables at Putney, and an assistant editor of the *British Journal of Dermatology and Syphilis*. During the war he acted as a physician dermatologist in the E.M.S.

A keen investigator, Duckworth often brought difficult cases to one of his colleagues for discussion; and, writes R.T.B., "This was made easy by his natural humility, a quality which greatly added to his charm. New aspects of therapy and all possible advantages for the comfort and progress of his patients were certain to stimulate his enthusiasm. He never sought the limelight, and was often too diffident to enter the discussions at society meetings, but we who knew him held him in great respect and friendship."

Dr. Duckworth leaves his wife with two daughters and a son. He was 46 years of age.

WILLIAM THOMSON MUNRO

M.D., LL.D. ST. AND., F.R.C.P.E.

William Munro was medical superintendent of Glenlomond Sanatorium, Kinross, for 25 years. Yet his position in tuberculosis is difficult to define. He always claimed to be a clinician and he studied the disease from that angle. It was thus that he saw its problems, and the value of his contributions to the subject lay primarily in the fact that they were deliberate investigations of problems seen in the course of his daily work. But despite his own claim to clinical interest his happiest hours were spent in his laboratory—a small room containing the minimum of equipment. Here work was done in the best tradition by a man who wanted to know why; and when he retired owing to ill health in 1945 he had in mind several inquiries to which he knew no satisfactory answer.

He graduated M.B. with distinction at St. Andrews in 1908 and M.D. four years later. After holding house-appointments at the Royal Infirmary, Dundee, he took his D.P.H. in 1914. A period of war service followed, and in 1920, after his demobilisation, he was appointed to Glenlomond Sanatorium.

One of the original members of the Tuberculosis Society of Scotland, Munro probably contributed more to that society than any other member, and he served as president from 1935 to 1938. In 1929 he was elected

F.R.C.P.E. and he was surprised and delighted when his own university in 1945 conferred upon him the degree of LL.D.

"Essentially an individualist, Munro tackled his own problems," writes C. C., "but he acknowledged the help and work of others and he was undoubtedly influenced by Robert Philip, Stanley Griffith, Bruno Lange, and Calmette. His investigations covered a wide field, but his best-known work is that on phthisis of bovine origin and on tubercle bacilluria. He had faith in his own views, which he expressed with conviction, and although in debate he often disagreed strongly with the views of others a spark of pawky humour illumined his remarks and no sting remained.

Sometimes he had the appearance of being aggressive, but he was a kindly man, shy at heart, and generous in his estimate of those whose work was more to them than a mere job. The lazy and garrulous were anathema to him, and there were no humbugs among his friends."

Dr. Munro's brief retirement was spent at Kinross, where his wife died 18 months ago. They had no children.

FREDERICO NITTI

Dr. Nitti was the son of Signor Francesco Saverio Nitti, prime minister of Italy before the advent of Mussolini. For many years he was in charge of the bacteriological side of the chemotherapy investigations at the Pasteur Institute in Paris, and he was one of the team who first found the activity of sulphanilamide in streptococcal infections.

After Domagk's discovery of the activity of 'Prontosil,' which was published in 1935, Prof. J. Tréfouël, Mme. Tréfouël, Nitti, and Bovet immediately started to assay a series of similar diazo compounds in mice infected with streptococci. After nine months' work they noticed that all of the diazo compounds which included the residue of the sulphanilamide group were active, whereas those without this grouping had no activity; further it was seen that no great change of activity resulted from changes in the other primary amine forming the diazo compound. They then tried sulphanilamide itself and found it to be active. This finding, following Domagk's discovery of prontosil, pointed the way to the great development of the chemotherapy of bacterial infections during the last decade. Nitti continued his chemotherapeutic research both with the antibiotics and with synthetic chemical substances, and took part in the very wide clinical trials at the Pasteur Hospital. His enthusiasm for this work was a most valuable asset to the Pasteur team.

He was a charming and delightful colleague, and his early death on March 1 is a loss to medical science. He had been suffering from tuberculosis for the past two years, but was only recently persuaded to give up his work.

Dr. RICHARD RICE died on March 7 at his home at Harwell, where he was in practice from 1882 till his retirement in 1945. A keen follower of the Old Berks Hunt, in the early days many of his rounds were done on horseback or by dogcart. On his 80th birthday 250 of his friends and patients presented him with an album of autographs.

Appointments

EVANS, W. J. M., M.B. Lond., D.P.H.: M.O., Tanganyika, Colonial Service.

HAMILTON, WINSTON, M.B. Belf., D.P.H.: asst. tuberculosis officer, West Riding, Yorks.

JONES, MAXWELL, M.B. Edin., M.R.C.P.E., D.P.M.: consultant in medical psychology, British Postgraduate Medical School, London.

STUNGO, ELLIS, L.R.C.P.E.: clinical asst., department of psychological medicine, University College Hospital, London.

WHALLEY, G. H., M.B., B.HY. Durh., D.P.H.: T.O. and deputy M.O.H., Great Yarmouth.

WALSH, W. M., M.B. N.U.I., D.P.H.: medical superintendent, Maiden Law Central Isolation Hospital, Lanchester, Durham.

Examining Factory Surgeons:

FRANKS, SAMUEL, M.B. Manc.: Tyldesley, Lancs.
HARRISON, D. G., M.B. Dubl.: Shanklin, Isle of Wight.
HUNT, J. G., M.B. Lond.: Arundel, Sussex.
MACDONALD, DUNCAN, M.B.E., M.B. Glasg.: South Uist no. 1 district.
MACKINNON, GEORGE, M.B. Glasg.: South Uist no. 2 district.
ROSE, J. V., B.SC. St. And., M.R.C.S.: Newton Abbot, Devon.
WRIGHT, WINIFRED, M.B. Lond.: Shepton Mallet, Som.

Notes and News

FEES PAYABLE BY LOCAL AUTHORITIES

LAST year the representative body of the British M Association proposed a scale of fees for sessional or occa work undertaken by doctors for local authorities. This now been considered by a conference held under the ship of Sir William Douglas, secretary of the Ministry Health, at which an amended version was accepted by sentatives of the B.M.A., the County Councils Asso the Association of Municipal Corporations, the Urban Dis Councils Association, the Rural District Councils A the London County Council, the Association of Committees, the Mental Hospitals Association, and the politan Boroughs Standing Joint Committee. The scale approved, which is published in detail in the Supplement the *British Medical Journal* of March 22, is as follows:

For sessions at hospitals and clinics of, normally, 1½–2 hours, *the fee should be £4 4s. for consultants and £2* for general practitioners; and for sessions not exceeding 1 hour, £2 12*s.* 6*d.* and £1 10*s.* respectivel "Higher remuneration should be paid where senior con are required for work carrying special responsibilities." W payment is made on the basis of single cases the fee for surgeon should be not less than £5 5*s.* for a minor and £10 10*s.* for a major operation, his fee for a consultation being £4 4*s.* The minimum fee for the administration of an anæsthetic should be £1 10*s.* To consultants' fees should be added an allowance of 1*s.* a mile each way for every mile beyond two miles from the doctor's home or the centre where he practises (whichever is less).

General practitioners should receive 7*s.* 6*d.* for each antenatal or postnatal examination, or 12*s.* 6*d.* if a report is required by the local authority. For diphtheria immunisation 3*s.* 6*d.* *should be paid per injection at surgery, or* 6*s.* 6*d.* at the child's home, the material to be supplied by the local authority.

The rate of remuneration for other services should be arranged after consultation between the local authority and the local division of the B.M.A., and differences can be referred to the advisory committee set up under the Askwith agreement. It is also pointed out that nothing in these recommendations prevents a doctor from continuing his present contract with a local authority.

The revised scales operate retrospectively from Nov. 1, 1946. The agreement is "of an interim character," without prejudice to any future negotiations.

A CAUSE OF TALIPES

Hippocrates suggested that congenital malformations were due to intra-uterine pressure, but it was left to Browne[1] to work out the details of this mechanism for congenital talipes and some other deformities. Now Rebaudi and Iannuzzi,[2] of Addis Ababa, suggest that in some cases talipes may be caused by a foot getting caught in a loop of the cord. They support their argument with photographs of three seven-month fœtuses in each of which the cord is looped round the ankles. Unfortunately it is not possible to make out the exact condition of the feet. The report mentions six such cases studied in fœtuses delivered at the sixth to eighth month.

SOCIAL MEDICINE AT OXFORD

THE Institute of Social Medicine in its second annual report records that with coöperation of town and gown useful progress has been made during 1946. Investigations relating to the beginnings of life have included statistical studies of stillbirths, and clinical, radiographical, and social studies of *the pre-school child and adolescents. Studies* into occupational mortality, morbidity, and accidents have also been undertaken and research has been carried out into the epidemiology and ætiology of social diseases, such as tuberculosis, rheumatic fever, peptic ulcer, and cancer. This work continues, and a new project which has been started is a long-term study of student health at a men's and a women's college, with which is linked a health advisory service for the students. At the beginning of the 1946–47 session Prof. John Ryle, the director of the institute, was asked to organise all teaching in social medicine and public health for students during their clinical period. A course has been arranged

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1. Browne, D. *Lancet*, 1934, ii, 960.
2. Rebaudi, F., Iannuzzi, V. *Boll. Soc. ital. Med. Igiene trop. (Sez. Eritrea)*, 1946, 6, 217.

which pays close attention to social factors in ætiology, and he lecturers besides the staff of the institute will include members of the city and county public-health departments.

CUT IN ALCOHOL SUPPLIES

THE production of drugs is likely to be seriously interrupted by a cut in the April allocation of alcohol to the manufacturers. The February allocation was reduced to 75% of the normal. In March this was made up by an allocation of 125%, but the drug firms were warned that this might have to cover April also. The Board of Trade has now informed them that there will be no April allocation. The reason given is the fuel cut to 33⅓%, which the alcohol industry is suffering in common with other industries. Like smelting, alcohol distillation is a process in which there is a close relation between fuel and output.

University of Oxford

A Betty Brookes fellowship for research into brain metabolism in relation to nervous and mental disease is shortly to be awarded. The fellowship will be tenable in the first instance for three years, and the stipend will be between £500 and £850 per annum. Application should be sent to the Whitley professor of biochemistry, University Museum, Oxford, not later than May 31.

Subject to the approval of convocation, the honorary degree of D.SC. will on May 1 be conferred on Dr. J. Tréfouël, director of the Pasteur Institute, Paris.

University of Cambridge

On March 15 the following degrees were conferred:

M.D.—J. W. Crofton, * F. S. Maclean.
M.Chir.—A. S. Till.
M.B., B.Chir.—* W. B. Webb.

* By proxy.

University of London

Dr. E. T. C. Spooner has been appointed to the university chair of bacteriology and immunology, tenable at the London School of Hygiene and Tropical Medicine, as from Oct. 1, 1947.

Dr. Spooner studied medicine at Cambridge and St. Bartholomew's Hospital, where, after qualifying in 1927, he was house-physician. Since 1931 he has been demonstrator and subsequently lecturer in pathology at Cambridge, where he is a fellow and tutor at Clare College. From 1940 to 1943 he worked for the Medical Research Council, becoming in 1942 member of a research section in the R.A.M.C. He graduated M.D. in 1942. From 1943 to 1944 he was director of the E.P.H.L.S. laboratory at Cambridge.

Dr. R. H. S. Thompson has been appointed to the university chair of chemical pathology, tenable at Guy's Hospital medical school, as from Oct. 1, 1947.

Dr. Thompson was trained at Oxford and Guy's Hospital, graduating M.A., B.SC., and B.M. in 1937. He held an Adrian Stokes travelling fellowship at the Rockefeller Institute of Medical Research, New York. In 1938 he was elected to the Gillson research scholarship in pathology by the Society of Apothecaries, and since then has been fellow and tutor of University College, Oxford, and demonstrator in biochemistry at Oxford. During the war years he was attached to the Chemical Defence Research Department of the Ministry of Supply, from 1939 to 1944, and from 1944 to 1946 he served in the R.A.M.C. with the rank of major. Since his return last year he has been dean of the medical school at Oxford.

Dr. H. Grüneberg has been appointed to the university readership in genetics, tenable at University College, as from Oct. 1, 1946.

From 1932 to 1933 Dr. Grüneberg was demonstrator in anatomy in the University of Freiburg. From 1933 to 1936 he was research student and since 1936 honorary research assistant at University College. Since 1938 he has held the Moseley research studentship of the Royal Society. He served in the R.A.M.C. from 1942 to 1946.

University of Sheffield

Dr. D. O. Stevenson has been appointed honorary lecturer in venereal diseases; Dr. Cynthia Redhead, tutor in child health; and Dr. S. J. Barr, assistant tutor in obstetrics.

University of Leeds

Dr. H. G. Garland has been appointed honorary demonstrator in neuropathology.

University of Edinburgh

On Tuesday, April 22, at 5 P.M., Dr. C. H. Kellaway, F.R.S., director-in-chief of the Wellcome Research Institution, London, is to deliver the 7th Sharpey Schafer lecture in the University New Buildings, Teviot Place. He will speak on the Perfusion Experiment in the Study of Tissue Injury.

University of Manchester

Among those who will receive honorary degrees on founder's day, May 21, will be Prof. E. D. Adrian, O.M., on whom the D.SC. will be conferred.

Auxiliary Royal Army Medical Corps Funds

The annual general meeting will be held at 11, Chandos Street, London, W.1, on Monday, April 14, at 5.30 P.M.

Westminster Hospital

The medical school of the hospital holds a clinico-pathological demonstration on the first Monday of each month, at 5 P.M. Owing to Easter the April meeting will take place on Monday the 14th.

Royal Medical Benevolent Fund

Messrs. Burroughs Wellcome and Co. Ltd. have handed over to the fund all proceeds of the sale of their medical diary for 1946. The gift, amounting to £650, will provide extra comforts for the fund's beneficiaries.

Charing Cross Hospital

Since 1911 students of Charing Cross Hospital medical school have attended King's College in the Strand for their anatomy and physiology. But next October, when it is hoped that repairs for bomb damage will be completed, the school will reopen its preclinical department, and this will enable it to take an additional 45 students each year. The preclinical school will be open to women as well as men, and opportunity is being taken at the same time to admit women to the clinical course. All vacancies for men for next session have already been filled, but applications from women may now be submitted. Further particulars will be found in our advertisement columns.

Epsom College

The council of the college will shortly award St. Ann's scholarships to girls attending Church of England schools. Candidates must be fully 9 and under 16 years of age, and must be orphan daughters of medical men who have been in independent practice in England or Wales for not less than 5 years. The value of each scholarship is dependent upon the means of the applicant and the locality and fees of the school selected.

Pensions are also available from the fund of the Royal Medical Foundation for impecunious medical men or their widows, and foundation scholarships, providing education, clothing, and maintenance free of cost for the sons of necessitous medical practitioners. Application forms are available from the secretary, Epsom College, Surrey.

North London Hospitals

Negotiations have now been completed for a scheme of close coöperation between the Prince of Wales's General Hospital and the Bearsted Memorial Hospital. The Prince of Wales's, with 260 beds, is the largest voluntary hospital in North-East London and is scheduled as a district hospital in the Ministry of Health Hospital survey. The new buildings of the Bearsted Hospital, to be opened in July, will have 100 maternity beds, and it is proposed that in addition to the general medical and surgical services already provided by the Prince of Wales's the two hospitals will offer a complete obstetrical and gynæcological service for the district. Both hospitals will also become part of the North London Postgraduate Medical Institute which also includes the North Middlesex County Hospital, the Chase Farm Hospital, and the North-Eastern Fever Hospital.

Centenary of the Chemical Society

The celebrations of the centenary of this society, which but for the war would have been held in 1941, will take place this year in London from July 15 to 17. Prof. C. N. Hinshelwood, F.R.S., the president, will open the centenary exhibition at the Science Museum, South Kensington, S.W.7, on Monday the 14th. The exhibition, which will remain open until the end of September, is to illustrate the development of chemistry in Great Britain and its place in the everyday life of the community. On Tuesday the 15th the visitors from overseas will be entertained to luncheon by the Government, and in the afternoon the president will deliver the centenary address. On the following day lectures will be given by Prof. E. K. Rideal, F.R.S., and Sir Robert Robinson, P.R.S. Further information may be had from the secretary of the society, Burlington House, Piccadilly, W.1.

Register of Orthoptists

The 1946–47 edition of this register has now been published, and doctors may obtain a copy free on application to the registrar of the Board of Registration of Medical Auxiliaries, Tavistock House North, Tavistock Square, London, W.C.1.

Allowance of Bacon to Tuberculous

On the advice of the Food Rationing (Special Diets) Advisory Committee, the Minister of Food has decided that persons suffering from active tuberculosis and actinomycosis, who are granted a priority supply of milk, shall also be granted an additional allowance of 1 oz. of bacon weekly in order to restore to them the recent cut in the ordinary consumer's bacon ration from 3 oz. to 2 oz. a week. These invalids are being invited at present to apply at local food offices for the additional allowance. In future the medical certificate of classification will provide the necessary authority for issue.

Fellowships in Plastic Surgery

Sir Simon Marks has established three fellowships, each to the value of £740 per annum, tenable for two years at the Queen Victoria Hospital, East Grinstead, Sussex. During the war with gifts from Canada, Australia, New Zealand, and South Africa, the buildings and equipment of the hospital have been modernised, while a new surgical wing has been given by the British War Relief Society of America. The "Simon and Matilda Marks fellowships in plastic surgery" will ensure that these facilities will be used for postgraduate education. Further particulars will be found in our advertisement columns.

Mackenzie Mackinnon Research Fellowship

Applications are invited from doctors for this fellowship which will be awarded in the form of grants to assist research in medicine or surgery and may be whole-time or part-time. The honorarium will be at the discretion of the joint committee of the Royal College of Physicians of London and the Royal College of Surgeons of England, and will be from £500 per annum according to experience and the amount of time available for research. A grant for expenses may be paid to the institution where the research is carried out. Applications must be submitted through a medical school by April 18. Application forms may be had from the secretary, Royal College of Surgeons, Lincoln's Inn Fields, London, W.C.2.

Hostel for Sanatorium Nurses

The British Legion has bought St. Alban's Guest-house in Colchester for use as a home for the nurses employed at Nayland Sanatorium, which lies 9 miles outside the town. Each nurse will have a separate room and there will also be a lounge, games room, and dining-room. Those responsible feel that they are taking a stage further the Rushcliffe Committee's recommendation that nurses should be able to go into town for recreational trips. The Nayland nurses are to live in the town and be transported to and from their work at the sanatorium.

Conference on the Family

A conference on Education for Family Life will be held in Manchester on April 21 and 22 by the extramural department of the university, assisted by the British Social Hygiene Council. The course is intended mainly for teachers and welfare workers, but will also be open to members of the public. Lectures will be given by Dr. Ethel Dukes, of the Marriage Guidance Council, Mr. Cyril Bibby, and Mr. R. Weatherall, educational secretary of the council. Further particulars may be had from the director of extramural studies, The University, Manchester, 13, or from the secretary of the council, Tavistock House North, Tavistock Square, London, W.C.1.

Nuffield Rheumatism Fellowships

The Nuffield Foundation is prepared to receive applications for these fellowships from medical men and women who wish to obtain advanced training to enable them to specialise "in the diagnosis, treatment and study of chronic rheumatism." The annual value of a fellowship will be between £500 and £800, with an additional grant for travelling expenses abroad where necessary. Candidates should have spent at least one year since qualification in the general medical practice of a hospital and should preferably hold the M.R.C.P. Service officers may apply for fellowships to be tenable on their release from the Forces. Further particulars will be found in our advertisement columns.

Cancer Research Congress

The programme of the fourth International Cancer Resear Congress, which is to be held at St. Louis, Missouri, fro Sept. 2 to 7, will cover the general biology of cancer, ætiolo (viruses, chemical carcinogens, hormones, and environmental factors), biochemistry, radiotherapy, and the development of nuclear physics, chemotherapy, and various clinical aspects. Further information may be had from Prof. Alexander Haddow, Chester Beatty Research Institute, *The Royal Cancer Hospital (Free), Fulham Road, London*, S.W.3.

THE Spanish review *Psicotecnia*, of Madrid, is to cease publication under that title, its place being taken by two new periodicals: *Revista de Psicologia General y Aplicada* and *Boletin de Psicotecnia*.

Diary of the Week

MARCH 30 TO APRIL 5

Monday, 31st

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
5 P.M. Sir Cecil Wakeley: Surgery of the Thyroid Gland.

Tuesday, 1st

ROYAL COLLEGE OF SURGEONS
5 P.M. Dr. J. F. Brailsford: Bone Tumours.

Wednesday, 2nd

ROYAL COLLEGE OF SURGEONS
5 P.M. Dr. Brailsford: Bone Tumours.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
2.30 P.M. *History of Medicine.* Mr. N. M. Matheson, Mr. W. J. Bishop: Exhibition of Medical History in Postage Stamps. Dr. W. H. McMenemey: James Johnstone the Elder and James Johnstone the Younger of Galabank and Worcestershire.
8 P.M. *Surgery.* Mr. A. H. McIndoe: Dupuytren's Contracture. Mr. Richard Battle: Plastic Surgery in the Treatment of Chronic Ulcer of the Leg. Mr. D. N. Matthews: Tattooing in Plastic Repair.

Births and Deaths

BIRTHS

BATTLE.—On March 19, at Woking, the wife of Mr. Richard Battle, F.R.C.S.—a son.

DUDGEON.—On March 16, in London, the wife of Dr. Alastair Dudgeon—a son.

FLOYER.—On March 12, in London, the wife of Squadron-Leader M. A. Floyer, M.B.—a son.

GODBER.—On Feb. 10, at Kuala Lumpur, Malaya, the wife of Dr. Greville Godber—a daughter.

HAMBLING.—On March 12, at Woking, the wife of Dr. John Hambling—a son.

JENNINGS.—On March 12, in Dublin, the wife of Dr. O. B. Jennings, Colonial Medical Service—a daughter.

LISTER.—On March 18, at Newcastle-on-Tyne, the wife of Surgeon Lieutenant James Lister—a daughter.

RIDLEY.—On March 18, the wife of Mr. Frederick Ridley, F.R.C.S.—a daughter.

RONALD.—On March 15, the wife of Dr. James Ronald, of Stirling—a daughter.

SHAW.—On March 15, at Colchester, the wife of Dr. J. P. Shaw—a son.

SHEERS.—On March 16, at Tunbridge Wells, the wife of Dr. Geoffrey Sheers—a son.

VULLIAMY.—On March 18, in London, the wife of Dr. D. G. Vulliamy—a son.

WILDE.—On Feb. 24, the wife of Dr. J. F. Wilde.—a son.

WINNER.—On March 18, in London, the wife of Dr. H. I. Winner—a son.

DEATHS

BARBER.—On March 15, in London, Frederic Samuel Barber, M.R.C.S., aged 86.

CRICHTON.—On March 19, at Fordwich, Kent, Arthur John Moncrieffe Crichton, M.B. St. And.

DUCKWORTH.—On March 18, in London, Geoffrey Duckworth, M.R.C.P., aged 46.

GREG.—On March 17, at Carnforth, Arthur Hyde Greg, O.B.E., M.B. Camb., F.R.C.S., aged 75.

GROSVENOR.—On March 17, at Arnside, Westmorland, William Clayton Grosvenor, M.A. Glasg., M.D. Edin., F.R.C.S.E., aged 80.

MACKENZIE.—On March 13, at Virginia Water, Stephen Morton Mackenzie, M.A., M.B. Camb., aged 86.

MORTON.—On March 21, in London, James Livingstone Morton, M.B. Belf., aged 47.

MOXON.—On March 8, at St. Jacques, France, Herbert William Moxon, B.A. Camb., M.R.C.S., aged 65.

NEILAN.—On March 16, at Scarborough, John Alexander Neilan, L.R.C.P.I., D.P.H.

PARRY.—On March 20, in London, Herbert Lloyd Parry, M.R.C.S., aged 86.

SHARPE.—On March 15, at West Keal, Lincs, William Salisbury Sharpe, M.D. Durh., F.R.C.S.I., M.R.C.P.

TUDOR.—On March 14, at Leamington Spa, Dorothea Mary Tudor, M.B. Durh.

CLINICAL APPROACH TO PREVENTIVE MEDICINE*

PERRIN H. LONG
M.D. Ann Arbor, F.R.C.P.
From the Department of Preventive Medicine, Johns Hopkins University School of Medicine

LAST spring, when I read the report on the U.S.A. medical curriculum, prepared by the Association of Interns and Medical Students from the returns of a widely disseminated questionnaire, I was amazed to find that instruction in public health (preventive medicine) stood third in the list of subjects which, in the opinion of the respondents, should be de-emphasised. This surprised me, not only because it ran counter to current social, economic, legislative, and educational trends, but also because it was derived from that segment of our profession which ordinarily is advanced in its social and educational consciousness.

This report should not be lightly dismissed. We cannot ignore it by remarking that the sample was probably inadequate, that it reflects the intellectual immaturity of the students and the undesirable educational features of the accelerated programme, or that it is symptomatic of either the disorganisation or the over-organisation which has existed in the teaching of preventive medicine during the past few years. Rather, it seems to me, this report must make us all stop and think about the general approach we are making to preventive medicine, the content and placing of our courses, and the philosophies with which we are attempting to inculcate our students. We should approach the subject with a spirit of inquiry and in a mood for self-criticism. Let us do this individually and collectively since the philosophies and methods of instruction in preventive medicine—because of the lack of a clear definition of the subject (which is so well shown by our various titles), and because of the nature of our individual training—vary more in medical schools in U.S.A. than do those of practically any other subjects included in the medical curriculum.

WHAT PREVENTIVE MEDICINE IS

A review of the current philosophies and trends in the teaching and practice of preventive medicine is necessary for an appraisement of the various methods of instruction used in presenting this subject to the students. As Ryle (1943) has so ably pointed out, "three great historical epochs exist in preventive medicine." During the first epoch the initial approaches to sanitation, proper working conditions, adequate housing, &c., were made, and empirical methods for the control of infectious diseases, such as typhus, yellow fever, smallpox, typhoid fever, and cholera, were put into effect. These measures were continued and extended in the second epoch under the influence of the development of microbiology and sanitary science to a point which, at least in certain parts of the world, has brought many infectious diseases under control and reduced their ravages to a minimum. At present we are living in the end of the second and in the beginning of a third epoch, in which prominence will be given to the prevention of non-infective diseases, the rehabilitation of the sick, and the mitigation of chronic or degenerative disease, and physicians, if they wish to survive either professionally or economically, will become increasingly conscious of the necessity for maintaining a primary interest in the promotion of health rather than the alleviation of illness.

Sir George Newman (1932) conceived of medicine as having three aims: the cure of disease (curative medicine); the prevention of disease and the modification of the course of established disease (preventive medicine): and the conservation of the natural defences of individuals and communities through favourable environmental and other factors to produce a way of life favourable to health (conservative medicine, constructive medicine, or hygiene). In his opinion, when efforts in the prevention or the modification of disease are directed towards the protection of the community and the improvement of its external environment, they fall within the realm of public health.

Leathers (1938) defined the subject as follows: "Preventive medicine constitutes a part of clinical medicine, obstetrics, pædiatrics, and psychiatry, and even much of surgery. Its purpose is to avert those disorders for which there are specific preventive measures, to detect early by accurate and thorough methods of diagnosis the beginnings of illness for which remedial therapy may be applied. Its objective is to aid in the solution of social, economic, and welfare problems of the community in relation to disease. It involves the uses of a specific technique in dealing with the public. The application of the principles of preventive medicine through organised administrative procedure in relation to local, state, or national needs constitutes public health."

Perkins (1942) has written: "Preventive medicine is not a specialty. . . . It is not public health. . . . It is not hygiene or sanitation. It is a philosophy and a science having practical application in every phase of clinical medicine. . . . Preventive medicine must maintain contact with clinical medicine at all points" and "should be a clinical branch."

Smillie (1943) states that preventive medicine "comprises those activities that are the direct responsibility of the individual in the prevention of disease, and in the promotion of the health of himself and his family. . . . The person who is most responsible (for these activities) is the private practitioner of medicine, who serves as health adviser to each family in the community." Public health, on the contrary, "encompasses those activities that are undertaken for the prevention of disease and the promotion of health that are a community-wide responsibility." They are not carried out by a practitioner of medicine.

Barnes (1943) and Anderson (1943) believe that public health is a specialty which should not be taught as such in medical schools, because it is beyond the needs and scope of the average medical student. Both emphasise the epidemiological approach to the study of disease, and Anderson feels there is a definite need for coördinating the instruction regarding communicable diseases (epidemiology) with the clinical instruction in these diseases.

Hitchens (1943) has emphasised the importance of instruction in environmental sanitation to provide the student with the proper appreciation for public health.

Wampler (1943) feels that, as "the most important function of the physician is to keep his patients well," and as this concept is the keystone to the intelligent practice of industrial medicine, an approach to preventive medicine through industrial medicine offers much hope in teaching.

Grant (1943) has concluded, after almost twenty-five years' experience, that environmental case-studies offer a valuable approach in the teaching of preventive medicine.

Probably Ryle (1943) has summed up the implications of the latest British concepts in this broad field when he says that social medicine is not just another name for preventive medicine, and that social medicine and socialised (State) medicine are not synonymous. It is his belief that social medicine is a direct development in and expansion from clinical medicine, and that it concerns the group as well as the individuals comprising the group in regard to sickness in the family and in the community:

> "It embodies the idea of medicine applied in the service of man as *socius*, as fellow or comrade, with a view to a better understanding and more durable assistance of all of his main and contributory troubles which are inimical to active health, and not merely to removing or alleviating present pathology. It also embodies the idea of medicine applied in the service of *societas*, or the community of men, with a view towards lowering the incidence of all preventable disease and raising the general level of human fitness."

In concluding this review of concepts of the content and teaching of preventive medicine, I wish to dwell at some length on the views set forth by Smith and Evans (1944):

> "Preventive medicine might be logically defined as all medicine that seeks to alter the course of disease or to better

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* Read before the Conference of Professors of Preventive Medicine on Sept. 30, 1946.

was based on the following observations. Nine out of ten of the graduates of the Johns Hopkins University School of Medicine enter into the practice of medicine or surgery or the specialties. As has been pointed out by Smillie (1943), the mission of undergraduate instruction in preventive medicine is not "to prepare students to become grade-B health officers" but rather "to meet their obligations as private practitioners of medicine." If most of one's students become practitioners it seems logical to attempt by the clinical approach to inculcate the philosophy, besides assisting other clinical departments to provide a knowledge of the practical aspects, of the prevention or modification of disease, especially the promotion of health.

A further consideration of teaching in preventive medicine brought me to the problem of the present curricula in our medical schools. From the day a student enters medical school practically his total outlook is focused on diagnosis and treatment. Anatomy, bacteriology, biochemistry, physiology, pharmacology, and pathology are more or less exciting and at times completely isolated milestones along the road to the clinic. All of us can remember the excitement and the intense satisfaction which pervaded us when at last we had worked up our first "case." We had a feeling that we had arrived.

The philosophy of clinical teaching at the bedside, so laudable in its inception, because it took medical students from lecture halls into hospital wards, has become restricted in its concept. The interest of the medical student is focused on the sick man recumbent in a hospital bed. But slight attention is paid to what brought the patient to the hospital, and when, owing to his own natural resistance or to the administration of one of the few "specifics" in modern medicine, he becomes ambulatory, interest in him rapidly wanes. Little consideration is given to his problems of convalescence or to his physical and mental rehabilitation.

Medicine today has become more specialised and more technical, with the result that its students are required to assimilate vast quantities of precise and intricate information. This is the result of the remarkable progress which has characterised medicine during the last quarter of a century. With the continuous increase in the definition of our knowledge, medicine and the teaching of medicine have tended to be compartmentalised in our medical schools. Disease has become a jigsaw puzzle whose integral parts are scarcely ever put together by one person to obtain the whole. Specialists and corps of technicians are required for its solution. Research is "directed and coördinated," because it is thought that many fields have become too broad for the individual endeavour. Is it any wonder, then, that the instructor and the student, staggering together under the impact of the increasing and continuous flow of new medical knowledge, have little time, as Ryle (1943) has said, for "the old ætiological interest and humanism of our fathers"? It is beginning to appear that the more they learn the less they understand. The eminent specialist, the great worker in research, and the expert and dexterous surgeon have become the gods of the students, and specialisation their goal. It is in such a milieu that preventive medicine must compete for the students' attention and contemplation, and it seemed to me that as a subject it would fail in its aims unless presented upon an equal and integrated basis in all of the school years by instructors who were well grounded in the various fields of general medicine, besides being imbued with the philosophy of preventive medicine.

Health economics and the social, environmental, and religious aspects of illness are directly concerned with, and stem from, the patient or groups of patients. It is therefore obvious that, for a proper understanding of the economy of health and the cost of illness, and for the proper appreciation of the rôle played by social and environmental factors in disease, a broad knowledge of clinical medicine is needed. In the approach to teaching in these fields, it has therefore seemed to me that the clinical approach is logical, because only through such an avenue can a proper appreciation of the many problems be achieved. I do not mean to infer by this statement that use should not be made, in teaching preventive medicine, of the material which can best be collected, analysed, and presented by trained non-medical observers; nor do I feel that the contributions made to medicine by the newer sociology should be neglected. The assistance of all branches related to medicine should be enlisted and the experts in the various fields employed in teaching programmes—but always under the supervision and guidance of one who, through training and experience in the natural history of disease, can leaven the presentation with the clinical aspects of the problem under discussion.

Finally, it is my belief that, from the point of view of pedagogy in preventive medicine, the clinical approach is preferable. One of the dangers in all types of education is for the instructor to present material which is either beyond the intellectual comprehension of his auditors or sharply limited in its subject interest by the instructor's own training and interests. The great teacher is easily understood. Instructors who have had a broad training in general medicine, with the daily multiple contacts with patients which such a training requires, generally have the ability to explain things medical in relatively simple terms. If this simplicity can be coupled with a sympathetic enthusiasm (but not emotional instability) and an ability to present the facts logically, the unrelated subjects which often make up the content of preventive medicine can be brought into a perspective which is proper in its relation to the remainder of the medical curriculum.

TEACHING

When preventive medicine stems from the clinical approach, biostatistics becomes "quantitative methods in medicine," with instruction in vital statistics reduced to the necessary minimum and the accent placed on the mathematical approach to diagnosis and prognosis, the quantitative testing of alleged "data," and the development of a logical rather than an impressionistic approach to the problems of illness. Patients can and should be used in this teaching, and the terminology of biostatistics, at present tending to become a jargon, can be reduced to English.

Epidemiology, shorn of much of its methodology and technology, becomes the natural history of disease when approached from clinical medicine. The discussion of the origin, spread, and course of disease, of those natural or artificial factors which tend to alter its spread, of its patterns and of the effect of political, social, religious, economic, and environmental factors which affect such patterns, is a basic requirement if a proper philosophy of preventive medicine is to be inculcated in the students. Indeed, this course, if not restricted and narrowly limited by the thinking of the first and second epochs of preventive medicine, could be termed the foundation course of general medicine. It is obvious that teaching, dealing with the social, economic, and environmental aspects of illness, must stem from the patient and his record. The economy of health and problems of medical care of the ill originate from the patient and lose much of their reality when presented in the abstract from masses of cold and often lifeless statistics. Their interpretation and elucidation gain much from clinical understanding. The same is also true in so far as the teaching in the communal aspects of medicine is concerned. Who can really understand or appreciate deeply the problems of the group unless he has a thorough knowledge of the problems and reactions of the individual?

lupus cured with the enormous dosage of 1000 g. of cod-liver oil daily. Evidently this treatment was too heroic, for the dose was reduced by his successors to something more palatable but ineffective, and Emery was forgotten. The next advance in lupus therapy was the introduction of heliotherapy and of concentrated ultraviolet light as local treatment by Finsen in 1897. In 1927 Sequeira and O'Donovan showed that the addition of daily general artificial light baths enhanced the effect of local light.

The next stage was the isolation of vitamin D from cod-liver oil and the preparation of vitamin D_2 by exposing ergosterol to ultraviolet light, culminating with the isolation of pure calciferol in 1931. Credit for this goes to many biochemists, starting with Mellanby in 1919. At first it was feared to give calciferol in massive doses because of possible toxic effects, such as had occurred with 'Vigantol' (*Lancet* 1946). It was used in small experimental doses in rickets, until in 1936 a child being treated for spasmophilia (Harnapp 1936) inadvertently swallowed a dose of 15 mg. (600,000 units). Not only did the child survive but the rickets was rapidly cured, and the way was open for Charpy to start treatment of lupus by this means in 1941.

The claim of a cure by Charpy (1943) was supported during the next two years by many French dermatologists. These were listed by Bureau (1946) in order as follows: Gougerot and Gaullier, Clement Simon, Touraine, Degos, Michel and Pellerat, Thiers, Huriez, Garric, and Bureau and Barrière. The earlier reports claimed 100% cure; but, later, less success was claimed. A cure in 70–100% of cases is now claimed in France, according to a referendum recently conducted among the French dermatologists by Charpy (1946). There was, however, one much less favourable reply from Meyer (1946), whose experience, much larger than that of the others, is mentioned below.

As part of the treatment Charpy emphasises that the addition of calcium is necessary, though in 1944 he favoured a fractionated or more intensive method of giving the calciferol. Also, in the Charpy method, local treatment of residual lesions is used occasionally.

Bureau and Barrière (1945) reported one case cured without the addition of calcium. Meanwhile, in England, Dowling and Prosser Thomas (1945) had been treating lupus with massive doses of calciferol independently for two years, also without calcium and usually with less associated local treatment: their results were equally good.

Histological cure was reported by Charpy (1945), Peyrie (1945), and Bureau (1946), in one case with negative serial sections of the residual scar and in another with negative biopsy of the scar and negative result from guineapig inoculation. Vachon (1944), however, found histological evidence of lupus still present in a series of 4 cases treated with calciferol without local treatment. Vachon and Feroldi (1945) did not find histological cure in any of 7 cases treated by the Charpy method, but the biopsies may have been made too soon (Charpy 1946). Vachon and Feroldi also found no calcium deposits in any of their sections. This finding contrasted sharply with those of Levaditi and Li Yuan Po (1930) in experimental tuberculosis in rabbits treated with irradiated ergosterol (two years before pure calciferol became available) where completely calcified follicles in tuberculous orchitic tissue were found.

Clinical reports on the effects of calciferol in other forms of systemic and cutaneous tuberculosis have been made by Bell (1946), Lapierre et al. (1946), Thiers et al. (1946), Wallace (1946), Macrae (1946), Jones (1946), and Wilkinson (1946). A complete bibliography of the preceding references is given in *Ann. Derm. Syph., Paris*, for May–June, 1946.

TABLE I—RESULTS OF TREATMENT OF LUPUS WITH CALCIFEROL

Months under observation	No. of cases	No. in which D_2 alone had no apparent effect	Associated general light baths	Associated local treatment	Worse	Relapsed	No change	Improved but not healed	Healed	Healed lupus cases; D_2 substituted for general light without relapsing	% of active cases either improved or healed	% healed
11–12	12	4	0	11	0	0	1	9	2	—	*92*	*17*
10–11	30	6	3	15	2	0	1	17	9	1	*90*	*31*
9–10	30	6	4	20	0	2	4	15	9	—	*80*	*30*
8–9	9	1	1	3	0	0	0	6	3	—	*100*	*33*
7–8	19	3	3	11	0	0	3	10	6	—	*84*	*32*
6–7	12	4	1	6	0	2	1	6	1	2	*70*	*10*
5–6	12	5	1	8	0	0	5	6	1	—	*58*	*8*
4–5	26	14	1	13	1	0	12	6	5	2	*46*	*21*
Totals	150	43	14	87	3	4	27	75	36	5	*77*	*25*

Toxic effects, as distinct from symptoms of intolerance, have been reported from the use of calciferol in lupus dosage by Merklen (1945), Bureau and Gougerot (1945), Bureau (1945), and, in a case of hypoparathyroidism, by Eaton (1946).

Findings in serial estimations of the blood-calcium level have been reported by Dowling and Prosser Thomas (1946) and Meyer et al. (1946). Findings in serial estimations of the blood-sedimentation rate have been published by Vachon (1944), Meyer et al. (1946), and Feeny (1946).

RESULTS

None of the 150 cases in the present series has been under observation for less than four months, as it was thought that a shorter period would not allow sufficient time for continued improvement or relapses to be noted. The dose of calciferol used was 100,000 units daily, and this was increased to 150,000 units if it was thought that the patient could tolerate the larger dose or was not improving satisfactorily on the smaller one. Occasionally the dose was temporarily reduced to 50,000 units daily, or the initial dose was 50,000 units, and this was raised, if well tolerated, to the larger doses.

Table I shows the progress of the cases in month groups, the degree of success or failure obtained, and the extent to which the therapy formerly in use was retained. These results should be compared with those of Meyer et al. (1946), who observed a similar number of cases for two years (1944–45). Of their 148 cases, 31 (21%) were cured and remained so, 25 relapsed after apparent cure, 72 were improved but not cured, and the remaining 20 (13%) were failures. The degree of success or failure obtained is very similar in these two investigations, the only large-scale ones hitherto reported. The smaller number of relapses in the London Hospital group may possibly be explained by the conservatism in the use, without histological confirmation, of the word "cure," which has long been customary at this lupus clinic. For example, O'Donovan (1944) indicates the large experience necessary to give a positive clinical opinion on this point, and Burrows (1938) draws attention to the periods of quiescence which alternate with periods of spread in lupus. A striking example of what can happen in a "sound" lupus scar occurred while this investigation was in progress:

A middle-aged woman, whose lupus had developed in childhood and had been "cured" or "sound" for a considerable time, attended for periodic examination. It was noted that since her previous attendance she had developed a granulomatous looking nodule in the middle of her solitary lupus scar. Biopsy of the complete nodule and repeated blood examinations showed that this was a nodule of lymphatic

It might be asked at this point how the type of teaching just described can be put into effect, and how preventive medicine can be established as a clinical subject. To begin with, *departments of preventive medicine should* be staffed with members who by training will not only be acceptable for appointment on clinical staffs of teaching hospitals but also can hold their own in clinical and research fields. Secondly, teaching in preventive medicine should be *integrated with instruction in all* departments of a medical school. Every effort should be made to have the various phases of its philosophy presented to students, interns, and staff in discussions of all clinical problems. Other departments should be encouraged to utilise the student's knowledge of quantitative methods in medicine to further the development of a logical, rather than an impressionistic, type of thinking in medicine. *Too often in clinical instruction the* quantitative approach to the preparation or analysis of data is ignored or even disparaged by those who are unfamiliar with the proper rôle of statistical methods in medicine. Thirdly, representation should be sought on all professional boards of teaching hospitals for members of the department of preventive medicine to provide the necessary leaven of humanism. Fourthly, separate clinical facilities are unnecessary if the staff of the department has been properly integrated with other staffs of the hospital. In those university medical centres in which the supervision of the health and the medical care of students, nurses, interns, employees, &c., is a responsibility of the department of preventive medicine the infirmary for the minor sick should be under its direct charge. A medical-centre health clinic provides a direct approach for instruction in and the practice of preventive medicine. Its value cannot be overestimated.

TRENDS

I have stated previously that I would not attempt to define preventive medicine, because I felt that it was not a science but rather a philosophy of the teaching and practice of medicine. However, I do believe that it is possible to outline certain of the important trends in this subject and to formulate its aims. I cannot agree wholly with Ryle when he says that social medicine is "a logical development *from* [italics mine] and a direct expansion of clinical medicine." If he had only said "in" instead of "from" clinical medicine, we would be in complete agreement. "Preventive medicine," "social medicine," "eubiotic medicine," or whatever one desires to call that branch of medical teaching and practice in which we are interested, can no more be separated from general clinical medicine than can the stethoscope from the clinician, or the scalpel from the surgeon. All attempts at such a separation are artificial in their conception and create a confusion rather than a clarity of purpose and mission. The fruits of our best efforts towards the promotion of health, the prevention or alteration of the ravages and effects of disease, the better understanding of the economic, social, and environmental factors in health and disease, indeed the whole of our philosophy in medicine, will be reflected primarily in the attitudes which we create in our colleagues and students.

We are living in an age which has produced and will continue to produce great changes in the social and scientific structure of our profession. Today, while the fruits of medical progress are being enjoyed in some parts of the world, in other parts medical care has been reduced to a minimum. It is a time of simultaneous sunrise and twilight in medicine. We have entered a period in which more than ever before it is the duty of our profession to maintain its historical perspective. We must not fear bold experimentation in the promotion of health, but at the same time we must not confuse hypothesis or theory with the truth. We must be prepared to present the facts which will permit an informed electorate through its representatives to exercise its proper opinion in respect to medical care. It is a time in which logical and [illegible] thinking and intellectual honesty concerning problems medical care should displace superficial emotionalism, cant, or *laisser-faire* reactionism. We must free ourselves from the traditions created by the spirit of the guild in a time when disease was the normal state of mankind, and lead the way in perpetuating health rather than sedulously occupying ourselves with the problems of disease. It is the time when the practice of preventive medicine should become the preoccupation of every physician and surgeon.

TOWARDS SELF-EXTINCTION

Despite the broad advances which have been made in most fields of medicine during the last century, there is still ample time, both in the teaching and practice of medicine and its specialties, to proclaim and practise those humanistic principles which have been lost sight of in the process of learning more and understanding less. It should be our purpose by precept and by example to advance in the teaching and practice of general medicine those principles in the promotion and protection of human health and welfare which have always pertained and still pertain to the broad field of medicine and are not bound down by narrow specialisations. We exist because others have either forgotten or neglected certain basic precepts of medicine.

With this philosophy in mind, what should be the aim of a department of preventive medicine? It should be one of gradual self-extinction in every medical school. Its course should be carefully charted, and its success should only be considered complete when, owing to its efforts and its endeavours, the level of the instruction in and practice of humanistic medicine has been raised to such a point in all departments in a medical school that the continued presence of a department of preventive medicine is unnecessary.

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CALCIFEROL IN TUBERCULOSIS

REVIEW OF 150 CASES OF LUPUS VULGARIS

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REVIEW OF 21 CASES OF PULMONARY TUBERCULOSIS

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A YEAR'S experience (1945–46) in the treatment of lupus vulgaris at the London Hospital with massive doses of calciferol (vitamin D_2) is recorded here. At the same time its therapeutic effect in pulmonary tuberculosis was investigated at the Kettlewell Hospital, and a report of the findings is included.

Lupus Vulgaris

(P. J. F.)

The story of how calciferol came to be used at Dijon in the treatment of lupus is told by Charpy (1946), the original user. It had been known for a long time that the administration of cod-liver oil was beneficial in tuberculosis, and Emery in 1848 recorded 74 cases of lupus cured with the enormous dosage of 1000 g. of cod-liver oil daily. Evidently this treatment was too heroic, for the dose was reduced by his successors to something more palatable but ineffective, and Emery was forgotten. The next advance in lupus therapy was the introduction of heliotherapy and of concentrated ultraviolet light as local treatment by Finsen in 1897. In 1927 Sequeira and O'Donovan showed that the addition of daily general artificial light baths enhanced the effect of local light.

The next stage was the isolation of vitamin D from cod-liver oil and the preparation of vitamin D_2 by exposing ergosterol to ultraviolet light, culminating with the isolation of pure calciferol in 1931. Credit for this goes to many biochemists, starting with Mellanby in 1919. At first it was feared to give calciferol in massive doses because of possible toxic effects, such as had occurred with 'Vigantol' (*Lancet* 1946). It was used in small experimental doses in rickets, until in 1936 a child being treated for spasmophilia (Harnapp 1936) inadvertently swallowed a dose of 15 mg. (600,000 units). Not only did the child survive but the rickets was rapidly cured, and the way was open for Charpy to start treatment of lupus by this means in 1941.

The claim of a cure by Charpy (1943) was supported during the next two years by many French dermatologists. These were listed by Bureau (1946) in order as follows: Gougerot and Gaullier, Clement Simon, Touraine, Degos, Michel and Pellerat, Thiers, Huriez, Garric, and Bureau and Barrière. The earlier reports claimed 100% cure; but, later, less success was claimed. A cure in 70–100% of cases is now claimed in France, according to a referendum recently conducted among the French dermatologists by Charpy (1946). There was, however, one much less favourable reply from Meyer (1946), whose experience, much larger than that of the others, is mentioned below.

As part of the treatment Charpy emphasises that the addition of calcium is necessary, though in 1944 he favoured a fractionated or more intensive method of giving the calciferol. Also, in the Charpy method, local treatment of residual lesions is used occasionally.

Bureau and Barrière (1945) reported one case cured without the addition of calcium. Meanwhile, in England, Dowling and Prosser Thomas (1945) had been treating lupus with massive doses of calciferol independently for two years, also without calcium and usually with less associated local treatment: their results were equally good.

Histological cure was reported by Charpy (1945), Peyrie (1945), and Bureau (1946), in one case with negative serial sections of the residual scar and in another with negative biopsy of the scar and negative result from guineapig inoculation. Vachon (1944), however, found histological evidence of lupus still present in a series of 4 cases treated with calciferol without local treatment. Vachon and Feroldi (1945) did not find histological cure in any of 7 cases treated by the Charpy method, but the biopsies may have been made too soon (Charpy 1946). Vachon and Feroldi also found no calcium deposits in any of their sections. This finding contrasted sharply with those of Levaditi and Li Yuan Po (1930) in experimental tuberculosis in rabbits treated with irradiated ergosterol (two years before pure calciferol became available) where completely calcified follicles in tuberculous orchitic tissue were found.

Clinical reports on the effects of calciferol in other forms of systemic and cutaneous tuberculosis have been made by Bell (1946), Lapierre et al. (1946), Thiers et al. (1946), Wallace (1946), Macrae (1946), Jones (1946), and Wilkinson (1946). A complete bibliography of the preceding references is given in *Ann. Derm. Syph., Paris*, for May–June, 1946.

Toxic effects, as distinct from symptoms of intolerance, have been reported from the use of calciferol in lupus dosage by Merklen (1945), Bureau and Gougerot (1945), Bureau (1945), and, in a case of hypoparathyroidism, by Eaton (1946).

Findings in serial estimations of the blood-calcium level have been reported by Dowling and Prosser Thomas (1946) and Meyer et al. (1946). Findings in serial estimations of the blood-sedimentation rate have been published by Vachon (1944), Meyer et al. (1946), and Feeny (1946).

TABLE I—RESULTS OF TREATMENT OF LUPUS WITH CALCIFEROL

Months under observation	No. of cases	No. in which D_2 alone had no apparent effect	Associated general light baths	Associated local treatment	Worse	Relapsed	No change	Improved but not healed	Healed	Healed lupus cases: D_2 substituted for general light without relapsing	% of active cases either improved or healed	% healed
11–12	12	4	0	11	0	0	1	9	2	—	*92*	*17*
10–11	30	6	3	15	2	0	1	17	9	1	*90*	*31*
9–10	30	6	4	20	0	2	4	15	9	—	*80*	*30*
8–9	9	1	1	3	0	0	0	6	3	—	*100*	*33*
7–8	19	3	8	11	0	0	3	10	6	—	*84*	*32*
6–7	12	4	1	6	0	2	1	6	1	2	*70*	*10*
5–6	12	5	1	8	0	0	5	6	1	—	*55*	*8*
4–5	26	14	1	13	1	0	12	6	5	2	*45*	*21*
Totals	150	43	14	87	3	4	27	75	36	5	*77*	*25*

RESULTS

None of the 150 cases in the present series has been under observation for less than four months, as it was thought that a shorter period would not allow sufficient time for continued improvement or relapses to be noted. The dose of calciferol used was 100,000 units daily, and this was increased to 150,000 units if it was thought that the patient could tolerate the larger dose or was not improving satisfactorily on the smaller one. Occasionally the dose was temporarily reduced to 50,000 units daily, or the initial dose was 50,000 units, and this was raised, if well tolerated, to the larger doses.

Table I shows the progress of the cases in month groups; the degree of success or failure obtained, and the extent to which the therapy formerly in use was retained. These results should be compared with those of Meyer et al. (1946), who observed a similar number of cases for two years (1944–45). Of their 148 cases, 31 (21%) were cured and remained so, 25 relapsed after apparent cure, 72 were improved but not cured, and the remaining 20 (13%) were failures. The degree of success or failure obtained is very similar in these two investigations, the only large-scale ones hitherto reported. The smaller number of relapses in the London Hospital group may possibly be explained by the conservatism in the use, without histological confirmation, of the word "cure," which has long been customary at this lupus clinic. For example, O'Donovan (1944) indicates the large experience necessary to give a positive clinical *opinion* on this point, and Burrows (1938) draws attention to the periods of quiescence which alternate with periods of spread in lupus. A striking example of what can happen in a "sound" lupus scar occurred while this investigation was in progress:

A middle-aged woman, whose lupus had developed in childhood and had been "cured" or "sound" for a considerable time, attended for periodic examination. It was noted that since her previous attendance she had developed a granulomatous looking nodule in the middle of her solitary lupus scar. Biopsy of the complete nodule and repeated blood examinations showed that this was a nodule of lymphatic

TABLE II—RESULTS OF CALCIFEROL THERAPY IN CASES TREATED IN THE PAST WITH RADIATIONS

Nature of radiation	No. of weeks treated	General light or local treatment	Clinical effect of calciferol	Nature of radiation	No. of weeks treated	General light or local treatment	Clinical effect of calciferol
X rays	21	Loc.	None*	X rays	28	..	None
Radium	32	Loc.	Improved*	,,	26	Loc.	Improved
X rays	34	..	Improved*	,,	17	..	Improved
,,	19	..	None	,,	17	Loc.	Deteriorated
,,	20	Loc.	None	,,	22	..	Improved*
,,	44	Loc.	Improved	,,	22	..	Sound lupus case which remained sound
,,	42	Loc.	Initial improvement, then relapsed	,,	22	Loc.	None
,,	46	..	Improved*	,,	46	Loc	Improved
,,	40	..	Improved*	,,	45	Loc.	Improved
,	41	Gen.	Improved (? due to oral D, ? due to carbon arc baths)	,,	44	..	None
,,	20	..	Improved	Grenz rays	45	..	Improved

* = Apparent cure (6 out of 22 cases).

leukæmia. There were no other signs or symptoms, and this patient still does not complain of anything several months later.

Before the advent of calciferol therapy there was 20% failure in treating lupus with general and Finsen light (Sequeira and O'Donovan 1927, Lomholt 1934). With the addition of calciferol there is little or no alteration in this percentage. The great advance has been the time saved (half to two-thirds) and the greater ease in treatment. The third and last two columns of table I indicate that treatment is increasingly efficacious for nine months. The third column shows that, though in 43 cases (29% of the 145 active cases) there was no apparent effect from the use of calciferol alone, nearly a third of these were in the group observed for only four to five months.

The response to treatment in the 14 cases which also had general light baths was the same as that in the 130 cases which did not have general light, and it is impossible to say whether any improvement was obtained more rapidly. But in the vast majority of cases the patient was now independent of general light, and this is a great advantage. Most patients have general light treatment in their home districts, but it has always been difficult for many of them to get it more than two or three times a week. There were, however, two cases in the present series which relapsed when calciferol was substituted for general light baths. These patients had always relapsed in the past whenever general light had been discontinued. Charpy (1944) suggests that less success is obtained when there is liver insufficiency.

Figures do not do justice to the outstanding improvement noted in many cases or to the consequent moral uplift of a class of "untouchables."

Illustrative Cases.—In 6 cases long-standing mucosal lesions were healed within several weeks, but 1 of them relapsed while still on calciferol. The accompanying lesions on the skin improved much more slowly.

One case had relief in a fortnight from pruritus ani due to perianal lupus. Previously all treatment for two years had failed to relieve this symptom.

Another case, where no reactions could be obtained with Finsen light, was apparently cured with calciferol.

The incidence of cases with signs of old pu tuberculosis was 1 in 15, and the incidence of cases the development of lupus followed tuberculous in childhood was 1 in 11. Only 1 case now had pulmonary tuberculosis. While awaiting admission another hospital this patient was given 100,000 units calciferol daily for six weeks. On admission there also signs of renal tuberculosis. It was learned this patient then preferred to go home, where she fifteen weeks after the administration of calciferol been discontinued.

In 3 women who became pregnant the lupus improved: 1 of them, who had already improved before was given, became apparently sound after two months; another developed acute iritis for the first time in the seventh month of pregnancy. Wilkinson (1946) the case of a woman, not on calciferol, in whom the cleared when she became pregnant.

A case in which moderate hyperthyroidism had been present for twenty years did not improve an observed period of twenty weeks.

An unusual case was in a man, aged 19, with lupus of the chin. On calciferol alone there was rapid though incomplete healing for two months, but with keloid scars. Finsen light was then added to the therapy, with the formation of much pigmentation locally, but there was no further improvement during the next four months. There had been no history of other keloidal formation in this case.

Cases Previously Treated with X rays, Radium, or Grenz rays.—In the past, for those who had access to Finsen light, it had always been the aim to complete local treatment as soon as possible, lest old fibrous tissue should interfere with the absorption of the ultra violet rays. X-ray treatment, which often was excessive, caused a similar difficulty, besides causing an added carcinoma in some instances. The clinical effect of calciferol therapy on all the cases in this survey who had ever been treated with X rays, radium, or Grenz rays is shown in table II.

Many of these patients had been subjected to prolonged X-ray treatment in various clinics very many years ago before the dangers of this procedure had been appreciated. But the results summarised in this table do not greatly differ from those in table I. One would like to have a better understanding of the mode of action of calciferol on lupus, and an opinion, based on histopathological examination of many serial biopsies, before reaching any conclusion about these findings.

Cases of Lupus Carcinoma and Premalignancy.—In 3 cases there was lupus carcinoma, and in 9 others an active lupus with healed or potentially malignant accompaniments. The clinical effect of calciferol therapy in these cases is shown in table III. Of the 7 patients who had at any time developed lupus carcinoma 3 had previously been given X-ray treatment.

In this series calciferol had no clinical effect on established lupus carcinoma, but suspected premalignancy was dispersed in at least 3 cases (marked with an asterisk in table III). The development of granuloma annulare in one case after thirty weeks' calciferol therapy is noteworthy

OTHER OBSERVATIONS

Intolerance.—Symptoms of intolerance were present in 35 cases (23%) and took the form of nausea and anorexia with, very rarely, vomiting. The drug was dispensed either in a tablet or in a mucilage. Dowling and Prosser Thomas (1945) noted 21% intolerance in 38 cases, but Charpy (1946) had not observed this complication in any of his cases—probably because the vehicle was alcoholic.

The addition of vitamin B_1 (1 mg. t.i.d.) or yeast was without effect on tolerance in 24 out of 25 cases. In the remaining patient nausea, which had been present for three weeks, was relieved.

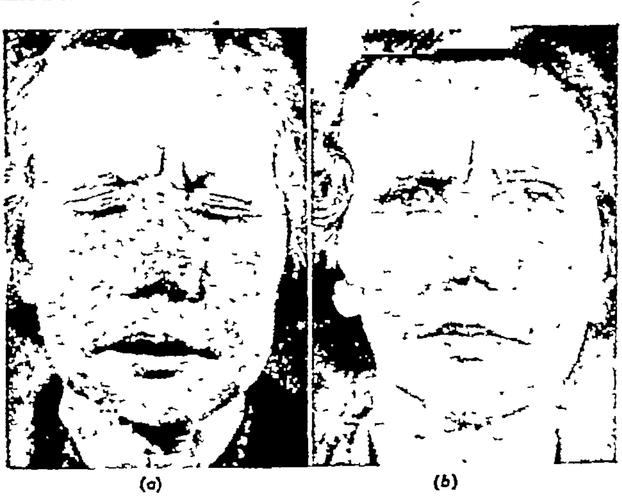
Addition of Calcium.—Calcium phosphate gr. 20 t.d.s.p.c. was given in 42 cases, and in 10 of them at the start of calciferol treatment. The clinical response in these 42 cases during a period of observation of 17–27 weeks was: 7 cases apparently healed; 21 improved but not healed; 11 unchanged; 2 relapsed; and 1 got worse. In 3 of these cases calciferol was better tolerated when calcium phosphate was added. One patient complained of flatulence, one of diarrhœa, one of constipation, one could take only half the dose of calcium, and another could take none.

It is now well established that the addition of calcium is not essential. According to McLaren (1946) it is dangerous to give one of the usually recommended preparations, calcium gluconate, by intramuscular injection. The amount of calcium given daily in the above cases was double the normal requirement, and there was no additional clinical benefit. Holmes (1945), who extensively reviews the literature and quotes many authors, states that seldom in his lifetime does the average person utilise even half the amount of calcium he consumes. But in France additional calcium is regarded as necessary, and one has only to study the statistics of Debré (1945) to see why this conception arose. These statistics concern food conditions in France during and after the German occupation, and it is certain that from 1941 until 1945 lupus patients in France, at least in the towns, were suffering from lack of calcium, even if they did get extra milk.

TABLE III—RESULTS OF CALCIFEROL THERAPY IN MALIGNANT OR PREMALIGNANT CASES

Previous radiation therapy	Weeks under observation	Weeks before signs appeared	Description	Clinical effect of calciferol at end of observation period
None	50	18	Lupus carcinoma	Lupus and carcinoma both healed 20 weeks after treatment of carcinoma with radon seeds
”	47	Present initially	Lupus carcinoma healed for 9 years; active lupus	Lupus improved +—
X rays	46	36	Cutaneous horn in lupus area	Lupus improved +; cutaneous horn unaffected
*Grenz rays	46	Present initially	Ulcerated lupus	Lupus improved +; potential malignancy dispersed
None	47	13	Healed lupus carcinoma; lupus still active	Improved +
*X rays	22	22	Septic erosion at site of healed lupus carcinoma	Improved ++, no development of malignancy
”	28	Present initially	Lupus in X-ray skin with healed lupus carcinoma	None
None	40	29	Papilloma in lupus area	Lupus improved ++, no sign of malignancy in papilloma
”	39	34	Recurrence of lupus carcinoma	None; after 15 weeks malignant area needed treatment with radon
*”	39	Present initially	Keratoses in lupus area	Improved ++ with reduction in size of keratoses
X rays	44	Present initially	Severe X-ray atrophy with active lupus	Lupus improved +; no development of malignancy; after 30 weeks granuloma annulare developed
”	42	25	3rd recurrence of lupus carcinoma	None on lupus; this recurrence more malignant; regional glands enlarged after 17 weeks

* Suspected premalignancy dispersed in these cases.


(a) (b)

Lupus vulgaris treated with calciferol: (a) Jan. 10, 1946, at start of treatment; (b) 14 days later.

Toxicity.—Apart from the frequent minor features of mental depression, giddiness, and abnormal tiredness, there were 6 cases of frequency of micturition, 2 of them with albuminuria, in the series. In each case the frequency and albuminuria ceased within two or three weeks when the calciferol was discontinued. There were also 2 cases of arterial calcification, the ages of the patients being 73 and 77. One of these, after six and a half months, showed calcification of the abdominal aorta and a single calculus in one kidney; the other, after four months, had calcification of the arteries of the pelvis. Calciferol was suspended for two weeks and four months respectively. In each case the lupus continued to improve on resumption of the drug and the patient felt no ill effects. The dose on resumption was reduced to 50,000 units daily.

Dosage.—The successful further use, after a rest interval, of a smaller dose of calciferol in the 2 cases where arterial calcification had occurred should be correlated with the parallel experience of Eaton (1946), whose case of hypoparathyroidism, showing peripheral arterial calcification after sixty-four days on 90,000–200,000 units of vitamin D_2 daily, had attained complete freedom from tetanic attacks of fifteen years' duration. Calciferol was then discontinued, and the attacks recurred. A smaller dose (max. 30,000 units daily) was then given for a year and though calcification increased slightly the patient was almost free of tetany. Meyer et al. (1946) thought that the size of the dose, so long as it was massive, did not matter in their 148 cases. Krestin (1945), who used massive doses in treating 83 infants with rickets, states that pure calciferol will not produce toxic signs until over 2,000,000 units has been given, but he found that his smaller massive dose (300,000 units) was less efficacious than his larger one (600,000 units). Another relevant finding is that of Heymann (1937), that storage of large doses takes place in the liver and other organs for so long as twelve weeks. The optimum dose in lupus has still to be decided, and there seems to be a large factor of personal idiosyncrasy to calciferol. Compare the spectacular response in a fortnight to a dose of 50,000 units daily (see figure) with those cases in table I where treatment with larger doses for many months was without clinical effect.

LABORATORY FINDINGS

Sedimentation-rate.—Vachon (1944) reported that with calciferol therapy the erythrocyte-sedimentation rate (E.S.R.), always raised in lupus, was reduced by 10–15% without however returning to normal. Meyer et al. (1946) maintain that the rate does not vary with the therapeutic results; when high, it remains high in spite of cure; and, when low, it is not modified accordingly. In general, they say, an initial high rate leads to hope of greater efficacy in treatment.

My impression, mentioned in a preliminary report on 32 cases (Feeny 1946), that this test is of no value in judging the progress of lupus treated with calciferol, was confirmed in a larger number of cases, as the following observations show.

The E.S.R. was recorded in 55 patients with active lupus to whom no calciferol had been given. Wintrobe's technique was used, the result being corrected for anæmia by determination of the hæmatocrit reading. In 80% of these cases the readings were within normal limits. Serial estimations of the E.S.R. were then made in 72 active cases during the first seven months of treatment with calciferol. In 30 of these cases (23 of which were improving clinically, 6 showing no change, and 1 getting worse) the readings remained within normal limits. In 15 cases readings above normal remained so, while clinically 13 of them were improving and 2 showing no change. In 20 cases readings rose to above normal, while clinically 14 of them were improving, 5 showing no change, and 1 deteriorating. The 7 remaining cases—i.e., those in which the readings returned to normal—all improved clinically.

The plasma fibrinogen was recorded in 12 cases, because an increased E.S.R. is found when the fibrinogen is raised. The method used was that of Cullen and Van Slyke with micro-Kjeldhal determination of the fibrin precipitate (Peters and Van Slyke 1932). The readings ranged from 280 to 418 mg. per 100 c.cm. and were therefore within the range of normal—i.e., 250–450 mg. per 100 c.cm. (Panton and Marrack 1945).

It may therefore be said that in lupus, a chronic and localised form of tuberculosis, the E.S.R. is usually normal; the exhibition of calciferol often causes an increase in the E.S.R.; and the E.S.R. is of no use as a test of the efficacy of lupus therapy.

Lymphocyte-counts.—The possibility that serial lymphocyte-counts might be of use as an index of progress in lupus therapy was also explored. Of 53 cases to which calciferol had not been given, the readings were within normal limits in 14, above normal in 29, and below normal in the other 10 cases. Serial estimations were made in 73 cases treated for four to seven months with calciferol. Readings within, above, or below normal limits remained so in 43 of these cases, 34 of which were improving clinically, 8 showing no change, and there being 1 relapse. Similarly with the other 30 cases, where variations took place up or down the scale without relationship to the clinical progress. This test also is of no use as a "sensitive index" in lupus therapy.

Analysis of Plasma Proteins.—In a case which had been treated with calciferol for six weeks an electrophoretic analysis by Dr. A. Hoch (lecturer in chemical pathology at the London Hospital Medical College) gave the following distribution of the plasma proteins in g. per 100 c.cm., the normal electrophoretically determined range (Lewis and McCullagh 1944) being given in parentheses in each case immediately after the reading: total protein 7·5 (5·94–7·82), albumin 4·7 (3·72–5·11), alpha globulin 0·3 (0·39–0·66), beta globulin 1·2 (0·65–1·07), gamma globulin 0·8 (0·60–0·91), fibrinogen 0·45 (0·16–0·48). The alpha globulin is below normal in this case, the beta globulin is above normal, and the gamma globulin (currently regarded as the likely holder of antibodies) is within normal limits.

AIDS FOR THE CLINICIAN

On what aids, besides serial biopsies, may the clinician rely to assess progress or to warn him of danger in the treatment of lupus? Dowling (1946) points out that hypercalcæmia occurs erratically and is not related to the clinical progress of the case, and Meyer et al. (1946) are of the same opinion, but Ingram et al. (1946), in a preliminary report, state that in cases of intoxication the diffusible calcium is invariably raised. Also, Wigley (1946) mentions preliminary work which suggests that estimations of the blood-phosphatase may be found to be a reliable index.

In the present series useful aids were serial photographs by a technique evolved in the photographic department, and routine radiography of the kidneys and arteries for signs of calcification.

SUMMARY

The history of how calciferol (vitamin D_2) came to be used in the treatment of lupus vulgaris is summarised, and the clinical results of this treatment in 150 cases observed for four to twelve months are reviewed. Local treatment was also given in 87 of the cases, and general light baths in 14 cases.

The success attained during this time would have taken twice or three times as long before the introduction of calciferol therapy but in almost all cases the patient was now independent of general light treatment. The treatment appears to be increasingly efficacious for the first nine months. The proportion of resistant cases was virtually the same as it had been before the advent of calciferol.

The response of cases which had at any time been subjected to X-ray, radium, or Grenz-ray treatment was the same as that in cases not so treated. Calciferol had no effect on lupus carcinoma, but clinically potential malignancy was dispersed in at least 3 cases.

The incidence of intolerance was 23%, and when calciferol is given by mouth an alcoholic vehicle should be used. The addition of vitamin B was without effect on tolerance in 24 out of 25 cases. The addition of calcium increased tolerance of calciferol in 3 out of 42 cases, but was without additional clinical benefit. It is shown that the addition of calcium is not necessary.

There were signs of toxicity in 8 cases, but in the 2 cases where arterial calcification occurred it was possible to resume treatment with calciferol after an interval. It is suggested that the optimum dose has still to be determined, and that idiosyncrasy plays a part.

Estimations of the erythrocyte-sedimentation rate and lymphocyte-counts were of no value in assessing progress in lupus therapy. Clinical aids found useful were serial photographs and routine radiography of the kidneys and arteries for signs of calcification. Analysis of the plasma proteins in one case showed that the level of gamma globulin, regarded as the likely holder of antibodies, was average.

I wish to thank Dr. A. Burrows, Dr. W. J. O'Donovan, and Dr. H. B. May for all the necessary facilities, and Prof. J. R. Marrack and Dr. F. Prescott for suggestions in the preparation of this article. Sister Hall, of the lupus clinic, gave valued assistance in charting the data.

Pulmonary Tuberculosis

(E. L. S. and L. M. F.)

With a view to making certain that any changes noted in pulmonary tuberculosis were due solely to the calciferol, cases in the following categories were chosen:

(1) Chronic open cases not considered suitable for collapse therapy other than phrenic crush, and which had been treated by rest in bed for some time.

(2) Cases in which effective collapse therapy had been maintained for more than three months, and in which the sputum remained positive.

(3) Open cases awaiting thoracoplasty, since they might have to wait a long time for operation.

It did not seem desirable to try this treatment on cases with rapidly spreading disease, those with much toxæmia, or those clearly in the terminal stages of pulmonary tuberculosis. Two of the patients had lupus vulgaris also. A total and differential white-cell count was made on all cases; but since no well-marked improvement occurred in any cases a subsequent count was not done.

TREATMENT

The length of treatment varied from 20 to 50 days (average 41·8). The total dosage varied from 500,000 to over 3,000,000 units (average 1,844,500). The treatment was begun with 25,000 units of calciferol and 3 mg. of vitamin B_1 daily. If no complications developed, the dose of calciferol was then raised to 50,000 units a day, with vitamin B_1 as before. After a period on this dosage, if there were still no complications, the dose was raised to 100,000 units a day. The urine was examined before treatment was begun, and afterwards at weekly intervals.

RESULTS

The E.S.R. rose in 12 cases, in some patients considerably, and fell in 5 cases. In only 1 case did the temperature, when elevated before treatment, fall during treatment. Of the 10 patients who were up for a few hours during treatment, 3 gained weight, 5 lost weight, and 2 remained the same.

Sputum.—In 2 patients who had a negative sputum before treatment it remained so after treatment. In 16 cases the sputum was positive before and after treatment. In 2 cases with a positive sputum treatment produced a negative or no sputum. In 1 case there was no sputum before and after treatment.

Complications.—Headache was complained of by 7 patients during treatment. Nausea was a common complication, occurring in 16 cases, and the vitamin B_1, which was given with a view to mitigating this, appeared to have no effect. Anorexia was common; and in 4 patients vomiting made it necessary to stop the treatment. Albuminuria developed in 3 cases.

Most of these complications appeared when the dose was increased and the patient had been under treatment for some weeks. Drowsiness was noted in 1 patient, but most of the patients during the first few days of treatment reported that they felt distinctly stimulated.

CONCLUSIONS

No clinical improvement in the lung condition was noted in any patient.

The 2 patients who had lupus in addition to pulmonary tuberculosis both showed immediate improvement in the skin condition; 1 patient, however, who had lupus of the mucosa of the nares besides on the face, showed no improvement of the mucosa, and treatment had to be *discontinued quite soon because of vomiting.*

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SAND-FLY FEVER

REVIEW OF 664 CASES

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IN Italy, during the autumns of 1943 and 1944, short-term fevers became increasingly frequent, until a major outbreak developed at the end of the war and in the autumn of 1945. Many of these fevers were probably abortive attacks of well-known febrile illnesses overcome by the reaction of the host before characteristic signs developed; we were probably dealing with many frustrated attacks of infective hepatitis, dysentery, atypical pneumonia, glandular fever, &c. This assumption gives reasonable sanction for the label "pyrexia of unknown origin" in the case of fevers lasting one or two days, but a very large group of these short-term fevers satisfied the rather ill-defined criteria for the diagnosis of sand-fly fever. This group, observed in a military hospital in Rome and another in Naples, is here reviewed.

THE VECTOR

There is no doubt that the case against the sand-fly *Phlebotomus papatasii* is complete, as numerous experiments have shown—e.g., Sabin et al. (1944), who studied 100 cases, many artificially infected by sand-flies. We doubt, however, whether the sand-fly is the only vector. In North Africa, where sand-flies were numerous enough to be readily visible, we saw in eighteen months very few cases of short-term fever of the sand-fly type, whereas they were numerous in Italy. There are undoubtedly sand-flies in the Naples area; but, even when this fever was epidemic, great difficulty was found in collecting sand-flies, though a large team of ex-patients was encouraged to look for them. In the Rome area the local physicians were emphatic that sand-flies were rare, though one of us (J. F.) saw more sand-flies in Rome than in the Naples area. On the other hand, culicine mosquitoes and *Stomoxys calcitrans* were in constant attendance during the whole epidemic period.

The fever is readily transmitted from an infected person to an experimental host by simple inoculation of blood-serum, as we demonstrated during the epidemic, and it seems possible that any blood-sucking insect may act as a minute hypodermic syringe, and larger insects are likely to be no less effective than the minute sand-fly.

Elkerton (1944), discussing oriental sore, has evidence that stomoxys may double the part of the sand-fly as infecting agent.

Gontaeva (1943), in an extensive investigation of 154 cases of sand-fly fever, could not find sand-flies in the area, but culicine mosquitoes were present.

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Sabin et al. (1944) carried out control tests with the mosquito *Aëdes ægypti*, the gnat *Culex pipiens*, and the flea *Pulex irritans* with negative results.

Doerr et al. (1909) found that the bedbug *Cimex lectularius* could not pass the infection.

It has been estimated (Sabin et al. 1944) that 1000 infective doses per c.cm. of blood are required if this possibility of mechanical transmission is admitted. Our observations suggest that individual susceptibility may admit of considerable variation of infective dosage. Thus, though the present weight of evidence does not incriminate insect vectors other than *Phlebotomus papatasii*, such a possibility cannot be ruled out.

EPIDEMIOLOGY

During the two summers when short-term fevers were prevalent, the numbers in one hospital were as follows:

Period	*1–5 days' P.U.O.*	*Sand-fly fever*
Jan.-March, 1944	68	0
April-June, ,,	61	8
July-Sept., ,,	221	311
Oct.-Dec., ,,	68	9
Jan.-March, 1945	23	0
April-June ,,	266	576
July-Sept. ,,	120	606

During the Italian summer of 1944 there was an epidemic of short-term fever, including cases which could confidently be labelled sand-fly fever. The epidemic began in July and was maximal in August. In the summer of 1945, however, the epidemic was well under way in May and involved three times as many cases as in 1944. It is remarkable that sand-fly fever was so prevalent in the post-hostilities period, when living amenities were much improved and there was no observed increase in insect vectors. This raises the question whether the infective period may not in some cases be prolonged.

Immunity and Second Attacks.—Cullinan and Whitaker (1943), writing of an area of high infectivity, report second attacks 2–12 weeks after the first in 15% of cases. Livshitz (1937), from a study of experimental and natural cases, concludes that a single infection gives protection for 1–3 months, and that about 20% of patients could be reinfected during the same epidemic. He believes that there is a high degree of immunity in persons resident in endemic areas. This may explain the absence of sand-fly fever among the native population in Rome and Naples during the outbreak among British and American troops. In this series there were no cases of second infection; hence the above-mentioned conclusions about postinfective immunity cannot be checked.

Infectivity.—It may be fallacious to assume that the evidence for a short immunity period precludes the possibility that some cases may remain infective for many months. Sabin et al. (1944) found in their experimental cases that the blood did not remain infective later than forty-eight hours after the onset, but a convincing answer to this query seems to require transmission experiments in natural cases at various periods after recovery. Modhkovski et al. (1937), on the other hand, have demonstrated the transovular transmission of the virus of sand-fly fever to the next generation of insects, and that the females of the second generation can infect immediately after hatching. The large increase in the number of cases in 1945, as compared with 1944 and preceding years, may therefore be due to (1) a long period of infectivity following recovery in a number of cases, and/or (2) the facts that a large insect population was infected in 1944, and that increased battalions were waiting to begin operations in 1945.

BITES AND WEALS

It was notable that, among all the cases seen in two widely separated areas, there were very few exhibiting insect bites or giving a history of having been bitten. In the whole series of 664 cases only 7 had definite insect bites; all of these were profusely bitten, but none showed weals. It is well known that many people suffer little or no inconvenience from insect bites and do not develop itching or weals. It was impossible to make an extensive survey, but among 500 soldiers who gave a history of irritation and weal formation to culicine mosquitoes and *Stomoxys calcitrans* there was no-one who had been treated for a short-term fever. This suggests that those who develop a local reaction to the bites of insects may have special protection from the sand-fly and its infection. Possible factors are: (1) persons who react locally are likely to take more precautions against bites for their own comfort, if not for safety; and (2) the rapid development of a weal may localise the injected virus and neutralise it, unless the protective mechanism is overwhelmed by multiple bites. This may explain the only failure to infect a susceptible case in the series of Sabin et al. (1944) even after repeated bites. One of us (J. F.), though frequently bitten by sand-flies, did not develop the fever; but, as with other insect bites, the skin responded to each sand-fly attack with a large weal.

SYMPTOMS

Out of 664 cases considered in this report, in 624 the onset was sudden, with a rapid rise of temperature *during the first twenty-four hours to its highest point.* The distribution of symptoms was as follows: headache 638, retro-orbital pain 364, body pains 410, vomiting 116, photophobia 55, giddiness 20. The headache was usually severe and was often accompanied by pain on moving the eyes and behind the eyes. When photophobia was an added symptom, there was a close resemblance to early meningitis. Neck stiffness was noted in 121, and a definite Kernig's sign in 3. The body pains were localised to muscles in most cases, but 7 had chest pain resembling pleurodynia, and 3 had colicky abdominal pains. In 30 pain was localised in the larger joints, but there were no physical signs. Though vomiting occurred in 116, the great majority had no notable gastro-intestinal upset.

PHYSICAL SIGNS

Conjunctival injection was noted in 240 of the 664 cases, and this number included most of the cases showing palatal congestion; 100 had small vehicles on the palate. Rashes developed on the first day of illness in 95 cases: macular 30, urticarial 5, petechial 20, herpes labialis 40. Fine crepitations were noted in 9 cases, usually in the mid-zone of the chest, and 4 had cough but no sputum; radiography showed no evidence of pneumonitis. The spleen was enlarged in 10 cases; this sign was specially looked for owing to the frequency of malaria, but in view of the highly malarious state of the troops this number of enlarged spleens was not considered significant with regard to sand-fly fever.

The fever was typical; pyrexia lasted 2–5 days in 89%, and three days in 83% (550 cases). The onset of symptoms and fever was so rapid that the patients were first seen when the fever was at its height. There was no characteristic shape of the curves. The fever rose quickly to its highest point in a steady curve, but defervescence was invariably a staggered descent with every variety of peaks. In this series secondary fever did not develop.

At the height of the epidemic 1 c.cm. of blood-serum taken from a typical case was *injected intravenously* into a healthy recipient. From the latter, when his fever was established, 1 c.cm. of serum was injected into a second recipient. In *both cases typical three-day* fever with the usual symptoms developed two and a half days after the injection. In both cases the temperature followed a steady rising and falling curve, in sharp contrast to the irregular fall in the natural cases.

BLOOD FINDINGS

In a small series of 138 cases we were able in general to confirm the findings of Sabin et al. (1944). In most cases there was a leucopenia on the first day of illness, so the fall in white cells began during the incubation period. The white-cell count regained normal figures by the eighth or ninth day. During the fever there was a continued fall in the percentage of neutrophils, accompanied by a rise in the percentage of lymphocytes, producing a relative lymphocytosis. After the fever had subsided, the relative percentages rapidly regained normal proportions.

CENTRAL NERVOUS SYSTEM

In common with other virus diseases, sand-fly fever often produces some reaction in the central nervous system. Of the 664 cases, 80 had some indication of cerebral irritation severe enough to call for lumbar puncture. All the major symptoms of sand-fly fever can be related to cerebral irritation, and the cases which called for examination of the cerebrospinal fluid (C.S.F.) had similar but more acute symptoms: intolerable frontal headache, nuchal stiffness, and, in 3 cases, Kernig's sign, photophobia, and vomiting. In 70 cases the total protein in the C.S.F. was increased, the lowest amount being 20 mg. and the highest 130 mg. per 100 c.cm. There was a leucocytosis in 35 and a lymphocytosis in 30 cases. The average cell-count was 90, and the highest 360 per c.mm. Sabin et al. (1944), in the 5 cases of their experimental series which underwent lumbar puncture, report normal C.S.F. In our series 15 had normal cell-counts, but either the protein or the cell-count was high in every case. In 15 cases with severe headache the fluid pressure averaged 140 mm. H_2O, with extremes of 130 mm. and 210 mm. In 10 other cases the pressure was normal.

Pearson (1941) reports 15 cases of short-term fever with pronounced cerebral symptoms. He divides them into two groups—sand-fly fever and benign lymphocytic meningitis—but concludes that the latter is a syndrome common to "a group of diseases," of which sand-fly fever is one. We agree that the diagnosis of benign lymphocytic meningitis is, in any case, only provisional. Shee (1942) found, in 27 out of 30 severe cases of sand-fly fever, papillœdema to the degree of 2–2·5 dioptres.

There is, therefore, evidence that the sand-fly virus has a special affinity for the cerebral meninges, and should be considered in the differential diagnosis of meningitis in areas where the sand-fly is prevalent. Cases with pronounced cerebral symptoms all had protracted debility, and about half of these had some mental depression.

DIFFERENTIAL DIAGNOSIS

When met with in epidemic form, sand-fly fever presents no difficulty in diagnosis, but isolated cases or small numbers are a considerable problem. In such cases the diagnosis can only be presumptive when the fever subsides in one or two days, but in the average case there is time for investigation.

Malaria must be excluded by repeated blood smears; a malarial attack similar in intensity to the average case of sand-fly fever usually has easily demonstrable parasites in the peripheral blood.

Cases with signs of cerebral irritation call for immediate lumbar puncture to exclude *cerebrospinal meningitis.* The cell-count is lower than is usual in the febrile stage of *poliomyelitis. Atypical pneumonia* is unlikely if the temperature is normal on the third or fourth day and there are no physical signs in the chest.

The pre-icteric fever of *infective hepatitis* may be indistinguishable from sand-fly fever (Havens 1944, Dixon 1944), since gastro-intestinal symptoms may develop in both. Since the average sand-fly case will have recovered sufficiently to be discharged well within fourteen days, a mistake in diagnosis may mean that the supposed sand-fly case will develop jaundice after being discharged, to the discomfiture of the medical officer. The blood changes in sand-fly fever do not alone suffice to differentiate it from other virus and protozoal fevers causing leucopenia and relative lymphocytosis. In circumstances which justify it, a transmission experiment goes far to confirm the diagnosis by the precision of incubation period, fever, and symptoms. When both diseases are prevalent, this possibility must always be borne in mind. During the interval between fever and the onset of jaundice in infective hepatitis there is usually some indigestion, and the subcostal area is usually tender even if the liver is not already palpable.

SUMMARY

The clinical findings in 664 cases of sand-fly fever, treated in two military hospitals in Italy, are reviewed.

The epidemiology is discussed, and it is suggested that other biting flies besides *Phlebotomus papatasii* may be vectors, and that the possibility of protracted infectivity should be examined.

Evidence is adduced that persons who develop local skin reactions to the bites may have special protection against the infection.

The differential diagnosis is discussed; the blood findings were found to be of little help in differentiating sand-fly fever from other virus infections.

The virus of sand-fly fever has a special predilection for the meninges and should be considered in the differential diagnosis of meningitis in areas where the sand-fly is prevalent.

The fever is usually short and without sequelæ, but it had a high nuisance value and could cause a serious shortage of man-power and dislocation of services.

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"... Britain has reason to be proud of its organisation for the treatment and social care of persons suffering from infantile paralysis and other crippling conditions. But these are the branches and leaves of the service; we must pay more attention to the roots. The work of the National Foundation in the United States should inspire us to devote more time and effort to research, to the study and the elimination of the causes of crippling disease. It would be short-sighted to confine attention to infantile paralysis alone, for there is a vast undiscovered country for research into allied conditions. Only recently an association has been formed for the care of children suffering from spastic conditions ... and St. Margaret's School, Croydon, has been opened as a research centre for the study of all aspects of this disability. What we need is a National Foundation for Research—'to lead, direct, and unify' the study of crippling conditions from the point of view of prevention. An organisation of this kind would be closely linked with the Medical Research Council, and its expert advisers would be drawn from universities, hospitals, and research institutions."—Special Correspondent, *Times*, March 24, p. 7.

PARAHÆMOPHILIA

HÆMORRHAGIC DIATHESIS DUE TO ABSENCE OF A PREVIOUSLY UNKNOWN CLOTTING FACTOR

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UNDER the term parahæmophilia a form of hæmorrhagic diathesis previously unknown is described here. The condition is characterised by a greatly reduced coagulability due to the absence of a hitherto unknown clotting factor necessary for normal coagulation.

A woman, aged 29, was admitted to the University Hospital, Oslo, in 1943 with an abnormal tendency to hæmorrhage.

Her parents and eight brothers and sisters were alive and in good health. No hæmophilia in the family. She was healthy the first three years of life, and grew and thrived normally. At the age of 3½ years she had severe nose-bleeding without any known provocation. It ceased spontaneously in some hours. On the third and fourth days afterwards she had further bleedings, the latter so severe as to cause loss of consciousness. The hæmorrhage was stopped by plugging. Five days after the last epistaxis the parents noted that the child had greatly reduced vision, and next day she was blind. Two days later (11 days after the first hæmorrhage) she was referred to the University Hospital ophthalmological department. Amaurosis was demonstrated, with dilated reactionless pupils and choked disks, of 4–5 D. Hæmoglobin 28%. Otherwise normal findings on routine physical and neurological examination. Wassermann reaction negative. In 6 weeks the choked disks became atrophied. She was blind for 6 months, but later she recovered central vision in the right eye. The left eye was permanently blind. The bleeding-time and clotting-time were not determined.

At the age of 4½ years she again had a severe nose-bleeding and was readmitted to the University Hospital. The hæmorrhage was again stopped by plugging. Hb 38%; thrombocytes 1,000,000 per c.mm.; bleeding-time normal; clotting-time of whole blood at room temperature 70 min.

Later on in childhood she had frequent nose-bleedings, sometimes severe. She constantly developed bluish "contusion marks" and large extravasations of blood followed small injuries. At the age of 12 years she received a blow on the right elbow, causing an enormous effusion, with swelling of the entire arm from shoulder to fingers.

Menstruation began at the age of 14 years. During the first few years it was usually profuse and of long duration, with the result that she had to stay in bed during these periods up to the age of 20. On one occasion she had to enter a hospital because of severe menorrhagia. She was given blood-transfusions, which had a rapid hæmostatic effect.

In November, 1942, she had an attack of intense pain in the right side of the abdomen, accompanied by dysuria and dark urine. She cannot say with certainty whether the urine was hæmorrhagic, and it was not analysed. Otherwise she has felt well on the whole. She has never had a hæmarthrosis.

On examination in April, 1943, she was of small stature, but had no developmental anomaly. Bluish "contusions" were found on various parts of the body. Routine physical examination gave negative results. There were no petechiæ or telangiectases on skin or mucosæ, and no enlargement of spleen or liver. Blood-pressure and urine normal.

Blood Examination.—Hb 98%. Red cells 4,500,000 and white cells 7000 per c.mm. The red and white cells gave normal values on differential counts. Thrombocytes 400,000 per c.mm. (Nygaard's method). Normal thrombocyte morphology.

Bleeding-time (Duke) 4½–5 min. Clotting-time: whole blood, by capillary method, 15 min. (normal for the method 2–5 min.); whole blood in dwarf test-tubes at 37° C 25 min (normal time 5–10 min.).

Clotting-time of oxalated plasma with optimal recalcification in dilution 1 : 4 at 37° C 350 sec. (normal time 80–120 sec.). Clot retraction normal. Prothrombin-time (Quick) 70–80 sec (*normal 15–20 sec.*).

Fibrinogen 0·3%. Albumin 4·3%. Globulin 2·9%. Calcium 9·7 mg. per 100 c.cm. and phosphorus 3·6 mg. per 100 c.cm. in serum. Ascorbic acid 0·50 mg. per 100 c.cm.

In this case a hæmorrhagic diathesis was present, which had lasted since childhood. Clinically it manifested itself as skin-bleeding, nose-bleeding, menorrhagia, and possibly a minor renal bleeding. Examination demonstrated prolonged coagulation-time and prolonged prothrombin-time by Quick's method. It seems natural to conclude that the hæmorrhagic diathesis was due to a prothrombin deficiency, as the prothrombin-time recorded should correspond to a prothrombin concentration below 10% of the normal, a value which according to experience is accompanied by a tendency to bleeding.

So high a degree of hypoprothrombinæmia is known only in hypovitaminosis K and in severe hepatic damage. A thorough clinical examination, comprising liver-function tests, and investigation of the stomach, intestinal tract, and bile-ducts, revealed no sign of any such lesion; and the condition did not respond to large doses of vitamin K.

In view of these findings it was natural to doubt the correctness of Quick's method of prothrombin determination.

TABLE I—COAGULATION-TIME FOR PATIENT'S PLASMA AFTER ADDITION OF VARIOUS AMOUNTS OF FACTOR V

Oxalated plasma (ml.)	Thrombokinase (ml.)	Factor V in buffer (ml.)	Veronal buffer (ml.)	CaCl₂ (25 mM.) (ml.)	Coagulation-time (sec.)
0·20	0·20	—	0·20	0·20	67·5
"	"	0·0025	0·1975	"	38·0
"	"	0·005	0·195	"	31·8
"	"	0·01	0·19	"	27·5
"	"	0·05	0·15	"	20·6
"	"	0·10	0·10	"	18·1
"	"	0·20	—	"	15·5
"	"	—	0·40	"	350·0
"	"	0·0125	0·3875	"	170·0
"	"	0·025	0·375	"	140·0
"	"	0 05	0 35	"	115·0
"	"	0·10	0·30	"	90·0
"	"	0·20	0 20	"	85·0

TABLE II—CORRELATION BETWEEN MAXIMAL THROMBOKINASE ACTIVITY OF VARIOUS TISSUE EXTRACTS ON CLOTTING-TIME BY OPTIMAL RECALCIFICATION OF OXALATED PLASMA

Thrombokinase	Coagulation-time (sec.)		
	Normal plasma	Hæmophilia	Parahæmophilia
Rabbit brain	14	13	58
Human brain	21	21	78
Placenta	12	13	53
Lung	16	16	68
Platelet emulsion: normal ..	78	92	222
Platelet emulsion: patient's..	72	94	190
Physiological saline solution..	120	480	365

EXPERIMENTAL INVESTIGATIONS

Quick's method is based, according to the classical theory of coagulation, on the assumption that the speed of coagulation is proportional to the speed of formation of thrombin, which again depends on the concentrations of prothrombin, thrombokinase, and calcium. If an excess of thrombokinase is added to oxalated plasma, and this is recalcified with an optimal amount of calcium, the concentrations of thrombokinase and calcium are effectively constant. The prothrombin then becomes the only variable component, and consequently determines the speed of coagulation.

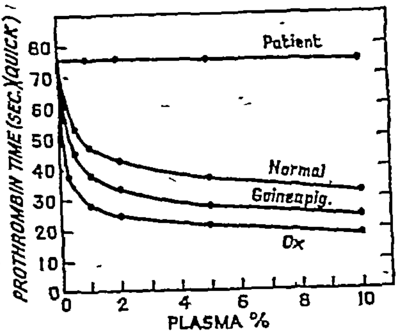

Fig. 1—Coagulation-stimulating effect on patient's plasma of small amounts of prothrombin-free plasmas examined by Quick's method for prothrombin determination.

In fibrinogen deficiency and in the presence of coagulation-inhibiting substances Quick's method fails. The fibrinogen concentration in this patient was normal (0·3%), and the reactivity of the fibrinogen to the thrombin was normal. The presence of substances inhibiting coagulation could also be ruled out, since the coagulation-time for normal plasma was not prolonged by addition of plasma from the patient.

To check the reliability of Quick's method, small amounts of plasma from normal persons were added to the patient's plasma, and the prothrombin concentration was determined by this method in the various mixtures. From the results it appeared that the prothrombin concentration increased more quickly than was anticipated from the amount of plasma added.

Prothrombin was then removed from various samples of normal plasma (two adsorptions with $Al(OH)_3$ followed by Seitz filtration), and variable quantities of this entirely prothrombin-free plasma were added to that of the patient. (Absolute freedom from prothrombin was proved by the absence of coagulation after addition of optimal amounts of thrombokinase and calcium.) The results (fig. 1) show that addition of prothrombin-free plasma caused diminution of the patient's "prothrombin-time" and consequently an apparent increase in the prothrombin concentration determined by Quick's method. Ox plasma and guineapig plasma had a greater effect than had human plasma, and prothrombin-free plasma from the patient was without effect, as anticipated.

Estimation of prothrombin by Quick's method failed, therefore, since the coagulation-time varied independently of the prothrombin concentration and depended on one or more additional factors in the prothrombin-free plasmas.

Normal conditions of coagulation in the patient's plasma could be restored by addition of 20% of prothrombin-free ox plasma. This effect of prothrombin-free plasma was unchanged after removal of fibrinogen (thrombin coagulation with subsequent inactivation of the excess thrombin by leaving for 30 min. at 37° C) and thrombokinase (Chamberland's filtration). The active factor which restored normal conditions of coagulation in the patient's plasma, therefore, could not be prothrombin, thrombokinase, calcium, or fibrinogen.

On the basis of these and other confirmatory tests it was concluded that the patient's blood lacked a substance found in normal blood and necessary to normal coagulation. This substance is not included in the classical theory of coagulation or in later theories of coagulation. This factor I have termed the fifth clotting factor—factor V. I have isolated this factor entirely free from the previously known factors of coagulation.[1]

Table I shows how addition of the isolated factor V produced normal coagulation in this patient after recalcification of the oxalated plasma, and after recalcification following the addition of thrombokinase by Quick's method. This latter test illustrates how Quick's so-called "prothrombin-time" may vary independently of the prothrombin concentration and depends on factor V.

In another test factor V was isolated from 100 c.cm. of normal plasma, sterilised by filtration, and injected into the patient intravenously. She experienced a slight shivering fit but no other reaction. One hour after the injection the coagulation-time after optimal recalcification of oxalated plasma was reduced from 340 sec. to 170 sec., and Quick's "prothrombin-time" had decreased from 65 sec. to 28 sec. The effect decreased gradually and entirely disappeared after 3 days.

The isolation of factor V and its function in the coagulation process are discussed in detail elsewhere,[1] evidence being adduced that pure prothrombin is not converted into thrombin by addition of thrombokinase and calcium alone. The formation of thrombin requires the presence of factor V, and the velocity of this reaction increases with increasing amounts of factor V up to a certain limit (fig. 2).

CONCLUSIONS

To summarise, thrombin formation may be expressed as follows:

Prothrombin + Factor V + Thrombokinase
+ Calcium → Thrombin.

I have demonstrated[1] that this reaction falls into two stages: (1) the formation of the actual prothrombin-converting enzyme, termed factor VI; and (2) the conversion of prothrombin to thrombin under the influence of factor VI in the presence of calcium. Factor V acts as a pro-enzyme for factor VI.

Parahæmophilia is caused by failure of the formation of factor VI owing to the lack of factor V. In hæmophilia the reaction is delayed because of the lack of free or active thrombokinase. In both cases the result is identical: a deficient formation of thrombin and consequent delayed and incomplete coagulation. This similarity in the pathogenic mechanism, together with the similarity in the clinical picture, justifies the designation parahæmophilia.

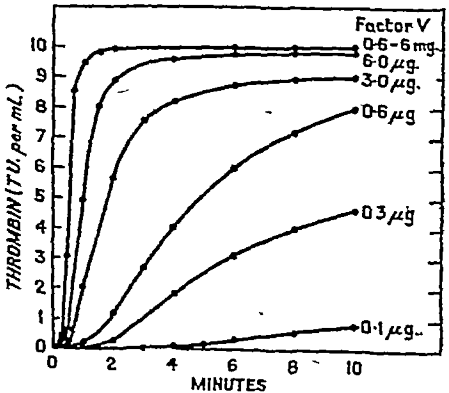

Fig. 2—Speed of thrombin formation by optimal concentration of thrombokinase and calcium and various amounts of factor V: prothrombin, 10 prothrombin units per c.cm. of mixture; thrombokinase, human brain (treated with acetone) in optimal concentration; calcium, 2·5 mM.; temperature, 37° C; pH, 7·3.

Factor V deficiency is a more adequate description of this lesion, but such a designation should be postponed until factor V has been given a more suitable name.

The differential diagnosis between parahæmophilia and hæmophilia is easy, as the faulty coagulation of parahæmophilia is not returned to normal by addition of thrombokinase as in the case of hæmophilia. Table II illustrates this relation by the use of various thrombokinase preparations.

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[1] Owren, P. A. *Proc. Norwegian Acad. Sci.* 1944, p. 21; *Acta med. scand.* (in the press.)

Parahæmophilia is rare, but the faulty coagulation demands considerable attention. This new knowledge of the coagulation process shows, among other things, that the usual methods of quantitative prothrombin determination are based on a dubious foundation, and it will influence our ideas about the pathology of prothrombin. The rôle played by factor v in clinical pathology will be the subject of further investigations.

SUMMARY

An account is given of a woman with a hæmorrhagic diathesis which had lasted since childhood, and had manifested itself by skin-bleedings, nose-bleedings, menorrhagia, and probably an isolated renal bleeding.

Prolonged coagulation-time and prolonged prothrombin-time by Quick's method were demonstrated.

The causal factor was not prothrombin deficiency but lack of a previously unknown coagulation factor named factor v.

The lesion has been termed parahæmophilia. It is probably not hereditary.

EFFECT OF WATER ON GASTRIC MOTILITY

A TEST FOR DUODENAL ULCER

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WHEN a recording balloon on the end of a Ryle's tube is introduced into the fasting stomach of normal man, the gastrogram obtained shows four types of waves. Two of these, respiratory and cardiac oscillations, are superimposed on the intrinsic waves resulting from changes in the intragastric pressure. The true gastric contraction is represented by a sharp-topped wave lasting 30 sec.; a less abrupt regular wave depicts a slow rise and fall of intragastric pressure caused by tonic contractions of the fundus—tonus rhythm (fig. 1).

Carlson (1916) observed that the ingestion of cold water inhibited gastric contractions for about 5 min. Anderson (1943) confirmed this inhibition, lasting 10–35 min., in normal subjects but not in patients with peptic ulceration, in some of whom the ingestion of cold water even stimulated gastric contractions. This abnormal response he called the "water reversal phenomenon."

This paper presents the results of an investigation on the effect of water on gastric motor function. The aims have been to investigate the physiological basis for the water response and to explore the possibility of its application to the diagnosis of duodenal ulcer.

METHODS

Gastric motility has been recorded by a modification of Carlson's technique, with the patient fasting, the swallowed balloon inflated to a standard pressure of 10 cm. H_2O, and a tambour-kymograph unit used for recording (fig. 2). Patients find this investigation less tedious and no more unpleasant than a fractional test-meal. To test the effect of water on gastric motility, the patient is given a small draught of tap water, or, if a double tube has been swallowed, 20 c.cm. of water is injected through the stomach-tube, and the test is signalled on the tracing.

RESULTS

The effect of water on gastric motor function was observed in normal subjects and in patients with active duodenal ulcer. In the normal group gastric motility was inhibited for about 5 min. (normal response); in the ulcer group either activity was increased (reversed response type I) or, where contractions were already well developed, existing activity persisted (reversed response type II) (fig. 3). In both groups the latent period was 45–60 sec.

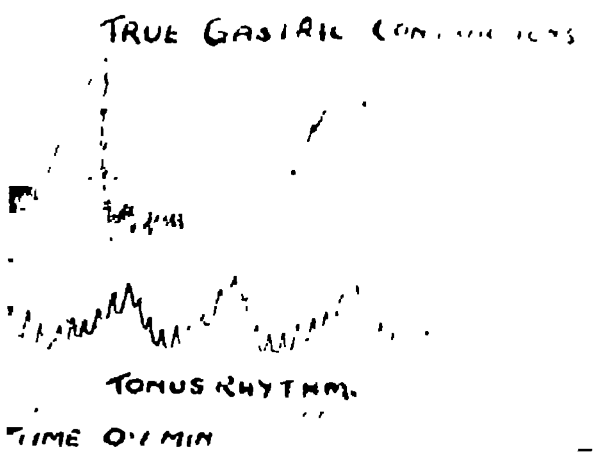

Fig. 1—Tracings of true gastric contractions and of tonus rhythm.

This confirmation of the observations of Carlson and Anderson seemed to justify a study of the physiological basis and possible diagnostic application of the gastric motor response to water.

PHYSIOLOGICAL BASIS

Site of Action.—Carlson believed that the inhibitory effect of cold water on gastric motility was due to afferent stimuli arising in the gastric mucosa. The modification of this response observed in patients with duodenal ulcer has led me to the view that the receptor for this reflex is in the duodenum. In support of this hypothesis, the following observations are offered:

I found that water, coloured with azorubrum, could be aspirated from the duodenum within 45 sec. of ingestion. Since the time taken by water to pass the pylorus corresponds to the delay in the development of the subsequent gastric motor response, it seems probable that the receptor point for the response is in the duodenum. This is supported by the results of a further experiment.

In 4 patients with gastric and duodenal tubes in situ 20 c.cm. of water at room temperature was introduced first into the duodenum and secondly into the stomach. After duodenal injection the latent periods for the water response were 18, 15, 20, and 22 sec.; after gastric injection the corresponding latent periods were 50, 45, 50, and 55 sec.

The fact that the water stimulates gastric contractions when the ulcer is duodenal but not when it is gastric (see below) also suggests that the receptor point is in the duodenum. When the duodenal ulcer has completely healed, the reversed response to water gives way to a normal response (see below).

Effect of Solution Tonicity.—The introduction of hypertonic solutions into the stomach is known to cause protracted inhibition of gastric motility in normal subjects. It therefore seemed useful to investigate the effect of solutions of different tonicity in cases of duodenal ulcer. In 15 patients with duodenal ulcer 20 c.cm. each of water, normal (0·9%) saline, 2% saline, 5% saline, and 10% saline, again at room temperature, was introduced into the stomach, and the gastric motor responses were recorded. As the test solution became more hypertonic an increasing number of patients gave a normal response (inhibition); in 14 patients 10% saline effected inhibition (fig. 4).

It therefore seems that, though water abolishes gastric activity in normal subjects, the stronger stimulus of hypertonic solutions is required in patients with duodenal ulcer.

Effect of Temperature.—The temperature of the water does not influence the type of gastric motor response but merely alters the duration of the response. In normal subjects I found that cold water (10° C) had a slightly longer inhibitory effect than hot water (50° C). Similarly,

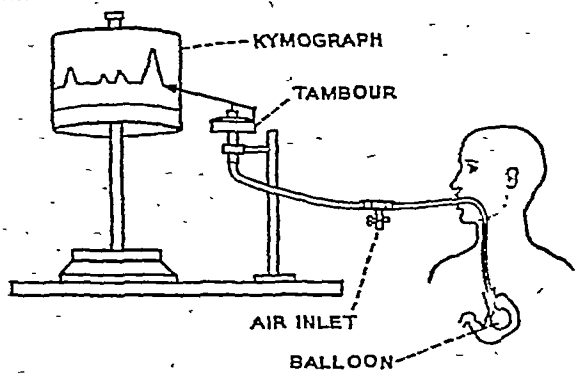

Fig. 2—Method of recording gastric contractions.

in duodenal-ulcer patients cold water had a longer excitatory effect than hot water. The type of response was always recognised without difficulty.

CLINICAL APPLICATION

To be of value in diagnosis (1) the water reversal response must be given consistently in patients with active duodenal ulcer; (2) it must be replaced by a normal response when the ulcer has healed; (3) it must not be given by other common causes of dyspepsia, such as gastric ulcer and gastric carcinoma; and (4) its inherent fallacies must be defined. The extent to which these criteria are fulfilled has been investigated:

(1) In 30 normal subjects the ingestion of water inhibited gastric contractions. In 90 patients with symptoms of duodenal ulcer and showing a crater on X-ray examination the water excited gastric contractions, gastric motility being increased in 68 and well-developed activity maintained in 22:

		GASTRIC CONTRACTIONS		
Condition	*Cases*	*Inhibited*	*Increased*	*Maintained*
Normal ..	30	30	0	0
Active D.U. ..	90	0	68	22

(2) To ascertain the effect of healing of the duodenal ulcer on the gastric response, the water test was applied to 15 patients who had remained symptom-free for at least a year after perforation of a duodenal ulcer and without any radiological evidence of activity. This group was chosen on the assumption that the ulcers had completely healed. A normal response (inhibition) was obtained in all cases.

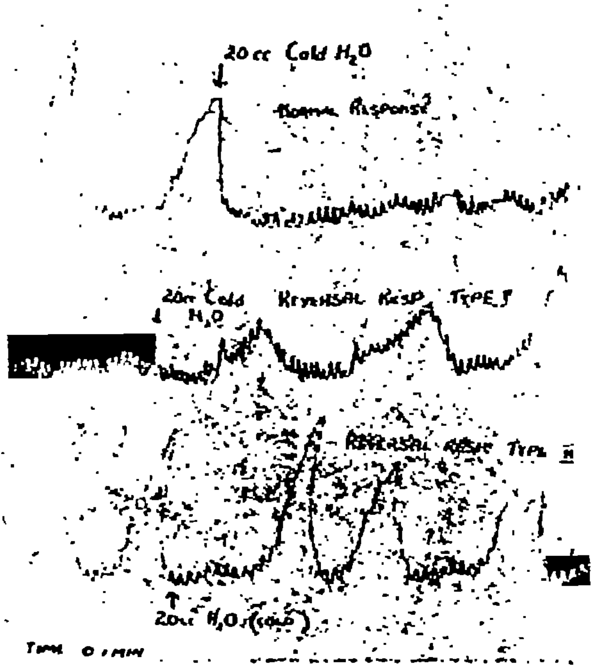

Fig. 3—Tracings of gastric motor responses to water test.

(3) The water test was applied to 34 patients with definite gastric disease (ulcer 12, carcinoma 22). A normal response was obtained in 33 patients. A reversed response was recorded in 1 patient with carcinoma of the stomach in whom, however, invasion of the duodenum was revealed at laparotomy.

(4) Carcinomatous involvement of the duodenum is so rare that it scarcely merits consideration as a possible fallacy in the water test. The only likely fallacy so far noted has been in patients with acute inflammation of the gall-bladder. Of 9 such patients investigated, in 2 the water test excited gastric contractions, and in 1 of these laparotomy revealed an empyema of the gall-bladder with adherent duodenum.

DISCUSSION

A gastric ulcer can usually be revealed with certainty with the aid of radiography and gastroscopy, but a duodenal ulcer cannot be so easily recognised. Endoscopy of the duodenum is not yet practicable, and the radiological demonstration of an ulcer crater in the duodenum is difficult. Thus Templeton (1944) reported 809 cases of clinically active duodenal ulcer in only 526 (65%) of which a crater could be demonstrated. The gastric response to water is proposed as a test to decide whether or not there is a clinically active duodenal ulcer. This test has the advantage of being objective, whereas the personal factor is an inherent weakness of radiological investigation.

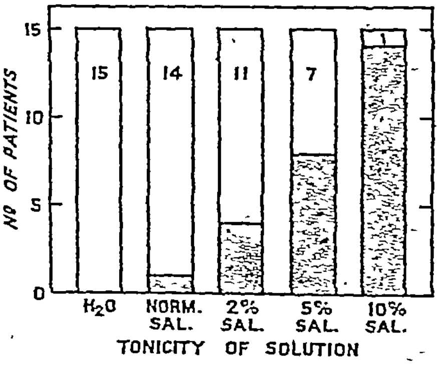

Fig. 4—Gastric motor responses in 15 patients with duodenal ulcer showing return of normal response (inhibition) with increasing tonicity of ingested fluid.

Besides its use in diagnosis, the gastric motor response to water may be used to test the healing of a duodenal ulcer. The gastro-enterologist who tries to assess the relative merits of various "cures" for duodenal ulcer quickly encounters difficulty in choosing an end-point for the healing of the ulcer. The absence of pain and of occult blood in the stool does not provide satisfactory evidence. The radiological disappearance of the ulcer crater almost certainly precedes actual healing. The gastroscopists have in fact shown that gastric ulcers often become "radiologically negative" for an appreciable time before complete healing is found gastroscopically. I suggest that the return of the normal gastric response to water (inhibition of contractions) is a dependable criterion of healing. Gastrograms are being recorded in duodenal-ulcer patients who become symptom-free and cease to show a crater on radiography. So far I have found that the gastric motor response to water may remain abnormal for as long as four weeks after a barium meal has shown no signs of ulceration.

SUMMARY

Ingestion of cold water inhibits gastric motility in normal subjects for about 5 minutes; hot water has a similar but briefer effect.

In the presence of active duodenal ulcer gastric activity is either unaltered or even stimulated by the ingestion of water.

The water test is therefore of value in the diagnosis of duodenal ulcer.

Evidence is presented which indicates that the receptor point for this gastric response to water is in the duodenum.

This duodenal mechanism, which normally inhibits gastric motor activity, is damaged by active ulceration but functions normally when the lesion has healed.

The water test can therefore be used to provide reliable evidence of healing.

I am indebted to my colleagues in the radiological department of the Western Infirmary, and to Prof. C. F. W. Illingworth for his direction and helpful criticism throughout this investigation.

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Carlson, A. J. (1916) Control of Hunger in Health and Disease, Chicago.
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Medical Societies

DEVON AND EXETER MEDICO-CHIRURGICAL SOCIETY

Tubal Patency Tests

ADDRESSING this society on March 20 Dr. MARGARET HADLEY JACKSON said that disorders of the fallopian tubes are commonly held to be a causative factor in nearly half all cases of infertility. Of 570 cases submitted by her to tubal patency tests, not much more than 30% had any tubal disorder (including complete occlusion, partial or temporary occlusion by spasm or stenosis, and lack of normal tubal peristalsis). This figure is lower than that of most workers. Moreover, after repeated patency tests total organic occlusion was present in only about 10%. If routine tubal patency tests are not carried out the cause of some cases of sterility will be missed. It should be remembered that the indications for these tests are not only diagnostic but also therapeutic, since pregnancy quite often follows.

With acute pelvic infections patency tests are naturally contra-indicated. The best time for doing them is during the middle third of the menstrual cycle—well away from menstruation, as near as possible to the date of ovulation and preferably just before it. With the patient in the lithotomy position, a bivalve plastic speculum is inserted; not more than 150–200 c.cm. of CO_2 should be used and pressure should never exceed 210 mm. Hg.

Gentleness and asepsis are essential; antispasmodics should be given whenever there is spasm; but anæsthesia is rarely necessary, and is indeed a disadvantage since the patient's coöperation is needed at the operation. Moreover, anæsthesia does not relieve tubal spasm. The operation causes slight pain rather like that of mild dysmenorrhœa, unless there is obstruction or unless pressure is raised unduly, whereupon mid-hypogastric pain, sometimes referred to the sacrum or iliac fossæ, ensues. The patient rarely feels sick or faint, and the whole procedure is often completed without her being conscious of anything more than the insertion of the speculum. Late effects include transient and usually moderate shoulder pain on sitting up or, after the use of iodised oil, pelvic and sacral aching. The importance of repeating the tests before accepting a diagnosis of complete occlusion cannot be over-emphasised.

Tubal insufflation and iodised oil injection are complementary tests. Insufflation is inexpensive and not troublesome, taking only about 10–15 minutes. With a regularly tested kymographic apparatus peristaltic movements, spasms, and stenosis of tubes can be accurately recorded; a volsellum need hardly ever be used. On the other hand, with insufflation alone it is impossible to be sure whether both or only one tube is patent; nor can a block be located; air-embolism and sepsis are possible but avoidable dangers. By means of uterosalpingography the shape, size, and position of the uterus and of the cervix can be visualised; filling defects and spasticity can be shown; fixation of the uterus can be demonstrated by screening; and the length and tortuosity of tubes and points of obstruction or occlusion noted. Moreover, iodised oil has a therapeutic effect; but the procedure takes longer and is more expensive, and since a volsellum is necessary it is more painful.

Reviews of Books

The Embryology of Behaviour

The Beginnings of the Human Mind. ARNOLD GESELL, M.D., PH.D., SC.D., in collaboration with CATHERINE S. AMATRUDA, M.D. London: Hamish Hamilton. Pp. 289. 21*s*.

WITH some nineteen previous books on child development behind him, Dr. Gesell has produced a twentieth which is perhaps the most ambitious to date. In this he and his collaborator attempt to "indicate how an organic complexus of behaviour is built up concomitantly with the bodily development of the embryo, fœtus, and neonate." The authors do not, however, appear to have been quite clear whether they were to produce a popular book or a serious contribution to scientific knowledge. The result in either case is somewhat unsatisfactory. This is particularly true of the sections dealing with antenatal development. Though profusely illustrated (largely from the works of other writers), they fail to give either a clear outline of what has been established experimentally about fœtal behaviour, or to add materially to it. Once birth is over, Dr. Gesell is on more familiar ground. The substance of the book is essentially the results of intensive study, by photographic and other methods, of some 22 premature infants admitted to the World's Fair Hospital (Infant Incubators Inc.). It has thus been possible to construct for different stages of prematurity certain behaviour norms comparable to those the author has previously established for full-term infants. This is a valuable piece of observation, and it is perhaps a pity that a study of behaviour in prematures should have been given a somewhat misleading title.

Radiologic Examination of the Small Intestine

ROSS GOLDEN, M.D., professor of radiology, Columbia University, New York. London: J. B. Lippincott. Pp. 239. 36*s*.

RADIOLOGICAL study of the small intestine has progressed very slowly, and until recent years only gross abnormalities were accurately reported. Prof. Ross Golden has long been attempting to correlate radiological abnormalities of pattern and motility with the clinical findings of diarrhœa, intestinal bleeding, and abdominal pain. This volume, the fruit of many years' laborious research, advances our knowledge considerably. He rightly insists that we need to know the basic facts about the action and control of the small intestine; and the first 50 pages deal only with the normal. There is a good chapter on the use of the Miller-Abbott tube for so-called small-intestine enemata. Appearances in disorders of nutrition are given much space, and changes in the earlier and less defined cases have been compared with findings in more advanced cases as they improved under treatment. This study had yielded much new information on abnormalities of bowel pattern with varying disturbances of motility. Professor Golden suggests that radiologists should abandon the term "deficiency pattern," since similar appearances can be produced by many conditions other than vitamin deficiency, and proposes instead "disordered motor function." Inflammatory disorders and tumours are considered in great detail, and there are good chapters on allergy and the action of drugs. He is well aware of the great gaps in our knowledge; but his work has gone an appreciable way towards filling them.

In the 15th edition of Pye's SURGICAL HANDICRAFT (Bristol: J. Wright, pp. 668, 25*s*.) Mr. Hamilton Bailey has supplemented the text with many new photographs and diagrams, and has presented material concisely under clear headings. His list of contributors should ensure that confidence in this trusted book is maintained.

The British mission of the Allied Control Commission to Rumania has published a stout loose-leaf volume on PENICILLIN, being a compendium, in Rumanian, of the British papers on the subject published in the last year. This able piece of work, which has been done entirely on the initiative of members of the mission, has been warmly welcomed by Rumanian doctors and their government. It sets an example which ought to be followed widely.

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THE LANCET

LONDON: SATURDAY, APRIL 5, 1947

The Crisis and the Service

ONE effect of the economic crisis is that the Government are being urged to drop their programme of nationalisation and give their whole attention to the needs of today. The suggestion has been heard that they may be obliged, among other things, to postpone the establishment of the National Health Service, and this suggestion seems to be associated with an idea that the task of bringing the service into being is too great to be accomplished in the twelve months remaining before the appointed day. In political life, of course, hardly anything is certain; and it is possible that before April 1, 1948, we shall have another Government or that the present Government will have departed from its firm intention to carry the scheme through. For anyone to count on any such a possibility, however, would be most unwise, and there is no reason to think that the arrangements required under the Act cannot be made in the allotted time. The machinery of hospital administration will soon be coming into action: by next month at latest the regional boards will be constituted; their first duty will be to appoint the management committees; and the transition from one form of management to another presents no insoluble problems. On arrangements for medical practice, the proceedings of the Negotiating Committee are wrapped in silence; but we shall not be far wrong in guessing that, with concessions on both sides, the differences between the Minister and the committee will be narrowed to one or two issues. It seems likely, too, that having considered these issues the profession will ultimately decide on participation in the service; and, if that is so, it would be well to make the decision as soon as possible. The earlier it is reached, the more time there will be for settling details in advance, and the less chance there will be of injustices and confusion that would benefit neither patient nor doctor.

If we are right in thinking that the National Health Service will be introduced according to schedule, we are left nevertheless with the disquieting question whether the economic situation will seriously damage its quality and development. Medical services are not necessarily any more expensive to the nation if they are maintained by the citizen as taxpayer rather than as private person; but to many people they appear so; and their progress is necessarily related more closely to the state of the Exchequer. If therefore the change to State ownership coincides with a big effort to reduce the weight of taxation there is danger that developments—even some which might have been possible under the old system—will be prevented by the general policy of keeping down all Government expenditure. The fact that it has to be raised in taxes and compulsory contributions might thus for a time make it harder, rather than easier, to find money for new hospitals, new health centres, and new health-workers.

But whatever the method of financing the service —and whatever Government is in power—the fundamental question will be: can a country in our position afford to devote more materials and man-power to medical work when these are needed for essential industries? If, as is probable, this question arises, we must be ready to show that efficient medical services are as necessary to a modern nation as they are to a modern army. If he is to give his best under difficulties the civilian, like the soldier, needs the best possible medical backing. And the full contribution which medicine can offer to national recovery cannot be made without large material improvements in many of the hospitals, clinics, and surgeries in which we now work at so much disadvantage.

Acholuric Jaundice

THE retirement of Prof. H. M. TURNBULL, F.R.S., from the department of morbid anatomy at the London Hospital has been marked by a special number of the *Journal of Pathology and Bacteriology*, all the contributors to which are his former pupils. Since the morbid anatomy of blood diseases is one of Professor TURNBULL's interests, it is appropriate that the articles should include one by LOUTIT and MOLLISON [1] on the classification of hæmolytic icterus (acholuric jaundice) into congenital and acquired types.

Ever since 1907, when CHAUFFARD first described the disease and WIDAL distinguished congenital and acquired forms, this division has been a source of controversy. The congenital or familial form usually presents a clear-cut clinical picture—recurring attacks of anæmia and jaundice appearing in childhood or early adult life; an enlarged spleen; a variable anæmia, sometimes severe, with most of the red cells appearing as small densely staining spherocytes showing excessive fragility in saline solutions; and signs of active hæmolysis, such as reticulocytosis, normoblastic hyperplasia of the bone-marrow, and high serum bilirubin with increased pigment excretion in the fæces but no bilirubin in the urine. The characteristic morbid anatomy of the spleen was graphically described by TURNBULL [2] as "conspicuous narrow venous capillaries in a lake of blood." The acquired form is much more vague: it appears later in life and is clinically more severe; the spleen is not so prominently enlarged; neither increased fragility of the red cells nor spherocytosis is so pronounced; and splenectomy often brings only partial relief, in contrast with the clinical cure in the congenital cases. There is no doubt that many of the acquired cases described were really hæmolytic anæmias secondary to some identifiable condition, such as secondary malignancy in the bone-marrow, but there remains a group of cases that appears to be primary.

Quantitative fragility tests revealed that many of the relatives of patients with congenital hæmolytic icterus had a minor but detectable spherocytosis and increased fragility of the red cells. It was then supposed that the primary defect was in the erythropoietic tissue of the bone-marrow, where spherical, unduly fragile red cells were produced instead of the

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1. Loutit, J. F., Mollison, P. L. *J. Path. Bact.* 1946, 58, 711.
2. Turnbull, H. M., in The Anæmias, by J. Vaughan, Oxford, 1936.

normal biconcave disks; and this applied to congenital and acquired cases, the only difference being one of degree. NAEGELI[3] together with DAWSON[4] and VAUGHAN[5] in this country and TILESTON[6] in America were among the supporters of this view, but MEULENGRACHT[7] maintained that the two conditions were separate and that acquired hæmolytic icterus was really a group of different diseases. Support for MEULENGRACHT's view came from several sources. In 1920 EPPINGER[8] had described, in addition to the splenic congestion typical of the congenital syndrome, at least two other histological pictures in the spleen in cases of hæmolytic jaundice—a pronounced histiocytic hyperplasia, sometimes associated with extramedullary hæmopoiesis, and one in which there were numerous small thromboses of capillaries and veins and consequent fibrosis. Such cases were described in this country by DAVIDSON[9] and by ISRAËLS and WILKINSON[10] in patients showing increased red-cell fragility and spherocytosis but with no detectable family history. The theory that spherocytes are produced only by a congenitally abnormal marrow received its most damaging blow from DAMESHEK and his co-workers in Boston,[11] who showed that spherocytes could be artificially produced in animals by the intravenous injection of hæmolysins, and that by varying the dose a whole range of hæmolytic syndromes, resembling the human syndromes from acute to chronic, could be produced. Their experiments led them to the view that spherocytes are formed outside the bone-marrow by the action of a hæmolytic agent on mature cells only, so that spherocytosis—and the parallel increase in red-cell fragility—is simply an indication of excessive intravascular hæmolysis. They again put the congenital and acquired varieties into one large group, the only difference being in the "dose" or effectivity of the hæmolytic agent; the symptomatic acquired cases—anæmias secondary to definite diseases like Hodgkin's disease, lymphosarcoma, and so on, or to drugs or poisons—were included; and SINGER and DAMESHEK[12] described 7 examples of secondary acquired hæmolytic icterus, 6 of which had spherocytosis and increased fragility of the red cells. Unfortunately, it proved rarely possible to demonstrate the hæmolysin, and the cases in which it could be demonstrated fell into the acquired group. Moreover, the hæmolysin may be only irregularly detectable; thus in a case described by STACEY[13] an autohæmolysin was demonstrable during a hæmolytic crisis but could not be found eight weeks later when the patient was clinically improved. The Boston school were obliged to postulate subdemonstrable concentrations of hæmolysin and prolonged or sudden action—a not very satisfactory explanation.

LOUTIT and MOLLISON[1] have now tackled the problem from a new angle. They have studied the survival of red cells in these patients, and have looked for evidence of sensitisation to hæmolysins by testing against a suitably prepared anti-human-serum serum. Completely opposing results were obtained in the congenital and acquired cases. In congenital hæmolytic icterus, normal red cells transfused into a patient survive normally; the patient's red cells transfused into a normal recipient survive only a short time (50% survival after 5–15 days, compared with the normal 50–60 days); and the cells are not agglutinated by anti-human-serum serum. After splenectomy, even when the patient is clinically cured, the patient's red cells are still rapidly destroyed by a normal recipient. In acquired hæmolytic icterus, normal red cells transfused into a patient survive only a short, or sometimes very short, time; the patient's red cells transfused into a normal recipient survive normally; and the patient's washed red cells are agglutinated by anti-human-serum serum. After splenectomy, the destruction of transfused normal cells is sometimes less rapid; clinical relief varies and is usually only partial. From these results LOUTIT and MOLLISON conclude that in the congenital form there is no evidence of any circulating hæmolysin or excessive activity of the reticulo-endothelial system; it is the red cells of these patients that are abnormally sensitive to the *normal* hæmolytic processes. In the acquired form there is no evidence of any abnormality of the red cells, but there is evidence of an intravascular hæmolysin that is rapidly destroying any circulating red cells—whether the patient's or transfused. They still agree with DAMESHEK and SCHWARZ that spherocytes are produced by the action in vivo of hæmolysins and are not produced by a congenitally abnormal marrow.

The ætiology of congenital hæmolytic icterus as proposed by LOUTIT and MOLLISON is as follows. Erythropoiësis is congenitally defective but the cells do not leave the marrow as spherocytes; they are unduly sensitive to normal lytic processes, and these, acting intravascularly, produce the spherocytic form. LOUTIT and MOLLISON think that lysolecithin may be the lytic agent responsible. It has been shown[14] that this substance acts particularly in the spleen when the blood is slowed in its passage through this reservoir. There is evidence, too, that red cells in the splenic vein show greater spherocytosis than those in the splenic artery, and a substance with the properties of lysolecithin has been extracted from splenic-vein blood. This would explain why clinical cure and a great diminution in all the signs of hæmolysis may follow splenectomy, even though the congenital defect of the red cells is unaltered. The acquired cases LOUTIT and MOLLISON regard as secondary, even when the original source of the abnormal hæmolysin cannot be identified, and they therefore urge that all these cases should, when possible, be classified according to their ætiology rather than on the red-cell changes that indicate only hæmolytic activity. MAEGRAITH and colleagues[15] have suggested that the hæmolysis in blackwater fever is due to a disturbance of the normal balance between tissue hæmolysins and lysin inhibitors in serum, the inhibitory power being much reduced. A similar disturbance may be the ætiological factor in the cases of acquired hæmolytic icterus in which no abnormal hæmolysin can be detected.

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[3] Naegeli, O. Blutkrankheiten und Blutdiagnostik, Berlin, 1931, p. 292.
[4] Dawson of Penn, Lord. *Brit. med. J.* 1931, 1, 921.
[5] Vaughan, J. The Anæmias, Oxford, 1936.
[6] Tileston, W. *Medicine, Baltimore*, 1922, 1, 355.
[7] Meulengracht, E. Der chronische hereditäre hämolytische Ikterus, Leipzig, 1922.
[8] Eppinger, H. Die hepato-lienalen Erkrankungen, Berlin, 1920.
[9] Davidson, L. S. P. *Quart. J. Med.* 1932, 1, 543.
[10] Israëls, M. C. G., Wilkinson, J. F. *Ibid*, 1938, 7, 137.
[11] Dameshek, W., Schwarz, S. O. *Medicine, Baltimore*, 1940, 19, 231.
[12] Singer, K., Dameshek, W. *Ann. intern. Med.* 1941, 15, 644.
[13] Stacey, R. *Amer. J. med. Sci.* 1946, 212, 586.
[14] Bergenholm, B., Fåhraeus, O. *Z. ges. exp. Med.* 1935, 97, 555.
[15] Maegraith, B. H., Findlay, G. M., Martin, N. H. *Lancet*, 1943, 1, 573.

Thus, what we know today confirms Widal's original idea that there are two clinically and ætiologically distinct forms of hæmolytic icterus: one, sometimes familial, in which abnormal red cells are rapidly destroyed by normal lytic processes; and another, with no familial element, in which normal red cells are rapidly destroyed by abnormal lytic processes. It remains to find suitable names: spherocytosis applies to both, so "familial spherocytic anæmia" and "secondary spherocytic anæmia" would be short descriptive terms; or, with Loutit and Mollison, we might be more explicit and term them familial and secondary hæmolytic anæmias of spherocytic type.

Treatment of Myasthenia Gravis

The neuromuscular defect in myasthenia gravis has been the subject of much research in the last few years, and its mechanism is becoming clearer. Clinical observation suggested that the essential defect was in transmission at the myoneural junction, and this was proved conclusively by Harvey and his colleagues[1] in 1941. There were three possible reasons for the interruption—too little acetylcholine might be produced; the acetylcholine might be destroyed abnormally rapidly by cholinesterase; or some substance similar in action to curare might block the action of acetylcholine. The last view was strongly supported by Wilson and Stoner,[2] who tested the serum of patients with myasthenia gravis on the isolated nerve-muscle preparation of the frog and found that it blocked neuromuscular transmission if the patients were not receiving 'Prostigmin,' whereas serum collected from patients during prostigmin treatment had no effect.

The first advance in treatment was an empirical one. In 1930 Edgeworth[3] found that ephedrine relieved the weakness of myasthenia gravis, and this was subsequently confirmed. In 1934 Mary Walker,[4] acting on the analogy between the symptoms of curare poisoning and myasthenia gravis, found that injections of prostigmin had a remarkable if transient effect on the muscle weakness; patients with profound weakness of the eye, face, and limb muscles might become almost normal within half an hour of the injection, but the effects wore off within 3–4 hours When prostigmin was found to be effective by mouth, though the dose was considerably larger than by injection, a new era opened for the sufferers from this disease. In many patients, however, increasing doses had to be given, and in some the myasthenic symptoms were not properly controlled even by large doses. A new drug—di-isopropyl-fluorophosphate (DFP)—which inhibits cholinesterase activity has recently been introduced at the University of Pennsylvania In 6 cases of myasthenia gravis Comroe and his colleagues[5] found that the cholinesterase activity of the blood-serum was completely inhibited by oral or intramuscular administration of DFP, and there was some increase of muscle power; but the effects were notably less than with prostigmin, while larger doses of DFP caused nausea, vomiting, and faintness which were not adequately controlled by atropine. The main advantage of DFP is that its action lasts much longer than that of prostigmin, and a combination of the two drugs might at times be helpful in treatment. Work is being carried on with congeners of DFP in the hope of finding a more efficient drug. If we accept the view that there is a curare-like substance in the serum of myasthenic patients, it is possible that prostigmin is more effective than DFP because it has a direct action on this substance whereas DFP relies solely on its anti-esterase activity.

Surgery offers an alternative approach. It was an old observation that cases of myasthenia gravis sometimes showed tumours of the thymus at autopsy, and on this basis Blalock and others[6] in the United States, and Carson and Keynes[7] in England performed thymectomy for the treatment of the disease. In 1946 Keynes[8] reported on 63 patients treated by thymectomy; there were 9 deaths, but 7 of these had occurred in the first 21 cases and the postoperative mortality had become steadily less. Of 41 patients followed up for a reasonable time 14 were apparently cured, 15 so much improved that the dose of prostigmin needed was considerably reduced, 3 only slightly improved, and 9 not improved at all There is no doubt that thymectomy is a real advance in treatment, especially in the younger patients with a relatively short history. In Paris a new surgical treatment has recently been introduced—bilateral denervation of the carotid sinus. Suprarenal cortical extracts have been thought to improve the symptoms of myasthenia, and this operation is supposed to cause hyperplasia of the suprarenal cortex. Thévenard and Leger[9] have operated on one case of severe myasthenia with respiratory crises. Improvement started within two days after the right sinus had been denervated, and the patient was normal within four months; she relapsed shortly after that, but after denervation of the left sinus she again improved and two years later was said to be practically normal though still taking small doses of prostigmin. This appears to be the only case so far treated by this method, and in such a fluctuating disease little can be deduced from the results in one case. Indeed, the absence of a careful follow-up of a large series before the introduction of prostigmin makes it difficult to assess the results of any new treatment.

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1. Harvey, A. M., et al. *Bull. Johns Hopk. Hosp.* 1941, 69, 1, 529, 547, 566.
2. Wilson, A., Stoner, H. B. *Quart J. Med* 1944, 13, 1.
3. Edgeworth, H. *J. Amer. med. Ass.* 1930, 94, 1136; *Ibid*, 1933, 100, 1401.
4. Walker, M. *Lancet*, 1934, i, 1200.
5. Comroe, J H, jun., Todd, J., Gammon, G. D, Leopold, I. H., Koelle, G. B., Bodansky, O., Gilman, A. *Amer. J. med. Sci.* 1946, 212, 641.
6. Blalock, A., Harvey, A. M., Ford, F R., Lilienthal, J. L jun. *J. Amer. med. Ass* 1941, 117, 1529.
7. Carson, J., Keynes, G. *Proc. R. Soc. Med.* 1942, 36, 140.
8. Keynes, G. *Ibid*, 1946, 39, 600; see *Lancet*, 1946, i, 739, 746.
9. Thévenard, A., Leger, L. *Pr. méd.* Feb 8, p 97.

Though still cramped through bomb damage and continued hospitality to other bodies, and hindered by staff shortage, the London School of Hygiene and Tropical Medicine lost no time at the war's end in setting itself to restore and surpass pre-war standards. The report for 1945–46 records that teaching for the D.P.H. was resumed in the late summer of 1945, with a duplicate course for 39 further candidates beginning in April, 1946; and other departments were almost as quick off the mark. Among the year's developments were the formation of a new department of human nutrition and the creation of a chair of clinical tropical medicine; plans for a department of occupational hygiene have been approved.

Annotations

CONVALESCENT HOMES

THERE is still doubt (and some anxiety) about the position of convalescent homes in the National Health Service. Will the Minister of Health take them over on the appointed day, like hospitals; or will they be allowed to continue as independent units, perhaps under some form of central supervision? These homes are mostly small and often highly individual. Good food, fresh air, and a care-free atmosphere are their therapeutic weapons, and there is a feeling that while the State can supply the first, and nature the second, only institutions possessing complete freedom of action can supply the third. The fate of these homes will probably have to be decided on their merits, the regional boards being responsible for settling the degree of liberty to be accorded to each.

Meanwhile the surprising fact remains that no-one knows where all the convalescent homes are nor what they do. For the London area King Edward's Hospital Fund has set up a committee, with Sir Henry Tidy as chairman and Mr. O. N. Chadwyck-Healey as vice-chairman, which is now at work trying to make a comprehensive list of homes. The task of finding and visiting these has mainly been undertaken by members of the Institute of Almoners, who have already recorded details of about 150. The results of their labours will shortly be published in the form of a directory of convalescent homes, which should be assured of a welcome from doctors as well as hospital authorities. The committee also hope to increase the number of convalescent beds, which are urgently required, by giving financial and technical assistance to homes which need help. Many homes which are already open and active have asked for the committee's aid to expand or improve their work. But another group which require help still more are the dormant homes—those which closed during the war and have not yet reopened. Unfortunately the most popular area for convalescent homes in England is along the south-east coast, and since this was particularly exposed to enemy attack during the war very many had to close. To find out what has happened to these, and to encourage them to reopen, is an onerous but useful task. It is to be hoped that the committee will be able to restore a substantial proportion to the active list.

ELECTRICAL PROPERTIES OF TRYPANOSOMES

A NEW approach to some of the puzzles of African sleeping sickness and the allied trypanosomiases is offered by Fairbairn and Culwick,[1] on the basis of many years' experimental and field work at the Tinde Laboratory in Tanganyika. Broom and Brown[2] showed ten years ago that 72 hours after infection of a tsetse fly with one of the polymorphic trypanosomes, *Trypanosoma gambiense*, *T. rhodesiense*, or *T. brucei*, the parasites in the gut of the fly all carry a negative electric charge. When the parasites invade the salivary glands of the fly their charge is reversed. Fairbairn found that after infection of a rat with salivary-gland forms of *T. rhodesiense* the trypanosomes are at first predominantly positively charged; as the infection progresses the proportion of positively and negatively charged parasites fluctuates widely.

Fairbairn and Culwick[1] now believe that much that is known of the polymorphic trypanosomes can be explained on the assumption that the electric charges they carry greatly influence their behaviour, that the parasites obey the laws governing charged bodies, and that their heterogeneous properties are maintained by syngamy in nature. Examination of stained dried thin film preparations of blood was found to afford a simple and accurate means of determining the electrical charges carried by *T. rhodesiense*. Positively charged parasites are seen in contact with the red cells, which carry a negative charge; but negatively charged parasites are repelled by the red cells, and the red cells in close proximity to such parasites are deformed. There are long slender, short stumpy, and intermediate types of each electrically charged variant, the negatively charged being significantly shorter than the corresponding positively charged. The maintenance of strains for long periods by syringe passage in animals alters their virulence and their electrical, chemical, morphological, and developmental characters. Syngamy would tend to perpetuate heterogeneity of the parasites; but artificial conditions of maintenance and transmission would lead to genetic segregation. Syngamy was actually observed between trypanosomes carrying opposite charges, but not between negatively charged or between positively charged parasites. It was found that a trypanosome of any form—long, intermediate, or short—will fuse with another of the same or different form, provided it is of opposite charge. The long forms multiply freely by binary fission; but the intermediate and short forms do not readily do so; they result from syngamy of long forms and develop into long forms with or without further syngamy.

ALIVE, ALIVE-O

OYSTERS, of which Sam Weller noted the "very remarkable circumstance—that poverty and oysters always seems to go together," have grown exclusive with the years, and are nowadays as scarce as formerly they were abundant. The reasons have been set out[1] by Mr. H. P. Sherwood, senior naturalist to the Ministry of Agriculture and Fisheries, who also considers mussels, cockles, escallops, and "queens" (all of which, like the oyster, feed by filtering particles out of the water passing through their gills), and whelks and periwinkles (which, on the other hand, are browsers). Our grandparents, it seems, devoured oysters so freely that breeding stocks fell and prices rose. Despite various Acts and orders our oyster beds have never recovered from these depredations, and moreover have been thinned still further by periodical hard winters, and by pests invading the beds. The output of native oysters fell from 38 million in 1920 to less than 7 million in 1930, stocks having been depleted by a heavy mortality in 1920–21. The average yearly output from 1924 to 1938 was 12½ million.

Yet even if oysters could abound as they did in the past, their reputation for carrying intestinal infection, including typhoid, would probably hinder a wide return to popularity. They are more liable to become polluted nowadays, because, during the last century, local authorities of towns near the sea began to dispose of water-carried sewage by discharging it untreated on foreshores or estuaries. Sewage is generally released after half-ebb, and runs through comparatively narrow channels, many of which contain oyster or mussel beds. The filtering capacity of these creatures is such that a single mussel in a day clears over 10 gallons of water of all suspended particles, including bacteria; so shellfish taken towards the end of the ebb are likely to be heavily polluted. Fortunately they have an equal capacity for cleansing themselves, given the chance; and it is with methods of providing such chances that Mr. Sherwood is chiefly concerned.

Disorders due to shellfish include typhoid and paratyphoid, and milder intestinal infections associated with

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1. Fairbairn, H., Culwick, A. T. *Ann trop. Med. Parasit.* 1946, **40**, 421.
2. Broom, J. C., Brown, H. C. *Trans. R. Soc. trop. Med. Hyg.* 1937, **31**, 81.

1. Safe Shellfish. Ministry of Agriculture and Fisheries. Pp. 13.

diarrhœa and vomiting; bacterial food-poisoning from stale shellfish; a rare type of paralytic poisoning acquired by eating shellfish which have been feeding on dinoflagellates (small poisonous organisms); and allergic symptoms, usually urticaria. This last can only be avoided, in susceptible people, by excluding shellfish from the diet; but the first three can be prevented if the shellfish are purified before they are sold and eaten.

The ceremony of purification, though simple, is based on careful experiment. The shellfish, spread about two deep on wooden grids in large tanks, are thoroughly hosed with a strong jet of water to remove external mud, and the mud is sluiced away. The tank is filled with purified sea-water, and the shellfish are left in it overnight. Their excreta fall to the floor of the tank, and the water soon becomes glass-clear. Next morning the tank is drained, the fish are hosed, and the waste matter is sluiced from the tank, which is refilled again, and again left overnight. Next morning the bath is drained and flushed again and the shellfish are once more hosed; they are then left covered for an hour in sea-water containing a trace of chlorine (3 parts per million), in which they remain closed, and which sterilises the outside of the shells. They are packed in bags or containers sterilised in chlorine, and sent to market.

Purification stations have been set up at Conway, at Lytham, and at Killorglin, Cromane, in south-west Ireland. Results have been good; at Conway, for example, cases of typhoid due to infected mussels, formerly common, are no longer reported, and Lytham mussels and Brightlingsea oysters have proved equally innocent. Mr. Sherwood thinks that confidence in the method is justified because the shellfish visibly discharge their contents, and the rectums of any examined are seen to be free from fæces; moreover, bacteriological tests show that sewage organisms are greatly reduced, though it is not claimed that they are removed outright. Whelks and winkles, being eaten after cooking, are always reasonably safe, but Mr. Sherwood considers that, thanks to improved conditions, "shellfish in general can now be eaten with greater confidence."

COLOUR-BLINDNESS

THE colour-blind are often unaware of their disability. This is partly because, as children, they learn to name colours by association: the grass is green, the sky blue, the pillar-box red, and so on. But it is also because they become skilled at using such clues as texture and brightness—yellow, for instance, appears brighter than red or green under the same illumination. This unawareness may give rise to difficulty and disappointment. A lad who has specialised in his later school years with the aim of entering the Navy or R.A.F. may be rejected when the entrance medical examination reveals for the first time that he is colour-blind. The committee set up by the colour group of the Physical Society[1] to consider defective colour-vision in industry quotes the case of the draper's assistant who startled customers by the ties and socks he offered in response to requests for definite colours. On another occasion a controversy arose through the inability of a colour-blind geologist to read a colleague's coloured maps.

In occupations where defective colour-vision might lead to disaster, all would-be entrants are tested. One of the classical tests, Holmgren's wools, was designed after a railway accident from this cause. In industries such as colour-printing and photography employers sometimes insist on testing entrants. But there is no preliminary test for many of the occupations demanding accurate colour-vision: these range from textile weaving to horticulture, in which the colour-defective may find difficulty in deciding when fruit and tomatoes are ripe for picking. In these jobs the defective becomes slow and inefficient, often without recognising the real cause.

Colour-blindness is not uncommon, being found in various forms in about 8% of males. Usually, like hæmophilia, it is inherited by male children from their mothers. In the female it is rare, occurring only in children born of a colour-blind father and a mother who is a carrier. There are all degrees of disability, the most usual being difficulty in distinguishing between red, green, and yellow.

The committee holds that all whose colour-vision is not normal should be made aware of it, and should know how far the disability is likely to affect their careers. Colour-vision is already examined during prevocational testing in parts of Scotland, notably Edinburgh and Glasgow. Most of those employed in industry, however, go to work direct from school, and the committee recommends that the test should be made on all school-children—or at any rate all boys—at the age of about 13. It is suggested that one of the confusion chart tests, such as Ishihara's, could be modified so that a whole class could be tested simultaneously; those who failed could be examined individually. The tests need not be conducted by a doctor. An experiment in which the Ishihara charts were thrown on a screen by an epidiascope showed that the group-testing of colour-vision is feasible. Whether the addition of yet another non-educational activity to the school curriculum is desirable is another matter.

THE COST OF LIVING

THE plaintive note struck by one of our correspondents recently on what a contemporary unkindly labelled "The Doctor's Dilemma—or how to live on £1000 a year" gives point to the current discussions on the cost-of-living index. No doctor struggling with his personal budget is likely to be reassured by bland statements to the effect that the cost of living as measured by the present index has risen by only a third since 1939. Wage levels alone have risen by two-thirds, and this rise is reflected in the cost of most articles now for sale. In fact, the present index is admittedly so manifestly out of date that the Minister of Labour and National Service has adopted the recommendations of his committee[1] for an interim index "to provide a measure for the time being, of future changes in the retail prices of the things in which ordinary working-class households are interested." The present index, based on the purchases made by a sample of labourers' families before the first world war includes articles such as tallow candles which are unlikely (except perhaps during the half-light of the morning power-cut) to be of much interest to the modern housewife. Designed as it was to show the average percentage increase in the cost of maintaining unchanged the standard of living of a selected group of families at a fixed date, it takes no account of the changing patterns of purchasing habits demanded by the rise in the standard of living in between the wars. For example, in recent years demobilisation and the setting up of many new homes has increased the proportion of purchases of household goods compared with other items such as apparel and food.

To make the index a reasonable overall guide to the cost of the total purchases being made at any one time by the working-class population, the actual retail costs must be multiplied or "weighted" by factors proportional to their relative importance. Thus at the present time, household goods would be heavily weighted to indicate that so many men had to buy this type of merchandise. Conversely, the cost of tallow candles, having an insignificant weighting, would be negligible in the summation of all items to form the final index. The committee therefore suggests that sample inquiries into current purchasing habits should be made from time to time to ascertain the weighting indicative of the relative importance of the various items of expenditure whether essential or recreational. The first index calculated under this new régime will form the base-line of 100 against which future changes will be measured. There is to be no attempt at comparison with a pre-war standard. All this, of course, will take time, and as a temporary measure an index based on a 1937–38 survey of working-class budgets will be used. The increased weighting of rent, rates, and many "non-essentials" not previously included, and the decrease in the weighting of food which this entails, will make for a more realistic measure of the cost of modern working-class purchases.

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[1] Report on Defective Colour Vision in Industry. By a committee of the Colour Group of the Physical Society, 1, Lowther Gardens, London, S.W.7.

[1] H.M.S.O. Cmd. 7077. Ministry of Labour and National Service: Interim Report of the Cost of Living Advisory Committee.

The economic questions involved are very complex. Food subsidies have kept the level of the present index, to which the wage scales of $2^1/_2$ million workers are related by agreements, within reasonable limits. Any increase in the index, either by reduced subsidies or by the new method of compilation, may bring fresh demands for higher wages and accelerate the upward spiral of inflation. As the *Times* remarks, "the interrelation of wage-rates, cost-of-living index and subsidies constitutes an impasse which must somehow be circumvented." This will inevitably influence the consideration of the terms of professional remuneration shortly to be negotiated.

EDUCATION FOR MEDICINE

It is always possible to learn from the difficulties of others, but where the problems are almost identical with our own a sense of comradeship is roused which bridges oceans and denies distance. In America, the Committee on Medicine and the Changing Order, established by the council of the New York Academy of Medicine, is reviewing educational method as applied to medicine, and under the ægis of this body Dr. Raymond B. Allen, from his wide experience as an educator, has made an analytical survey of the problems of American medical education,[1] much of which might well have been written about our own system.

Dr. Allen justly holds that the foundations of a medical career are laid in the early general education of the child. He points to the danger of dulling those bright facets of the child's untutored mind—"the natural curiosity and imagination" without which "there can be no lasting educational influence or progress"—by the imposition of a traditional educational system planned by adults. These inherent qualities of the child's mind are the mainspring of its future career; if they are congenitally absent or are destroyed by misuse, they cannot be replaced, and they must at all times be exercised by the challenge of appropriate studies. Outlining the programme of a liberal education which in this case happens to lead on to a medical career, but which might equally well culminate in any of the learned professions, Dr. Allen shows a breadth of outlook which makes his book worthy of study not only by deans of medical schools but by all who are concerned in child and adolescent education. Admittedly he looks to the ideal; and it is likely that the prevailing error of teaching too much in detail and too little in principle will defeat his aims.

It is clear that he deeply distrusts that early and enforced specialisation which, both in the United States and here, compels a disastrous narrowness of adolescent education at the most formative age. He comments upon the illiteracy of American students, and feels their lack of facility in oral and written communication "is a serious indictment of both secondary and collegiate education." He stresses the apparent lack of first-class brains among the student entry to the medical schools, which results in the padding-out of the schools and later of the profession with second-rate men, who though technically efficient lack the wisdom and the approach which endow each case of illness with a humanising intimacy linked with the individuality of a research investigation. Faintly but definitely he scents from afar the possibility, even in America, of a State medical service born of the inequality in the distribution of medical facilities to the poorer and the less populous districts. He suggests that this may not be purely a problem of money, but may be due in part to the training of students in hospitals armed with a profusion of specialised ancillary services; for after qualification the young physician may feel driven to live in an area where such services are freely available—not having been trained to manage without them.

For the future, Dr. Allen foresees a gradual reduction of specialists as rising standards of living and broad therapeutic advances, such as the bacteriostatic drugs, eliminate the difficult techniques upon which such specialism depends. Then the doctor will become the priest of good health: "the physician as a highly educated citizen shares responsibility with other community leaders in the endeavour to create the conditions which will improve the general economic and social well-being of the people as a whole." He asks, "Does medical education share in the responsibility for the failure of the medical professions to exhibit social insight and aggressive leadership in molding public opinion towards a comprehensive handling of the problem of adequate medical care for all the people? The answer is undoubtedly yes."

Many questions will stir in the reader's mind. Are we spoiling the child mind by traditional and inelastic methods of education? Is the occasional brilliant brain merely the one which is tough enough to survive a faulty educational system? Is that system sufficiently at fault to require, not patchwork revision from time to time, but radical reconstruction from an entirely fresh outlook? "It is the responsibility of education," writes Dr. Allen, "to keep pace with the times if, indeed, it cannot set the pace."

BETTER CARE FOR THE HOMELESS CHILD

THE Government have accepted the main recommendations of the Curtis and Clyde Committees, and have decided to make the Home Office the central department responsible for the care of homeless children in England and Wales. It will be remembered that the Curtis Committee wished to see supervision of these children brought under a single department, though they did not want that department to be responsible for every aspect of their lives. Thus the Ministry of Education should, it was felt, have the same responsibilities for educating them as it has for children living with their parents, and the Ministry of Health should have similar charge of their health. The supervising department was in fact to become a sort of father-figure to the children, and should have a children's branch which would make a study "of child welfare on the side of the home," and an inspectorate capable of considering the child's total welfare as a person.

These principles have been fully accepted by the Government. The Home Office is to have a new and enlarged children's branch and an expanded inspectorate; similar functions will be assumed by the Scottish Home

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[1] Medical Education and the Changing Order. By Raymond B. Allen, M.D., executive dean, University of Illinois. New York: The Commonwealth Fund, London: Oxford University Press. Pp. 142, 8s. 6d.

Department. A standing advisory committee containing representatives of the Ministries of Health, Education, and Pensions will support the Home Office in its new task. It has always been responsible for children in any voluntary homes not inspected by other departments and for children boarded out with foster-parents by juvenile courts; it will now take over, from the Ministry of Health, children whom public-assistance authorities have placed or boarded out in local-authority institutions or voluntary homes. One duty will be to make more good foster-homes available; and we share the Prime Minister's hope that an increasing number of people in comfortable circumstances will take children into their homes.

The most important recommendation of the Curtis Committee—that every local authority should appoint a children's officer—has also been adopted. These careful plans for homeless children are welcome; and should be explained simply to the children themselves. The knowledge that their country feels serious concern for their welfare should help to give them the security they so much need.

PROGNOSIS IN ERYTHROBLASTOSIS FŒTALIS

LAST year Wallerstein[1] reported 3 cases of severe erythroblastosis successfully treated by removal of the blood of the newborn infant and its replacement with Rh-negative blood. He has now published[2] 7 successful cases, 5 of them having a severe icterus gravis. (The protocols of the other 2 cases are not sufficient to make this diagnosis certain.) There were 2 failures in infants suffering from icterus gravis treated after the 48th and the 60th hour, and it is suggested that these might have been saved if the treatment had been instituted during the first 24 hours of life.

Wallerstein's original technique was to remove the infant's own blood by fontanelle puncture of the longitudinal sinus and to transfuse Rh-negative blood into a cannulated arm vein. He infused 75–100 c.cm. more blood than had been removed. Wiener and Wexler[3] have found that, by heparinising the infant with 500 units intravenously and cannulating the cut radial artery, they could remove through a 20-gauge needle 150 c.cm. of blood before clotting occurred in the radial cannula; by giving a further 500 units of heparin it was possible to remove a total of 400 c.cm. Wiener[4] has described 2 successful exchange transfusions in infants with icterus gravis, and promises a report on 17 infants with only 1 failure.

The procedure is readily practicable and satisfactory when the diagnosis is made early, and offers many advantages over simple transfusion with Rh-negative blood. It is still too early, however, to be certain that it offers a better prognosis. The early reports[5] suggested that the prognosis could be dramatically improved by transfusion with Rh-negative blood, but this view has not been generally confirmed. The general impression of pædiatricians is that the mortality from this disease is still around 50% and that in the infants who survive damage to brain and liver may be manifested later.

The pathogenesis of icterus gravis and erythroblastosis fœtalis in general is still not fully understood. There is general agreement that in most cases of erythroblastosis fœtalis there is an Rh blood-group incompatibility between mother and fœtus, the mother being usually Rh-negative, with Rh antibodies in her serum, whereas the fœtus is Rh-positive. It is generally accepted also that the maternal Rh antibody, be it agglutinin or incomplete antibody or both, crosses the placenta and can there attack the fœtal red cells which contain the Rh antigen. Wiener[6] has postulated that the clinical type of affection of the infant depends on the type of maternal antibodies produced, so that the Rh iso-agglutinin in the mother leads to icterus gravis in the infant, whereas the incomplete or "blocking" Rh antibody in the mother causes congenital hæmolytic disease—that is, congenital anæmia or hydrops fœtalis. Wiener[7] has since produced statistical evidence in favour of this conception. In 25 instances where the mother's Rh antibody was the iso-agglutinin there were 2 stillbirths, 7 cases of hæmolytic anæmia, and 16 cases of icterus gravis. In 57 instances where the maternal agglutinin was a "blocking" antibody there were 25 stillbirths, 24 cases of hæmolytic anæmia, and 8 cases of icterus gravis. In 15 instances where the maternal antibodies were both bivalent and univalent there were 4 stillbirths, 10 cases of hæmolytic anæmia, and 1 case of icterus gravis. It seems probable that, under the term hæmolytic anæmia, Wiener includes cases which would be called icterus gravis in this country. His figures—41 cases of hæmolytic anæmia to 25 of icterus gravis—are certainly vastly different from those met with here, where the diagnosis "icterus gravis" is many times more common than "hæmolytic anæmia," even when hydrops fœtalis is included under hæmolytic anæmia.

Both Wiener and Wallerstein, though they have made notable contributions to pædiatric practice by evolving this technique of exchange transfusions, may be raising unduly high hopes. First, the treatment must be given very early. Secondly, both appear to lay too great a stress on the damage to the infant in extra-uterine life. That damage also occurs in intra-uterine life is evidenced by the high proportion of stillbirths in cases of Rh blood-group incompatibility between mother and infant with maternal iso-immunisation. If the fœtal tissues contain the Rh antigen, as has been demonstrated by Boorman and Dodd,[8] the tissue cells as well as the red cells will be damaged by the maternal antibody. In the long run, therefore, the greatest promise will be held out by a régime which will prevent the maternal antibody from being formed or from passing across the placenta to damage the infant.

IF THE TRIBUNAL ACQUITS

IN one of the committee discussions on the Scottish National Health Service Bill, which were concluded in the House of Commons on March 20, Mr. J. S. C. Reid drew from Mr. G. Buchanan, an Under-Secretary of State, an assurance that where the disciplinary tribunal acquits a doctor accused of misdemeanour the Secretary of State will have no power to reverse the decision. From the proceedings in England Mr. Reid had understood that an appeal would be allowed in either direction, so that where a doctor was acquitted by the tribunal the Minister could then appeal to himself; and he quoted a remark by Mr. Bevan which certainly lent colour to this idea. In fact, however, the position in England and Scotland will be the same: if the tribunal condemns the doctor he can appeal to the Minister, but if it acquits him the acquittal is final.

Dr. Walter Ramsden, senior fellow of Pembroke College, Oxford, and professor emeritus of biochemistry in the University of Liverpool, died on March 26. In 1897 he qualified from Guy's Hospital, and he held the lectureship in chemical physiology in the University of Oxford till he took up his Liverpool chair in 1915. His most notable original work was on the chemistry of colloids. After his retirement in 1931 he returned to Oxford, where he continued his observations on adsorption phenomena and also on silk-fibrinogen.

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[1] Wallerstein, H. *Science*, 1946, 103, 583.
[2] *Amer. J. Dis. Child.* 1947, 73, 19.
[3] Wiener, A. S., Wexler, I. B. *J. Lab. clin. Med.* 1946, 31, 1016.
[4] Wiener, A. S. *Westchester med. Bull.* 1946.
[5] Mollison, P. L. *Arch. Dis. Childh.* 1943, 18, 161. Gimson, J. D. *Brit. med. J.* 1943, ii, 293.
[6] *N.Y. St. J. Med.* 1946, 46, 912.
[7] *Amer. J. clin. Path.* 1946, 16, 761.
[8] Boorman, K. E., Dodd, B. E. *J. Path. Bact.* 1943, 55, 329.

Special Articles

SOCIAL MEDICINE

The Appeal of the Common Man

LORD HORDER'S ADDRESS IN NEW YORK

In an address to the Institute on Social Medicine of the New York Academy of Medicine on March 21, Lord Horder spoke of the new field now opening for the statesman, the sociologist, and the doctor—a field that *is common ground for all three.*

Although we have not been blind in the past to the sociological aspects of Medicine, he said, we have as yet done very little about it. I think the recognition of the *omission has gone far in the United Kingdom towards* deciding our statesmen that something *should* be done about it. Looking at our health services in a more objective way than the physician can possibly do they take note of this big gap that he himself is doing so little to fill. Then war, the great accelerator, has taken a hand by stressing the importance of "intelligence, agility, endurance, strength," and by giving the term "positive health" a more exact meaning. In short, "Social *Medicine . . . signalises . . . the birth of a new outlook on* human affairs, a new interpretation of human relations in a free society and a new scale of social values" (Crew).

But Virchow spoke of Medicine as a "social *science.*" *Can his use of the word "science" be justified in relation* to Medicine? I think it can and should. . . . But to make Medicine a complete science in the service of man we must arrange that it infiltrates this important and now more clearly perceived *sphere—as yet largely neglected—of* social need. This sphere lies between that in which the diseases of the individual patient are presented and treated by the individual doctor and the sphere in which the preservation of the public health is achieved by the proved methods of the State health officer. This largely untilled field includes all the environmental factors which influence the citizen's health and happiness—his conditions of work, his house and home life, his sense of *security or insecurity, and his ignorance of the things* that make for the salvation of his body and his mind. In short, as Professor Ryle has it, "our next advance" (in Medicine) "will be . . . concerned with causes" (as the last was) "but with the ultimate, rather than with the intimate, causes of disease."

OBSTACLES

As things are at present I do not feel at all hopeful that the physician is capable of dealing with this aspect of Medicine. I believe his incapacity to be due to two things —his lack of training for the particular job and his lack of time in which to do it.

The student's premedical *education is lopsided. Almost* from the moment the boy or girl has decided to become a doctor the confines of his or her interest tend to be more and more narrow. Medicine, which should have the widest contacts of any profession, almost ceases to be a "liberal" education, for its cultural outlook dwindles from this moment. . . . May I repeat something that I said about eight years ago?

> ". . . if it be advanced that the doctor's training has not, up to now, fitted him for work of this sort, then the sooner it does so fit him the better. Inevitably the doctor's work in the future will be more and more educational and less and less curative. More and more will he deal with the physiology and psychology of his patient, less and less with his pathology. He will spend his *time keeping the fit fit* rather than trying to make the unfit fit. And we must make it worth his while to do this work. This reorientation of his education, and of his work, is overdue, and it will remain overdue until reorientation occurs in the attitude of the health authorities towards *him and towards his sphere of* usefulness."

The other, and more serious, handicap to the physi in any effort he may want to make towards t *furtherance of "social trends" that* overlap so cl with Medicine, is his want of time. This, as I say, probably a more severe handicap than mere lack special preparation in this field. For, after all, the doct *is in the very midst of all that is happening to the* vario groups within the social fabric. He sees the peopl needs and his natural inclination is towards helping; it were not so he is unlikely to have chosen Medicine his vocation. But time is essential, and this he just hasn got. He hasn't got it because he is generally gros overworked and his day is badly organised. And it here, perhaps more than anywhere else, that the nee for developing our health services is so urgent.

When the statesman seeks to free the doctor fro trivialities and time wastage so that he may be able t pull his weight in the field of Social Medicine he deserve and must be given, all our sympathy and all our hel *But there are many of us in Britain who think that* th freedom should not be secured by nationalising Medicine because we consider that such a policy would lose t Medicine two of its most virile characteristics, which ar *individual initiative and the spirit of adventure.*

How, then, are we to free the doctor from his incessan grind and hurry? I think the Health Centre is th answer. The Health Centre could do much to organise doctor's work; it could also save him from the sterilisin effects of isolation. Moreover it could itself be a place where the social aspects of Medicine of which I have been speaking might be studied. . . .

MEDICINE MUST BROADEN

There are some 54,000 practitioners engaged in medical care in my country. There are nearly three times that number in yours. What is called the "impact" of *these skilled armies upon the public mind* is potentially tremendous. I have dealt with the doctor's influence in society in another place, saying of him that I thought he was the most important citizen the nation possesses. This sounds egregious seeing that I am a doctor myself But I believe the public takes the same view. *The physician* owes his power to three things—to his training, to his humanist outlook, and to his opportunity to effect a "close-up" with the individual patient. We must be insistent that the "close-up" should be *preserved* in any attempt to integrate our health services; it is a privilege that should be jealously guarded in the interest of the citizen and of medical progress.

But the scope of Medicine must broaden. There is today hardly a field of human endeavour that *does not* require the physician's advice at some time or other. In the words of Sigerist, "no longer a magician, priest, craftsman or cleric, he must be more than a mere scientist *Scientist and social worker, prepared to cooperate* in team-work and in close touch with the people he serves, a friend and a leader, he will direct all his efforts towards the prevention of disease and become a therapist when prevention has broken down—the social physician protecting the people and guiding them to a healthier and happier life."

The "all-in" war that has so recently swept like a blizzard across our social fabric at home has shaken us rudely, physicians *included, out of a number* of our former complacencies. A few of us grouse because a lot of the things we have to do seem trivial, detached, or beneath our dignity. We can't any more do only the things we like doing most, nor only the things we think we can do best. And *I am not at all* sure that we *will* ever have the same choice of doing things that we previously had, or that it is good that we should. And therefore I consider that to yield in this matter is an ignoble attitude. I would prefer to think that we orientate willingly and actively towards the general *social scheme. The doctor's* job has, by its nature and traditions, always been linked up closely with the special structure of the day; only in quite recent times does the doctor seem to have been aloof from the rapidly changing pattern that has disclosed itself.

When I use the phrase "general social scheme" I do not mean yet another plan; I mean, pragmatically, things as they are at this moment in the unbroken stream of human welfare; and of course I have in mind also the probable continued trend of things in the future.

I want to see a "close-up"—or it would be more accurate to say a "closer-up"—between the physician and the social services. Is the physician—and when I say physician in this connexion I mean the family physician, than which I can give him no better or more significant title—is the physician going to continue only to cure or relieve disease, or is he going to make contact with this health business that we are finding to be such a vital national asset? This rigid distinction between the G.P. and the S.H.O. (State health officer), and, alas! the antipathy so often seen between them, are surely due to a misconception on both sides as to what the medicine man's function really is; he was the "health man" to the tribe, and he should be still, and only, that, to the men and women of today.

We all pay lip service to the great importance of preventive medicine. But again and again we say "that is the State health officer's job," when really it is every doctor's job. To do the G.P. justice, he does make many contributions to preventive medicine that are not recognised as such, but they *should* be recognised and it is the business of the State to recognise them. Inevitably, if the G.P. does not accept the challenge of this position, and is not helped by all of us to accept it, the S.H.O. service will expand whilst that of the G.P. contracts and there will then be intensified that rivalry between private and public medicine which we all of us surely deplore.

I want to see the physician not only make use of the public-health services, but show some passionate conviction about them in his patient's interest. Take school meals as one example: if the physician is only doctrinaire on the matter, and not intensely practical, Mrs. Jones isn't stimulated and the local education authority doesn't get busy.

THE BASIC NEEDS

Take the case of industry. Work is good; work is health-giving. But it is the doctor's duty to protect the worker against excess fatigue, against dullness, and against the various hazards of his job. In all these matters Medicine has accumulated a mass of facts, but they are very largely wasted because they are not implemented in terms of social service. If I embarked upon the subject of Nutrition, and the light which our rapidly growing knowledge in regard to it has thrown upon food, I could, of course, give equally striking examples of the need for the physician's direction and execution. To say the truth, there is very little in the life of John Citizen, whether he be in a factory, an office, or a public-utility service, that does not give the physician scope for the practice of Social Medicine.

Consider the basic needs of the citizen—I have long ago stated and re-stated them:

1. Sufficient of the proper food.
2. Suitable shelter and clothing.
3. A satisfactory job of work.
4. Access to the fresh air and sun.
5. Reasonable leisure and the amenities of life.

In every one of these the doctor must stake out his claim, for in every one of them his is the knowledge that should guide and it is his enthusiasm that can stimulate to achievement. It is not as mere passengers that we physicians must take our part in these affairs. We must lead; we must guide the politicians since they cannot act effectively without expert help, and we must keep the citizen's end up, since he learns to rely upon us for this.

But suppose the politician won't be guided? Suppose it is as Swift wrote in a letter to Pope: "Although I have known many great Ministers ready enough to hear opinions," said Swift, "yet I have hardly seen one that would ever descend to take Advice; and this pedantry ariseth from a maxim which they themselves do not believe at the same time they practice it, that there is something profound in politicks, which men of plain honest sense cannot arrive to." In that case the physician has no alternative but to appeal to public opinion, continuing to serve his patient in the manner which he believes to be in the patient's best interest. . . .

THE FUTURE

If, finally, any one of you should ask me, point-blank: "Do you see hope in the future of Medicine?" I should reply: "Yes—I see more hope for ourselves as doctors and for the people who will come under our care, in the future of Medicine than perhaps in any other single thing in the new world towards which we are hacking our way. We at least have not—yet—forfeited the trust of people for whom we work; we at least have not—yet—turned inwards in despair, bartering our spirit of adventure for a mere hope of security. We stand for sane knowledge, selflessness, and mercy in a world gone mad. We cannot let these people down who trust our profession, and it is in this firm resolve that we shall face the future of Medicine."

A MEDICAL SERVICE FOR STUDENTS

FROM OUR EDINBURGH CORRESPONDENT

For the past 17 years students at Edinburgh University have been entitled to free medical examination at entry and at other times as they wish; they have also been encouraged to engage in physical education. Domiciliary treatment, though sometimes arranged unofficially, has hitherto not been organised by the university.

Lately the service has been extended, and every new student is now advised to avail himself of the chance of free clinical examination and chest radiography. During the present academic year 752 (about 60%) of the male students have taken advantage of the scheme; and the proportion of women is about the same. Amongst the men pulmonary tuberculosis was disclosed in 8, all of whom had been unaware of it.

Besides routine medical examinations, consultations are now held three days a week for students wanting advice; and any student unfit to attend may obtain free domiciliary treatment. The medical service works in liaison with the department of students' social service, the director of which makes a point of getting into touch with the parents of sick students. The service has been devised for the benefit of those whose homes are not in Edinburgh; and local students are encouraged to seek the advice of their family doctor rather than call upon the university medical service. The Royal Infirmary has for many years provided a separate students' ward, which is still used to the full. A dental service, organised through the Dental Hospital, is already in existence.

Discussions which are now being held will, it is hoped, eventually result in the establishment of a university "sick bay" or "sick dormitory" in one of the university hostels; and a scheme for the full care of students with tuberculosis is also being considered. The physicians operating the medical service hope to obtain useful data on students' health and on their physical and psychological reactions to environmental circumstances.

"... No-one can foresee the basic discoveries of tomorrow; the predictable belongs to the level of applied research. At best we can merely select phenomena which we do not understand, confident that if we investigate them in a true scientific spirit, some useful knowledge will emerge."—Dr. JAMES CRAIGIE, F.R.S., in his presidential address to the Society of American Bacteriologists. *Bact. Rev.* 1946, **10**, 73.

Reconstruction

"THE SYLLABUS"

FROM A CORRESPONDENT

THE General Nursing Council has been considering the "improvement" (by elaboration and addition) of the syllabus to be covered in preparation for the State examinations for nurses. The Royal College of Nursing, full of zeal for the development of "nursing education," has announced an optimistic scheme for setting up a University School of Nursing. Mr. David Patey, F.R.C.S., in the *Times* of March 7, challenges the council of the college on the results of American experiments in making nursing a university subject, as compared with the results of the British system of nurse training. Both he and *The Lancet*[1] quotes the opinion of an American surgeon who says that under the programme of advanced nursing education in the United States, the nurse is not being trained primarily to care for the patient.

Thus we meet once again, in modern dress, the old controversy: *do nurses have "too much theory" nowadays*; does it matter how much or rather how little they know, as long as they have "nurses' hands" and do what they are told? Has actual bedside nursing deteriorated since the theoretical course became more exacting, and if so is it a case of propter hoc or only a case of post hoc? The conservative party in this debate (including many members of the medical profession) assumes a conflict between theory and practice: if the theory goes up, the nursing practice at the other end of the seesaw must inevitably go down. The "progressives," who include the most articulate portion of the nursing profession, might sometimes be thought (no doubt quite unjustly) to believe that if you take care of the theory, the practice will take care of itself. Truth, as is her wont, has eluded the earnest controversialists, and laughs at them unnoticed from a corner of her own.

The first responsibility of the nurse, as of the doctor, is the well-being of the patient. The physician's responsibility demands knowledge, judgment, reflection, clinical experience, and skill. The nurse's responsibility is less directive, but is more constantly and more intimately concerned with the patient's comfort and well-being in mind and body. The most important part of her teaching, therefore, should take place at the bedside, and it is there that she should develop the skills which are the real measure of her proficiency and success as a nurse. Where this does not happen, it may be because she is distracted by classroom work for which her educational background is inadequate and is worried by the prospect of examinations. But it is at least as likely to be because her time and energies are used up in a scramble of ward routines connected only very remotely (if at all) with the comfort and well-being of the individual patient, and because no-one in the wards has time or responsibility to teach her the true art of nursing. It is not the patient, and not always even the medical staff, whose well-being is most seriously disturbed if every piece of ward furniture and every flower-vase is not set to an unchanging pattern by 10 A.M. In the immediate shortage of domestic help, some admixture of domestic duties with nursing is inevitable, but there should be some system whereby the necessity for this is questioned at frequent intervals now that there may be a temptation to economise in the more highly paid domestic labour at the expense of the student nurse.

If the training of every nurse were centred in the wards and in the care of her patients as individuals, surely the classroom work could and should be allowed to vary in accordance with the capacity and educational background of the students or pupils which each training school can recruit. It is only common sense to that the nurse who is capable of grasping the p underlying the techniques she must follow in the will be the better for knowing them, and should taught them as part of her course, rather than being to find them out for herself from textbooks if she sufficient enterprise. As regards the more au nursing procedures, there is real danger in pra training which is so stereotyped and so unrelated to principles that the nurse cannot adapt her practice safely to varying conditions. Recent developments in medical treatment could provide many instances of the risk of leaving a nurse to follow instructions without k and understanding of the processes involved.

The moral? Neither a more advanced compulsory syllabus nor an arbitrary levelling down to the capacity of the girl whose education ceased at 14, but a greater variety in the content of the nursing course, to match the great range of educational standard of mental capacity. Freedom for training schools develop their course on the lines best fitted to the student body which they are able to recruit, and financial independence to enable them to let that course centre in bedside teaching on a planned curriculum, undisturbed by the labour requirements of the hospital. A periodical review of the more impersonal ward routines to see which can be eliminated or mechanised, so that the individual care of the patient may come first.

Can all this be fitted into the present machinery for State registration? If not, an examination of the results of the present system may suggest that it is not simply the syllabus which should be revised, but the whole concept of a rigid national standard imposed on a profession which surely needs at least as much diversity and flexibility in its training and qualification as any other.

"We must make arrangements which will attract well-educated women into a profession demanding all their powers, but will nevertheless permit any sensible girl to attain the title of nurse if she shows aptitude for the care of the sick.[1]" The planners of the National Health Service would do well to make this twofold objective a matter of urgency, remembering that numerically the nurses are the most important group within the team on which the operation of the National Health Service will depend.

Public Health

A City Replanned

Charles Hastings, who maintained that no physician could practise without a knowledge of his locality, studied the population trend of his native city of Worcester in the year 1834, attributing its rapid rise rather to the lowered death-rate and greater expectation of life than to an increase in the birth-rate.[1] He reviewed the occupational diseases of leather-workers, glovers, needle-pointers, and operatives in the china works, and noted associations between the incidence of fever and the periodic flooding of the river Severn. Hastings, who had advocated compulsory drainage and vaccination and who had railed at the Government for its indifference to medical research and for its encouragement of quackery, reviled his fellow citizens for allowing their city to develop haphazardly at the expense of parks and natural amenities. Over a century has passed and the country has now entered upon an age of planning such as would have delighted his heart.

The city council of Worcester is to be congratulated on having commissioned, on a high professional level, an economic and social survey[2]; it has been prepared by the commerce department of the University of Birmingham and covers not only the city, which now has a computed population of 51,686, but the surrounding country and towns for which it is the transport, marketing, and social-services centre. The survey is literally built up from rock bottom, and shows how industrial expansion may be discouraged by reason of low water-pressure from piped sources, especially on a Keuper marl elevation with poor natural supply.

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[1] *Lancet*, March 15, p. 333.

[1] Illustrations of Natural History of Worcestershire. London. 1834. Observations on Longevity and on Public Health. *Trans. Worcestershire Nat. Hist. Soc* 1840.

[2] County Town. A Civic Survey for the Planning of Worcester. By Janet Glaisyer, T. Brennan, W Ritchie, and P Sargant Florence. London: J. Murray. Pp. 320. 21*s*.

The industries change with the years. Just as in the past the clothing and carpet industries declined, the glove trade is now on the wane, and many reasons are given to account for this. On the other hand, engineering industries have developed rapidly within recent years, while the city is fortunate, especially in times of depression, in possessing a balance of industries not dissimilar from those for England and Wales as a whole, although in general a relatively higher proportion of juveniles is employed. The surveyors show the need to dovetail industries with differing seasonal fluctuations, to splice declining with growing industries, and to mix stable industries with those subject to severe cyclical depressions. One valuable suggestion is that the city should provide blocks of playing-fields to be let to those small factories which cannot afford to maintain their own. For Worcester to fulfil its function as the medical centre of the west Midlands, improvement of the hospital facilities is essential. With only 36 maternity beds and a central clinic over-ripe for condemnation, the city is not well provided for: the outstanding needs are for a "health centre," a maternity hospital, and at the other extreme a crematorium.

In the past the doctors in the vicinity of Worcester have frequently looked to Birmingham for consultants, so that there is need for further decentralisation of medical specialist services towards Worcester, especially if the city is to increase in size and if Droitwich and Malvern are to play their part in the comprehensive medical rehabilitation service.

Better bus services, more attractive shops and hotels, improved facilities for adult education, and good recreational amenities, including public gardens and an up-to-date outdoor swimming pool, will all be needed if Worcester is to become, as the surveyors hope, a tourist centre. The city, which is so full of historic associations, has delightful architectural features and with little trouble the river frontage could be made attractive, although it is disastrous that circumstances should recently have necessitated the erection of a large ugly power-station on the riverside. Surely even at this late date something could be done to remedy this harm.

Infectious Disease in England and Wales

WEEK ENDED MARCH 22

Notifications.—Smallpox, 0; scarlet fever, 1362; whooping-cough, 2277; diphtheria, 212; paratyphoid, 0; typhoid, 1; measles (excluding rubella), 11,295; pneumonia (primary or influenzal), 1035; cerebrospinal fever, 114; poliomyelitis, 8; polioencephalitis, 1; encephalitis lethargica, 3; dysentery, 48; puerperal pyrexia, 169; ophthalmia neonatorum, 57. No case of cholera, plague, or typhus was notified during the week.

Smallpox.—Up to March 29 no further case was reported. The last reported case, as we said last week, was in a man admitted to Surrey County Isolation Hospital on March 21.

Deaths.—In 126 great towns there were no deaths from enteric fever or scarlet fever, 3 (0) from diphtheria, 8 (1) from measles, 24 (5) from whooping-cough, 76 (13) from diarrhœa and enteritis under two years, and 66 (9) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 272 (corresponding to a rate of 25 per thousand total births), including 28 in London.

Planned Psychiatric Service.—The memorandum reviewed under this heading in our last issue (p. 421) is an appendix to a report on the planning of hospital services in the Berks, Bucks, and Oxon region, which is obtainable from the Nuffield Provincial Hospitals Trust, 16, King Edward Street, Oxford.

In England Now

A Running Commentary by Peripatetic Correspondents

I WISH newly qualified men would do six months general practice first and house-jobs afterwards. Don't tell me they learn confidence in themselves in hospital. There is no training for a G.P. like general practice. No big white chief comes round in the morning to check our diagnoses and treatment: No nurses stand straining at the leash for our commands. And the G.P.-turned-houseman would at least answer the telephone. Compare this with the present commonplace state of affairs—the sluggish, laconic young houseman answering an emergency call after 30–40 minutes, blissfully unaware that the G.P. at the other end has three more calls and is gnashing his toothless gums in frozen fury in a distant telephone booth.

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As all good peripatetic correspondents should, I have been on tour. The trip did not carry my feet very far, but my mind has been forced out of the ruts that encompass it more closely every day. The traditional impossibility of getting away having been proved a downright lie, one wonders whether it was worth the trouble. It is pleasant to see old friends after the lapse of years, but it is of inestimable value to hear about their work. Medical thought, before it reaches the stage of print, is a local thing that can be snared only in its own lair. My friends were very generous, so my mind is stocked with a hundred new ideas. It is only by going the rounds that one realises how much local variation there is in hospital administration. The problems, in general, are the same throughout the country, but the solutions are the fruit of local action, local prejudice, and local competence—an example of the survival of the fittest in a field of infinite variation. I was even fortunate in finding a hairdresser who "never talked politics to gentlemen in the chair" and then condemned the whole Government in one sentence repeated in different terms with a twitch at my hair each time by way of emphasis. Finally, my mind replete, a kind friend found for my stomach a draught of nectar. So it was well worth while and I hope the all-seeing State will make a monthly "swan" one of its compulsory sessions for those of us who live in isolation. Perhaps it is too much to expect the nectar as well.

* * *

She was a multipara and well on in the second stage when I arrived. "No, Doctor," she said, "I haven't any rubber sheeting or thick brown paper. You'll have to use newspapers." A few moments later the baby was shot out on to a sodden copy of the *Daily Express.* This adhered lovingly to the child, and when the mother asked to see her latest I felt like a fishmonger displaying sixpenn'orth of cod.

* * *

The howlers which Dr. Firth quoted in his letter of March 22 are of course as nothing compared with the sort of answers one gets in the examination papers of native nursing assistants in South Africa. Their examination follows only 6 months' instruction, and they have a serious language difficulty to grapple with. Take these, for example: "After severe sweating the patient falls into a comet." "Our best source of mineral salts is Popular Pop." "The temperature is taken from him when he is warm. After that send the temperature to the doctor so that he may know what goes on and what comes back." "The nasopharynx has openings to the station." But this might be hung over the mantelpiece of every nurses' home: "Only for fire or bleeding must a nurse hurry, otherwise she must stroll." My reaction to these was Dr. Firth's second one: admiration for a gallant, if ineffectual, effort of memory.

* * *

Cautionary Tale

This is the fable of the two rectors' daughters. In the land of Albion were two villages so far apart that in each they did not know what happened in the other; though when matters arose in both that had a similarity the one to the other they were known in the great city in between. Hence this fable. In each village there was an elderly rector who had married late in life, and to his ageing wife one girl child had been born who at the time of the story was growing up. And in each village was a doctor who for four years had had no holiday—not for a single day—because Albion had been at war, and both of them had decided on a break and had employed a young locum tenens back from the war.

Now one of these young men had been trained at St. Didymus's Hospital. He was a graduate of an ancient monastic university and had taken a fellowship, and he was a very brilliant young man. He was called to the rectory because the daughter had a soreness of the throat; and he looked at it and said, "I think this is syphilis: we must have a Wassermann." Neither the rector nor his wife knew what syphilis was or who Wassermann had been. But they learnt later, after they had told all the village. The report came back negative; but the old man with his grey hairs went down with sorrow to the grave because it had even been suggested that his daughter could suffer from such a disease. Before that he complained to the doctor, who came back from his holiday and sent away the young man with a very bad chit to *the agency so that they would not employ him* again, and he could get no work, and took to drink, and finally breakfasted on gin on the seashore of a distant island, and there he died.

To the other practice went a Fawkes' man who was only an L.S.A. and he also was called to the rectory because the rector's daughter had a sore throat. She was a demure and silent little maiden, and he looked at her throat and wondered what it was. Now he was an early riser, and there had been some rain in the night, and as he had walked round the garden he had seen on the wall a slimy track where a snail had climbed. The track came back into his mind as he looked at that throat. So he asked the rector's wife to arrange for her daughter to strip to the waist that he might examine her chest. And as he listened to her lungs he looked at the skin of her chest, but it was without blemish. Then he took her by the hand with one of his own and bent her elbow, and with a finger of the other hand felt above the internal condyle on the arm. He felt a lymph-node on either side; and he wondered how he could get a blood-test without the old folks knowing. He dried his hands and went back into the drawing-room and told the rector and his wife that their daughter was suffering from a blood-poisoning and he must give her a tonic. And he turned to the girl and said, "It will be ready for you at 4 o'clock today; perhaps you will fetch it yourself?" and as he spoke he looked pointedly at her. When she came he asked her whether she knew what "syphilis" meant, and she answered, "Good God! It isn't that, is it? It must have been that blighter Bill. But how could that be? He rejoined his ship three months ago." And the young locum tenens said, "That is just about the time it would be; but I cannot be certain without a blood-test"; and he drew blood from her arm and it was strongly positive. When he told the girl she said, "Mother and father must never know," and he asked her whether there was anyone else with whom she could go and stay. She said, "Yes, there's my Aunty Judy: she's a sportsman and lives at Brighton." So the young doctor went to the rectory and told the old couple that their daughter was not progressing and he feared she might go into a decline and he thought she needed bracing air such as that of Dr. Brighton. And the rector said, "Well, there's Judy. She would have her. She's coming on Friday to stay the week-end"; and on Saturday he saw Aunt Judy and fixed things up, and he wrote to a friend in Brighton. From time to time for the next four years the rector's daughter went and stayed with her Aunt Judy and was cured of her blood-poisoning, nor did she go into a decline. And the young man from Fawkes' Hospital, who was only an L.S.A., pleased the doctor when he returned after having had an extra week's holiday, and he made him his assistant. Then he took him into partnership, and he married the rector's daughter, who was quite a nice girl after all, and she bore him four healthy children and they lived happily for twenty years till he gave his life on a desert in another war.

Letters to the Editor

SERVICE MEDICINE

SIR,—I have always looked to your journal to pro a realistic and objective policy; but I cannot con that any real advantage would be gained from a me of the medical branches of the three Services. I not agree with you more than when you state, in y leading article of March 22, that "medicine must as an equal in the highest counsels of the Armed Forces but it is just because the sailor, soldier, and airman h to perform such diverse duties, and are therefore s different persons, that separate organisations are req to keep them in health and attend to their sicknesses.

Health is not merely a negative state characterised the absence of sickness, but is very definitely a posi state of well-being, which, in the case of Service perso must be planned and fought for by the executive medical officers as a team. In order to exercise greatest influence in this team-work the medical offi must be an officer first and a doctor second. No offi can be a "good" officer unless he has fully studied environment and duties demanded of his men and traditions of their Service. He must, therefore, be officer of *that Service who has been trained in its* req ments and has lived in its spirit—only then can he b to possess the knowledge and prestige to talk authority at the highest level.

You suggest, further, that we need a training sch for Service medical officers which will bear compa with that of the Americans; but even the Ameri have their flight surgeons!

No, Sir, such a training school for a gargantuan co bined medical service would not produce medical office any more capable of either maintaining or re-establishing the fighting efficiency of our individual sailor, soldier and airman, but would only create a fourth arm "Service doctors." Presumably this idea would appea to those of bureaucratic, totalitarian persuasion; bu not to those whose aim it is to render the most efficient and effective service to the individual members of th Armed Forces, and so to those Forces as a whole.

R.A.F. MEDICAL OFFICER.

SIR,—It is not without significance that the material for your leading article of March 22 is quite openly admitted to be a study of the medical organisation o only one of the Services; and therefore it is perhaps pertinent to ask whether this can be an impartial survey of the organisation of "the medical services of the Armed Forces," or whether "it is generally agreed that their organisation left much to be desired."

That your journal, which is to be congratulated on publishing such an impressive and impartial article on Exports and Agriculture in your issue of March 15, shou publish such a misleading, mischievous, and misinformed article on Service Medicine is greatly to be regretted. More particularly is this so at a stage in the evolution of a State medical service for the community in general when there is a real need for informed opinion on the efficiency of the organisation of some, if not all, of the existing State medical services.

NEC ASPERA TERRENT.

P.S.—It is of some interest that airmen rejoining the Royal Air Force as a result of the Government drive for recruitment to the Armed Forces have publicly stated that one of the greatest factors influencing their re-enlistment is the existence of "a first-class medical service."

SIR,—Your plea for unification of the medical servi of the Navy, Army, and Air Force under a single head will be supported by many ex-Service doctors, particularly those who have suffered from the parochial atmosphere and the backwardness of one of the smaller services, those who while working in combined hospitals have experienced the labour of complying with three different sets of medical regulations, and those who knew the acute local medical shortages or duplication of facilities, the frustration and lack of medical liaison between the Services which existed in all but the most important fronts during the war.

There are other grounds for suggesting unification. A combined service offering a temporary commission with possibilities of duties at sea, abroad, or on air tations would probably attract many more young doctors than could the three separate services between them, and the unwelcome conscription of these young men at a vital stage in their apprenticeship might then be unnecessary. Secondly, promotion would come to depend more on professional or administrative ability than on seniority, a tendency which could only lead to better standards of work. Thirdly, I submit, a member of a medical corps would, to the average man, be more welcome as a medical attendant than an officer of the Navy, Army, or Air Force.

Bristol. J. NAISH.

AMYLOID MACROGLOSSIA

SIR,—I read with interest the article by Dr. M. D. Baber (Feb. 8) and the subsequent discussion by Dr. Parkes Weber, and Dr. Smith and Dr. Cooke (March 15).

It is apparent to me that more attention should be paid to the reports of Askanazy [1] in 1904 and of Magnus-Levy [2] in 1931, which noted the relationship of atypical systemic amyloidosis to diffuse plasma-cell myelomatosis; indeed, Dr. Parkes Weber [3] himself as early as 1903 remarked upon this association. After examining many cases of atypical amyloidosis, Magnus-Levy emphasised the fairly frequent association of these two rare conditions. Repeated confirmation of this relationship has come from the United States (Moschcowitz [4]; Robertson and Brunsting [5]; Rosenblum and Kirchbaum [6]; et al.) One case recently under my own observation illustrated the relationship extremely well.

I understand from Dr. Baber's report that the skeleton and marrow were not examined histologically. I would make a plea that this relationship be borne in mind in all cases of atypical amyloidosis, and that future publications relating to the occurrence of either localised or generalised atypical amyloidosis should include a description of the state of the bone-marrow. I believe that if this were done the frequency of such phrases as "unknown ætiological factors" and "obscure ætiology" might be reduced.

J. H. FODDEN.

Department of Pathology, University of Liverpool.

STAMMERING

SIR,—May I correct a mistake in Dr. Stein's letter (March 15)? The Chinese word for stammering is *k'ou-chih* (using the Wade system of Romanisation), and the version which he gave, *kchi-ko*, must surely be a corruption of that, even allowing for Romanisation in the German manner, employed by Kussmaul.

I should like to comment on the contention that stammering does not occur in the Chinese because they have a monosyllabic language. It is not only that Colombat seized upon a little anecdote as valid scientific evidence, but both he and Kussmaul misunderstood the actual nature of Chinese language and speech.

While it is true that from a philological point of view Chinese is basically a monosyllabic language, yet I learn, in conversation with a philologist friend, Mr. D. C. Yu, that, from earliest times, borrowings from the Sanskrit and Persian have contributed in effect polysyllabic words to the language. These were frequently phonetic translations, each syllable of the word being rendered by a single ideograph, which by itself possessed no meaning. These polysyllabic words (made up of several ideographs each carrying a syllable) are however rare, though phonetic translations of words from western languages are nowadays quite common.

On the other hand, a great number of Chinese words are made up of two or three independent ideographs, each of which standing by itself has meaning (apart from carrying a sound). Thus the word *k'ou-chih* itself is bisyllabic: *k'ou* means mouth, *chih* means *eat*. It is obvious that *k'ou-chih* means something more than *k'ou* and *chih*, just as *wireless* means more than *wire* and *less*; the word is a unitary whole, and not merely the sum of its parts. This tendency to form new words by combining ideographs is a fundamental one in the language (it is not, technically, *agglutination*), so that in a very real sense the language is also polysyllabic. The habit of certain translators from the Chinese, who render Chinese words into, say, English, according to their component parts, is pardonable for the sake of literary effect, but is psychologically false.

There is no reason to suppose then that Kussmaul's hypothetical "centre for integrating syllables" in speech is less exercised by Chinese than by any other (polysyllabic) language. Indeed it must be obvious to all who speak Chinese that words of several syllables exist, and it does not require acquaintance with the concept of organic integration in modern biology and psychology to realise that a work formed by two or more others is something on a level by itself, not explained entirely by its components.

That Kussmaul did not apprehend this can only be another historical illustration of the dangers besetting those who turn to anthropology for evidence to establish a theory.

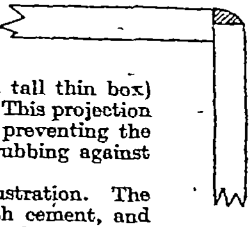
Maudsley Hospital, London, S.E.5. POW-MENG YAP.

PERSPEX SPECIMEN BOXES

SIR,—For museum specimens I have used 'Perspex' containers for a year, and have seen no sign of deterioration. I am glad, however, to see Mr. Fatti's favourable report (Feb. 1) after two years' experience with boxes made by Mr. John Carr.

Apart from a pleasing appearance, the special attractions of these containers are (1) that they are "made to measure," thus saving size and weight, and obviating the need for a large stock of jars of all sizes and shapes; and (2) that, unlike some glass jars, they withstand changes in atmospheric temperature and pressure without leaking or cracking. My technique, which is rather different from Mr. Carr's, is designed for people with little equipment or skill in carpentry.

The four upright sides are cut from $^{1}/_{8}$-in. sheeting and cemented with perspex cement no. 6 on to a base cut from $^{1}/_{4}$-in. sheeting. The base is cut large enough to project about $^{1}/_{4}$ in. beyond each of the four vertical panels or (in the case of a tall thin box) sufficiently for it to stand firmly. This projection reduces the risk of scratching, by preventing the sides of one box from knocking or rubbing against those of another.



The sides are joined as in the illustration. The trough on the outside is filled with cement, and as this shrinks with drying it must be filled several times. Next day the joint is smoothed and rounded with a file, after which the polish can be restored by coating the filed surface with a thin layer of cement. With this type of joint accurate carpentry, though desirable, is not essential; quite large gaps can be invisibly filled. It is best, before cementing, to file any cut edges, so as to remove saw marks, which might trap air-bubbles; but there is no need to apply pressure to the joints. The box is tested for leaks by filling it with water.

The specimen is sewn to a sheet of $^{1}/_{16}$-in. perspex through holes pierced with a hot needle. It is then placed in the box (previously filled with mounting fluid so that no unnecessary strain is placed on the supporting stitches) and the box is filled to within $^{1}/_{2}$ in. of the top. There is no need for supporting struts.

A piece of $^{1}/_{8}$-in. sheeting is laid on the top of the box, and the pattern for the lid is marked on the under surface by running a pencil around; the saw cuts are made slightly inside the pencil marks. The lid is now cemented on with a joint like those at the sides, the trough being filled with cement in the same way. Finally, the box is completely filled with mounting fluid, in which the appropriate amount of sodium hydrosulphite for colour restoration has been dissolved, through a small hole pierced in the lid. The hole is sealed with a blob of cement, and the joint holding the lid is rounded and polished in the same way as the side joints.

J. E. WENTWORTH
Museum technician.

Welsh National School of Medicine,
Cardiff.

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1. *Verh. dtsch. path. Ges.* 1904, 7, 32.
2. *Z. klin. Med.* 1931, 116, 510.
3. *Med.-chir. Trans.* 1903, 86, 395.
4. *Ann. intern. Med.* 1936, 10, 73.
5. *Amer. J. Path.* 1936, 12, 766.
6. *J. Amer. med. Ass.* 1936, 106, 988.

JOINT CHANGES IN CANCER OF THE LUNG

SIR,—Your annotation of March 22 almost coincided with a report by me to the section of medicine of the Royal Society of Medicine of 3 cases of gross pulmonary osteoarthropathy with lung cancer, which have come under my care during the past three years. In these cases the lung tumours were practically symptomless, and the connexion between the joint and lung conditions was not immediately apparent. In all, however, chest radiology in the anteroposterior and lateral planes revealed a tumour, while additional investigations revealed the precise nature of the lung lesion. All 3 cases were referred to me as examples of atypical rheumatoid arthritis.

CASE 1.—This was a man of 55 whom I saw at the Rheumatism Unit of the London County Council on account of pain, swelling, and stiffness of both knees, thickening of the long bones, and marked crippling. Examination revealed a rheumatoid type of lesion with effusions into both knee-joints. Examination of the synovial fluid showed a cytology typical of a non-specific rheumatoid lesion. The condition was complicated by gross pulmonary osteoarthropathy with an ossifying periostitis of the radius, ulna, femora, tibiæ, and fibulæ. *The fingers, toes, and even the nose* showed gross clubbing. There were no symptoms referable to the chest, but investigation showed a well-defined opacity in the right upper lobe. Mr. R. C. Brock, who kindly saw the patient for me, decided that his condition would only permit a lobectomy. Subsequent histological investigations showed the growth to be a bronchial carcinoma. Almost immediately after its removal the knee-joint swellings began to subside, and the fingers, toes, and nose became less clubbed; now, nearly two years later, the joint and soft-tissue swellings have almost completely subsided.

CASE 2.—A man, aged 48, had similar physical signs and was likewise operated on by Mr. Brock. Secondary mediastinal-gland involvement was treated with deep X-ray therapy, which unfortunately flared up a latent tuberculous focus that was not revealed clinically or radiologically; and he succumbed to this.

CASE 3.—This patient, a man aged 53, is at present under investigation. I first saw him a month ago as a case of "polyarthritis." The history was of rather sudden onset of pain, swelling, and stiffness of the knees some twelve months previously, followed within a month by swellings of the ankles, fingers, and toes. The swellings subsided after a month in bed, and the patient resumed work in spite of disablement. Six months later recurring joint swellings increased his crippledom, and three months ago he was obliged to give up his work. When I saw him he presented a clinical picture of a somewhat acute rheumatoid arthritis; he was febrile (99–100° F); there was pronounced anæmia, with lymphadenopathy but no clinical enlargement of the spleen. The joint changes included effusions into both knees and some involvement of the wrists, left elbow, left shoulder, and ankles; *and the condition was complicated by gross clubbing* of the fingers and toes and thickening of the long bones. Clinical examination of the chest showed no localising physical signs. The knee-joint fluid was typical of a non-specific rheumatoid lesion. X-ray examination of the chest showed in the lateral view a well-defined rounded opacity, 2½ in. in diameter, lying in the posterior basal segment of the right lower lobe. Although bronchoscopy has revealed little abnormal the findings favour a peripheral carcinoma of the lung. Mr. Brock will be seeing the case for me with a view to thoracotomy and possibly pneumonectomy.

In neither of the first 2 cases was there any real evidence of extensive tissue breakdown or appreciable infection; *and the association of the joint* and lung conditions on the basis of infection alone or of anoxia (suggested as possible causes) is difficult to explain.

The potential significance of the pituitary in relation to the ætiology of chronic arthritis has received some attention in recent years, and the connexion between acromegaly and pulmonary osteoarthropathy has been noted by Fried[1] in his work *on lung cancer*. *He has* advanced the theory that the diffuse pulmonary osteoarthropathy found in some cases is probably due to a dyspituitarism akin to acromegaly. The possible relation of endocrine imbalance to chronic arthritis and pulmonary osteoarthropathy in these cases is significant, the pathogenesis of diffuse pulmonary osteoarthro (Bamberger-Marie's disease) is as obscure today as it was first described by Bamberger and Pierre Marie 1889 and 1890 respectively. Can one postulate, Crump[2] has done, an abnormal substance circu in the blood, affecting the periosteum, the bones, joints, and the soft parts of the terminal phalanges evidenced by clubbing of the fingers? And might the lungs—"pulmonary glands," as Aschoff[3] others has suggested—take on additional functions secretory organs? Certainly the association of join changes, osteoarthropathy, and lung-cancer is wort of more detailed investigation.

London, W.1. PHILIP ELLMAN.

HEALTH INSURANCE IN THE UNITED STA

SIR,—The commercial insurance interests of A are seeing to it that the proposed Federal health insurance scheme, backed by President Truman, does not become law—not if they can help it. Here is a sample of one their widely circulated leaflets, headed *Socialised Medicine —Bad Medicine for You!*

Dr. Edward H. Ochsner of Chicago testified at the recent Wagner-Murray Bill hearings in Washington that

This is how it was in Britain:

The doctor got back to his office just at 2 o'clock. "How many?" he said to his nurse. "Forty." Casually, without hurry, he put on his white jacket and poked his head into the waiting-room where the forty patients sat: "Will those of you with headache please stand?" he said. Six stood. The doctor took identical printed prescriptions out of his desk and handed one to each of the six and dismissed them. "Will those of you troubled with a cough please stand?" Another group got up and again he handed them printed prescriptions and dismissed them. The others he took one by one into his private office for a few minutes. Two hours later the office was empty, the 40 patients gone, an average of 3 minutes per patient. In Germany, under compulsory insurance, some doctors did even better—30 to 40 patients in one hour!

This same leaflet lectures insurance managers to be more active on the political war-path.

"It is, of course, not natural for executives whose job it is to smell a dollar to delve into this field, because there can't be a profit—the objective being merely to avoid losing money. But it is a matter of large import to private insurance from the long-range standpoint. We need only recall that England has had a cash sickness scheme since 1911 and now industrial life insurance and workmen's compensation have become lost to commercial insurers!"

Shiplake. RONALD DAVISON.

SUCCESSFUL REVACCINATION

SIR,—I frequently dispute two widely held inferences about revaccination: that an early reaction is evidence of immunity, and that "no reaction" is unacceptable because it is due to failure to vaccinate properly. I welcome Dr. Broom's paper (March 22) as supporting my views.

For revaccination to be properly performed and recorded there are four essentials: the lymph must be potent; the technique must be correct; the reading of the reactions must be accurate; and the interpretations of the findings must be true. I maintain that today it is possible for every one of these factors to be at fault and yet for the subject to be certified as successfully vaccinated. Paradoxically it is the desire to eliminate such faults, by refusing to accept a "no reaction," which has been largely responsible for recent reports *of a high incidence* of smallpox among the recently vaccinated.

It is but a short step from the standpoint that "there must be some reaction to vaccination" to the erroneous and dangerous assumption that any sort of reaction is evidence of successful vaccination and no reaction is proof of failure. It is precisely among those early reactions which are called "reactions of immunity" that the most serious errors of interpretation are made.

The explanation of my views will be helped if the term "immunity" is avoided and the subject is considered in terms of susceptibility. Vaccination is both a test of susceptibility and an immunising inoculation. The highly susceptible respond by a typical *primary vaccinia*; the less susceptible show a so-called accelerated reaction, which is better described as an *abortive vaccinia* or *vaccinoid*; while the insusceptible show *no visible response at all*, as in 238 of Dr. Broom's 1227 cases.

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[1] Fried, B. M. *Arch. intern. Med.* 1943, 72, 565.

[2] Crump, C. *Virchows Arch.* 1929, 271, 467.

[3] Aschoff, L. *Z. ges. exp. Med.* 1926, 50, 52.

Besides these responses others may appear which are not concerned directly with susceptibility; of these, the most important is the sensitivity reaction to products of the virus, living or dead. The reaction develops in some of those who have had previous experience of vaccine lymph. It may occur in all the above groups—the highly susceptible, the less susceptible, and the insusceptible—although it is true that there is some association between sensitivity and immunity, because sensitivity implies previous exposure to the virus and an opportunity of acquiring resistance. Now, Sir, despite a vast literature on immunology and allergy, the distinction between immunity and sensitivity is still confused; and frequently reactions of sensitivity are accepted as evidence of immunity. In vaccination this is particularly dangerous, because vaccination requires the use of a living virus and the sensitivity response can occur with inactive lymph, as the 110 control reactions in Dr. Broom's series show.

It comes to this: if revaccination is followed by primary vaccinia or aborted vaccinia, the subject is susceptible and the vaccination has boosted his resistance to a safe level. (It would help enormously if we restricted the term "*successful vaccination*" *to the susceptible* and held that the immune cannot be successfully vaccinated.) If revaccination is followed by an early reaction or by no reaction, no positive inference can be drawn as to the susceptibility of the individual. The early reaction may be specific, non-specific, or traumatic. If specific, it may be a sensitivity response to the products of the virus, living or dead. What is certain is that it is not a reaction of immunity, and this term should be dropped. On the other hand, if no reaction occurs the vaccination may be faulty in some way or the subject may be immune. In face of this uncertainty repeated revaccination may be desirable, but no further inferences can be drawn beyond those stated above. For these reasons I agree with Dr. Broom in advocating a change in the international certificate of vaccination.

River Hospitals, Joyce Green,
Dartford.
MAURICE MITMAN.

INFANTILE INSOMNIA AND MATERNAL GRAVES'S DISEASE

SIR,—The following case-histories show that infantile insomnia may be the presenting symptom of maternal Graves's disease, and they are also interesting as a study in the emotional relationship between mother and child.

Mrs. A came to the outpatient department with her first child, aged 5 months. Her complaint was that the baby never slept for more than an hour or two consecutively. The baby proved to be a fine healthy if over-active bottle-fed girl, weighing 14 lb. 12 oz. and looking the picture of health. Her mother, however, said that she herself had lost 10 lb. in weight since the birth of her child. The mother was found to have tachycardia, with a pulse-rate of 100 per min. at rest, slight exophthalmos, a visible swelling of the thyroid, and a fine tremor of her fingers.

Mrs. B, the mother of two boys, separated from her husband for the past year because he had to work in Wales while the home remained in London, brought her son, aged 2 years, with the complaint that he was very restless at night, sleeping a total of 4 hours only. With him came his brother, aged 4 years. They were tough noisy healthy children, over whom their mother had little control. She looked worn out, had well-marked exophthalmos of some years' standing, a pulse-rate of 110 per min. at rest, tremor of the fingers and hands, a palpable swelling of her thyroid, and obvious over-anxiety.

Mrs. C, an excitable Jewish mother, brought her first child, aged 9 months, with the complaint that the baby girl apparently never slept either day or night. She was a large lackadaisical over-fed child, constipated but otherwise healthy, weighing over 20 lb. She was in the process of being weaned and had a good mixed diet in addition to four breast feeds daily. The mother was stout, florid, and emotional. She thought she had lost weight herself, but did not know how much. She had a very variable pulse-rate which was consistently over 100 per min. at rest. Her exophthalmos was not pronounced, but she had a lid-lag and a fine tremor of her fingers. She said her nerves had been bad since she had tried to wean the baby at 6 months and had failed.

All these children slept within earshot of their mothers, the two girls in the same room and the boy in the next room with an open communicating door. In the first two histories there was no question of the babies getting too much thyroxine from their mothers' breast milk, and, although this is a possibility in the last instance, the appearance of positive health with a regular gain in weight in all these infants belied their mothers' stories of insomnia.

It seems probable that they were normal healthy babies whose every cry or movement was heard by an over-anxious parent, and whose insomnia if not entirely imagined was induced by their mothers, who picked them up and generally disturbed them every time they so much as whimpered or turned in their sleep.

All three patients came to the outpatient department of the Hospital for Sick Children, Great Ormond Street, within a year. The mothers had to be sent elsewhere for confirmation of the diagnosis and treatment. This confirmation was obtained from the adult hospital in each case. No treatment was given to the children, two of whom are reported, in reply to a written query, to be sleeping well, while their mothers, who are at home, say they themselves are much improved. These two mothers are being treated with thiouracil; the other one has not yet left hospital.

I wish to thank the honorary staff of the Hospital for Sick Children for permission to publish these case-histories.

R. E. BONHAM CARTER.

Institute of Child Health, Hospital for Sick Children,
Great Ormond Street.

THIOCYANATE FOR HYPERTENSION

SIR,—In his article of March 15 Dr. Mills claims that potassium thiocyanate produced striking symptomatic relief in 27 cases of benign hypertension in which headache and dizziness were prominent symptoms. He states, however, that the drug does not permanently lower the blood-pressure, even in cases in which there is much symptomatic relief. These results are at variance with those of other workers published in the past ten years. They have claimed to produce relief of symptoms in a much smaller proportion of cases, but have often found a reduction of blood-pressure. A typical example is the report of Barker et al.[1] on a carefully controlled series of 246 hypertensives treated with thiocyanate for 2–11 years. Persistent symptomatic improvement occurred in 56%, and reduction of blood-pressure by 30/20 mm. or more was obtained in 67%.

Dr. Mills's failure to lower the blood-pressure was probably due to inadequate dosage. He aimed at a blood thiocyanate of 5–8 mg. per 100 ml., whereas previous writers have found 8–12 mg. necessary. One wonders whether the doses Dr. Mills used could have had much real effect on the patients. In considering the claims of any treatment to relieve the symptoms of hypertension without lowering the blood-pressure, the work of Ayman[2] should be borne in mind. He produced decided symptomatic relief in 82% of a series of hypertensives by administering solemnly and with enthusiasm doses of coloured water.

Beverley Emergency Hospital,
East Yorks.
S. G. SIDDLE.

SIR,—Dr. Geoffrey Evans has asked me to correct a mistake in my paper in your issue of March 15. I stated that in his paper with Dr. D'Silva he maintained "that some benefit was derived from this drug in all cases." Apparently I had not made my meaning clear. I wished to point out that although they likewise found that headache was the symptom which was most relieved by potassium thiocyanate, they also found that all symptoms obtained some benefit in certain cases—for example, insomnia and mental changes (lack of concentration). I was unable to confirm any benefit in cases with such

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1. Barker, M. H., Lindberg, H. A., Wald, M. H. *J. Amer. med. Ass.* 1941, 117, 1591.
2. Ayman, D. *Ibid*, 1930, 95, 246.

symptoms, but as I stated in my article I only treated 8 cases in which headache was not the predominant symptom.

Lister Emergency Hospital,
Hitchin, Herts.
P. J. W. MILLS.

COMPRESSION OF MEDIAN NERVE IN CARPAL TUNNEL

SIR,—Since our article appeared on March 8 we have seen a paper by W. B. Cannon and G. J. Love in *Surgery* (1946, 20, 210) reporting 9 patients in whom the transverse carpal ligament was divided for median compression. In 3 cases the condition was thought to have arisen spontaneously, and the characteristic swelling of the nerve is described.

MARCIA WILKINSON.
Maida Vale Hospital for Nervous Diseases, London, W.9.

STEVENS-JOHNSON SYNDROME

SIR,—I was most interested in the accounts by Dr. Maurice Nellen and Dr. J. O. Murray in your issue of March 15. It is strange that so few reports of the syndrome have appeared in England, for there are many references to it in Continental and American literature. A case was described, however, by Low and Davies[1] in 1938, under the diagnosis of dermatostomatitis—the name given to the condition by Baader in 1925.

It is not very uncommon here; in the last six years I have seen 8 identical cases, which will be reported in detail elsewhere. Of these, 5 were in young male adults in the Royal Navy, while 3, seen during the last six months, were civilians. The later group included one woman of 55 and a child of 9, the onset of whose illness followed a trivial injury to the lip, as in Dr. Murray's first case.

It is impossible not to be struck by the constancy of the symptoms and of the course of the illness; it does appear to me to be an entity and not a variety of erythema multiforme. This conclusion is also reached by the *Commission on Acute Respiratory Diseases*, of Fort Bragg, N.C., in a recent article on the association of the syndrome with atypical pneumonia.[2] Despite extensive bacteriological and animal inoculation studies, they were unable to establish the ætiology.

The impression from American articles that severe ocular complications are common has not been borne out in the cases I have seen; only 1 of my series developed chronic conjunctivitis, and the remainder recovered completely.

Department for Diseases of the Skin,
Royal Infirmary, Sheffield.
I. B. SNEDDON.

THE TRAINING OF FUTURE PSYCHIATRISTS

SIR,—Admitting my temerity, I submit that the recommendations for the future training of D.P.M. candidates set out in the interim report of the committee on psychological medicine of the Royal College of Physicians, and embodied to some extent in the new Conjoint regulations for this diploma, are uninspiring, and that if followed they will tend to produce psychiatrists who are robots. Not very good robots either, because the recommendations contain serious sins of omission as well as of commission.

To train in a circumscribed subject for five years with the object of taking an examination at the end of that time is a formidable task. The temptation to "learn" current official viewpoints and not to develop gradually individual thought will be a pitfall difficult to avoid. The first five years of a would-be psychiatrist's life are highly impressionable. That his goal at the end of that journey should be the passing of an examination does not seem the most sound way of developing the best that is in him. A good examinee and yes-man would be the safest albeit the least desirable candidate.

A less imposing qualification than the proposed future D.P.M., and an honours qualification that could be acquired later, or recognised useful stages of the D.P.M., to be passed at intervals of six months to a year, would be much sounder propositions.

That the value of a certain period of non-medical work in the training of a psychiatrist is not recognised or recommended as part of the D.P.M. curriculum is a great pity. The average medical man or woman, this includes psychiatrists, has actually rubbed sho on equal terms very little with the workaday, un cally minded world. The journey has been from c to university, thence to the medical school and w with very little time to spare for other than nec recreation. Three to six months' compulsory work outside medical and psychiatrically trained circles wo be a valuable part of training and in many might be the starting-point of original psychiatr thought.

The omissions in the recommendations are dep That a personal analysis should be considered a n part of the training of a psychiatrist is surely as re as to expect that the student of medical anatomy sho spend some time in the dissecting-room. There are *things, in fact the most important things, in psyc* that cannot be learnt from a book or by attending lec and clinics. Only the physician who has faced the in his own mind will be able to search fearlessly the of his patient. And just as it is important to main strict asepsis in the operating-theatre, so it is ne that the psychiatrist should not project his own pro into the therapeutic session. This danger can only guarded against by the deeper self-knowledge acq during personal analysis.

I feel that the recommendations for the training future psychiatrists ignore the intelligence and la abilities of the men and women who wish to take this fundamentally important branch of medicine, that if carried out they will seriously hinder the deve ment of British psychiatry.

Cassel Hospital, Stoke-on-Trent.
ALICE E. BUCK.

PALPABLE EPITROCHLEAR GLANDS

SIR,—Surveys and tables no doubt have their uses, and Dr. Laurence Martin's dip into the literature of syphilis (March 22, p. 363) has its interest; but clinical medicine does not work like that when it deals with a problem, such as a patient with a suspicious lesion of the tonsil. It is then that palpation of the epitrochlear lymph-nodes has its value. *If the glands are palpable on both sides you must go on* and withdraw blood for a Wassermann reaction whatever the domestic implications may be. The diagnostic *value of the epitrochlear nodes* lies in the fact that they are the only superficial ones which are not fairly frequently palpably enlarged in healthy people. You find those in the groin enlarged in people that walk a lot, those in the axilla in people with sweaty arm-pits, those in the neck in adults in whom they are left over from the physiological recurring enlargements of childhood; Dr. Martin finds that he can palpate a normal epitrochlear lymph-node; I cannot. When there is a general enlargement of the lymph-nodes throughout *the body*, I can feel this gland; and one of the conditions in which this occurs is secondary syphilis, where it may be palpable before there is any rash.

If, then, a person has a suspicious lesion on the tonsil and both epitrochlear lymph-nodes are palpable you must follow up the line of inquiry. It is not a question of making a diagnosis on these findings alone. In the old days the inquiry consisted in asking the patient to show the external genitalia and waiting for further secondary symptoms. Today it is taking a Wassermann. In the 39 years in which I have followed and taught this traditional advice I must have felt for enlarged epitrochlear glands in quite 300 people who turned out not to have syphilis, *but I do not remember one* i whom I could feel them *on both sides.* On one side I have felt them from a small infective lesion of the little finger; but *in my experience* these septic lesions are not bilateral.

It is probable that in a throat department we are especially faced with this clinical problem; until about 1930 I used to have one example every three months or so and could go over the question with *each set of* dressers. Since then they have been very rare; but we have had one in a man during this three months. Perhaps the cases are going to the L.C.C. hospitals. During the war I saw three or four *at one* of these where I was then working, though none came to my clinic at Guy's. One was a young man sent up with a demand that I should erform tonsillectomy.

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[1] Low, E. B., Davies, J. H. T. *Brit. J. Derm.* 1938, 50, 141.
[2] *Arch. intern. Med.* 1946, 78, 687.

It will be a pity, I think, if Dr. Martin's paper is nterpreted to mean that to palpate for epitrochlear ymph-nodes is of no clinical value in a suspected case of secondary syphilis.

Throat Department, Guy's Hospital. T. B. LAYTON.

RECURRENT SHOULDER DISLOCATION

SIR,—Until I read Mr. Hindenach's article on the interior bone graft (March 22) I had thought that this earsome operation had begun to be forgotten after its ecent revival.

The lesion in recurrent dislocation of the shoulder detachment of the capsule from the anterior aspect of the neck of the scapula) was first described by Perthes, who was treating the condition by suture as far back as 1906, and gives an excellent review of the problem.[1]

Mr. Hindenach appears to recommend the bone-graft operation when "the capsule is thin . . . or friable." I have never met this condition, nor does Perthes mention it in his article.

In this country Bankart popularised Perthes's operation, which is the only reliable procedure. The method of suture described by him is, however, unnecessarily difficult and traumatising. Recently there has been a return to Perthes's original method of using a steel staple (U-shaped nail of Perthes). An account of the method used in South Africa has been given by Sir Heneage Ogilvie[2] but even this method is needlessly traumatising; and I would refer Mr. Hindenach to a letter by me[3] describing an exceedingly simple approach to the anterior aspect of the neck of the scapula, sufficient to allow repair of the lesion using a staple introducer of the type described by Ogilvie and myself. Post-operative immobilisation is unnecessary; the patient need only be in hospital a few days; and there is a rapid return of function.

I hope the bone-graft operation will never become popular in this country.

London, W.1. J. S. MAXWELL.

ANTENATAL PREFERENCES

SIR,—As a prelude to a study of normal child behaviour in the borough of St. Pancras, it seemed worth surveying the preferences of husbands and wives for male or female children.

At antenatal clinics 100 married primiparæ, under thirty-five years of age, were questioned; 70 of the husbands were labourers or artisans and 30 were clerks, small shopowners, or skilled technicians: 31 women wanted a boy, 35 wanted a girl, and 34 had no preference. Of their husbands, 41 were said to want a boy, 32 a girl, and 27 to be indifferent.

Many factors influence the choice of sex for the firstborn. There is the influence of the parent's own family, for the children one knows best are oneself and one's siblings. No relation between predominance of siblings of one sex and preference for a firstborn of a particular sex could be proved in this small series, but several mothers cited their brothers or sisters as biasing their choice. The mate may have strong views: of the 50 couples, both members of whom held opinions, 30 agreed and 20 disagreed in their choice. The effect of topical events has probably been over-rated; although over a quarter of the primiparæ gave reasons for preferring a boy or a girl, only one mentioned war as a deterrent to bearing a boy. State custom in some races has encouraged selective infanticide of boys or girls[4]; but in England we have merely a mild patriarchal tradition.

One does not know if preferences vary in different social groups in this country, but male and female sex prestige seem approximately equal in the district where this study was made.

The 100 secundiparæ who were also questioned had borne 53 boys and 47 girls. Of the husbands, 70 were labourers or artisans, and 30 clerks, &c.: 60 women wanted a child of different sex to that of the firstborn, 24 were indifferent, and only 16 wanted a child of the same sex; 64 men wanted a child of different sex, 21 did not mind, and 15 wanted a child of the same sex as the first. 54 couples agreed and 11 disagreed in their choice.

It is interesting that the desire for a mixed family is so strong despite the economic disadvantages (e.g., waste of clothing and sleeping accommodation).

How do these preferences vary in different social groups? To what extent do they affect family planning? And how much do they influence the subsequent relationship of parent and child? RICHARD MEYER.

Maternity and Child Welfare Department,
St. Pancras, London, N.W.1.

MACROCYTIC ANÆMIA: A CORRECTION

SIR,—I write with all haste to disclaim the suggestion in the report (March 15) of a recent meeting of the Association of Clinical Pathologists that I described two cases of "pernicious anæmia" in which hydrochloric acid appeared in the gastric juice after treatment with folic acid.

One of the cases was of a young man who developed a macrocytic anæmia after resection of a long stretch of small bowel; the other of a young woman in whom a similar anæmia appeared after pregnancy. In both cases intractable diarrhœa was a prominent symptom; and in both the anæmia was irresponsive to liver.

I have on various occasions maintained both in speech and print that responsiveness to liver is an essential criterion for the diagnosis of pernicious anæmia. I regarded neither of these cases as falling within this category. S. C. DYKE

Director, Pathological Laboratories.

Royal Hospital, Wolverhampton.

PERFORATED PEPTIC ULCER TREATED WITHOUT OPERATION

SIR,—While the work of Mr. Hermon Taylor may make all previous ideas of the treatment of perforated peptic ulcers of historical rather than practical importance, my experience with conservative treatment in the last three years may be of interest.

Two problems have presented themselves in dealing with these sealed ulcers—diagnosis of the perforation and the indications for conservative treatment. The diagnosis of a sealed perforation is made on the same lines as the usual type, but because the symptoms are much less definite many cases are probably missed. The two most reliable symptoms are sudden onset of upper abdominal pain, which is invariable, and shoulder pain, which occurs in the great majority. The combination of these two symptoms should suggest a perforation, even if the rigidity is minimal. The signs may be very slight, particularly if the case is not seen for some hours, but there is always some rigidity and tenderness in the right upper quadrant. The diagnosis can be confirmed but not excluded by a straight radiogram taken after the patient has been sitting up for a few minutes.

The following rules have been evolved for deciding to treat a case conservatively. (1) At least one quadrant of the abdomen, usually the left lower, must show slight rigidity. (2) The area of board-like rigidity must be less than one complete quadrant. (3) The patient's general condition must be good and the pulse-rate less than 100 per min. when he has settled down after admission. All the cases treated conservatively have had a gas bubble less than 2 in. in depth.

At first these patients were kept strictly in Fowler's position, but in the last two years they have been treated in the most comfortable position. Nothing is given by mouth until the form of treatment has been definitely decided. The pulse is recorded half-hourly, and the abdomen examined every hour for four hours. If the ulcer is sealed there is a well-marked improvement within two hours; the pain diminishes, and the rigidity recedes towards the right costal margin. Within four hours a definite decision to operate or to treat conservatively is taken. The patient is put on a slow rectal drip, and allowed sips of water by mouth. The possibility of a further leak must always be considered, so he is not given any morphine for at least twelve hours, and any increase in pain or rise in pulse-rate must be reported. I have never been faced with the necessity of considering a change in the line of treatment once it has been started. After twelve hours the patient is allowed an ounce of water hourly, and this is increased until he is on an ulcer diet after four days.

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[1] *Dtsch. Z. Chir.* 1925, 194, 1.
[2] *Brit. med. J.* 1946, i, 362.
[3] *Ibid*, p. 588.
[4] Ploss, H. H., Bartels, M., Bartels, P. Woman, London, 1935, vol. I, p. 548.

In the last three years among 42 consecutive cases diagnosed as perforation, 9 have been treated conservatively. There have been no deaths and no residual abscesses, but it is unlikely that there would have been any mortality in this type of case if they had been sutured. One case in which the above indications were exceeded gave anxiety for forty-eight hours, but then recovered uneventfully. The morbidity has been greatly reduced. The patients are over the perforation in four to five days, and gastric investigations can be started after seven days.

All forms of peptic ulcer will seal themselves. The series described is too small for analysis, but there have been both gastric and duodenal ulcers, and, in the cases of this type explored and found sealed before the conservative line of treatment had been adopted, there were all stages from acute ulcers, with a very short history, to old sclerotic ulcers with a long definite history.

Unfortunately the importance of the proximity of the last meal was not realised, so no records have been kept. Gastric suction has not been employed, but I consider that it would have greatly extended the scope of the conservative method.

Gloucester. P. M. BIRKS.

TEMPORARY HYPERTENSION AFTER CURARE

SIR,—A slight rise in blood-pressure after the administration of curare has already been recorded [1] [2], and we have often seen cases where a rise in pressure of up to 30 mm. Hg has followed its use, whatever method was used for the accompanying narcosis. Recently we were perturbed to encounter the following case:

> A man, aged 71, exceptionally fit for his age and with a blood-pressure (B.P.) of 160/90 mm. Hg, was undergoing colectomy for carcinoma. After premedication with morphine gr. $^1/_6$ and atropine gr. $^1/_{100}$ anæsthesia was induced with 0·25 g. 'Intraval,' and a no. 8 Magill tube was passed blindly, under light cyclopropane anæsthesia, after the soda-lime had been cut out of the circuit for a few breaths. 15 mg. of 'Tubarine' was given intravenously just before he was taken into the theatre, a little cyclopropane later being added to the circuit from time to time for maintenance.
>
> At the beginning of operation the B.P. was 140/90 mm. Hg and the pulse-rate 80 per min. After half an hour the pressure rose suddenly to 180/120 and continued to go up steadily, twenty minutes later reaching 200/110; fifteen minutes after this the beat could be heard at the extreme top of the sphygmomanometer scale, giving a reading of at least 260/120. All these abnormal systolic readings were confirmed by palpation of the radial pulse. Thirty-five minutes later the pressure dropped to 200/110, and after a further twenty minutes it was 160/100. The pulse-rate had remained between 80 and 100 throughout, and the patient left the table, after $2^1/_2$ hours' anæsthesia, with a blood-pressure of 180/110 and a pulse-rate of 90. Removal of the mask revealed that a profuse epistaxis had taken place, which, we must hasten to add, had not appeared immediately after the passage of the tube. The patient's reflexes returned while he was still in the theatre.
>
> Postoperatively he showed no untoward effects of his temporary hypertension. The night following operation his pulse-rate was 64 and of normal volume, no reading being taken to avoid disturbing him. The following morning his B.P. was 160/90, at which it remained until his discharge.

During the operation there was neither gross respiratory depression nor anoxia; the soda-lime was fresh and, indeed, was changed as a precaution as the blood-pressure rose; and we were certain the narcosis was not too light. The sphygmomanometer was subsequently checked. We concluded that curare was responsible for this alarming rise in blood-pressure; that the epistaxis indicated the functioning of a most auspicious "safety-valve", and that the pharmacology of curare can certainly bear closer investigation.

GORDON OSTLERE
Senior Resident Anæsthetist.
Hill End Hospital (St. Bartholomew's), St. Albans.

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1. Gray, T. C., Halton, J. *Proc. R. Soc. Med.* 1946, 39, 400.
2. Prescott, F., Organe, G., Rowbotham, S. *Lancet*, 1946, ii, 80.

INFORMING THE PATHOLOGIST

SIR,—In many teaching hospitals the study of c pathology is much restricted, and pathologists e can usually tell at once whether a new houseman has taught how to use a laboratory. It is perhaps not be expected that this ancillary though all-emb branch of medicine should receive much attention in already overburdened curriculum; but there are think, some simple ways in which the student could made aware of the importance of an efficient approach the laboratory, and of the benefit that could acc to him through such an approach.

Often request forms submitted to the laborat are badly filled in, causing irritation and delay. could quote many examples: for instance, a requ for a blood-count accompanied only by the diagn "fractured femur" does not get anyone very far; extra few words—"clinically anæmic" or "P.U.O" would raise the status of the request form from t of a penny-in-the-slot to a reasonable medical docume Similarly with histological requests: "tumour of leg—section please." The pathologist at once wond how big it is, how long present, and whether it easily removed. In his own hospital the patholog can overcome these things by personal contact with houseman, but when specimens arrive by post furth information may be difficult to obtain.

Would it not be possible for every student to spe at least one full working day in a clinical patholog laboratory, perhaps at about the end of the second mo in the medical wards or sooner? The purpose of th would be simply to show him what happens to specime when they arrive at the laboratory. Seeing the for that accompany them, he would appreciate the value filling them in correctly with essential clinical detai He would come to understand that the purpose of t form is not just to enable the specimen to travel fro the ward to the laboratory. Even if he learnt no clinic pathology he would at least have learnt the corre approach to the laboratory; and possibly his inter might be stimulated.

One more point. The making of blood films is simp when properly done; but it rarely is properly done clinicians. A good blood film is essential where blo for counts has unfortunately to be sent by post. Af all, the blood film is usually the most important sta of a blood-count. The pathological service is to extended, and even the smallest coöperation between t clinician and the laboratory will increase its value.

Canterbury. I. B. MORRIS.

Parliament

QUESTION TIME

What We Eat

Mr. W. ELLIOT asked the Minister of Food what intake calories per head per day was shown, for the latest availa month, by his department's dietary food survey; and wh were the comparable figures for the corresponding month 1946.—Mr. J. STRACHEY replied: Our latest available fig is for November last. It is based on a small but representati sample of working-class families. It covers only food eat in the home, and not, for example, school or canteen mea The figure is 2320 calories, which shows no variation from t figure for November, 1945. It is very difficult to know wh addition ought to be made for meals taken out, but a cante meal will contain anything from 600 to 1000 calories.

Family Allowances Claims

Replying to a question Mr. JAMES GRIFFITHS stated th though the total number of families entitled to draw fam allowances was not precisely known, it was estimated th up to the present about 93% of the families initially entitl have received awards. Belated claims were still coming in.

Mr. JOHN LEWIS asked the Minister of National Insura if he would consider introducing amended legislation so th under the Family Allowances Act, claims by parents family allowances should not be affected by their havi children over the age of 14 years who were mentally defect or incapacitated and who were not included in the catego of those undergoing full-time instruction in a school virtue of the Family Allowances (Qualifications) Regulati

1946.—Mr. Griffiths replied: I sympathise with his point but a number of anomalies would arise if this particular type of case were picked out for special treatment. The Family Allowance Scheme has only been running for just over 6 months and I think we must have more experience of its working before we contemplate further legislation.

Industrial Injuries

Mr. D. J. Williams asked the Minister whether he had received the report of the Interdepartmental Committee on the Assessment of Disablement due to Specified Injuries; and what action he intended to take in the matter.—Mr. Griffiths replied: I have considered the recommendations of the committee and I am prepared to accept them in principle as a basis for the regulations which I shall have to make regarding the assessment of injuries under the Industrial Injuries Scheme.

Doctors in the R.A.F.

Mrs. Ayrton Gould asked the Secretary of State for Air if he was aware that the proportion of medical officers to officers and other ranks in the R.A.F. was 30% higher now than it was at the end of the European war: and if he would take steps to reduce the proportion of medical officers to other personnel in the Service to the war-time level.—Mr. Philip Noel-Baker replied: I am aware that the proportion of medical officers in the R.A.F. is higher now than at the end of the war. There are some good reasons why this should be so, but I share, nevertheless, the preoccupations expressed by my hon. Friend. I propose to consider the matter again in consultation with my right hon. Friends.

Appointments

Angel, R. E., M.B. Lond., D.A.: anæsthetist, Prince of Wales's Hospital, Plymouth.
Ward, R. D., M.B. Lond., D.O.M.S.: chief asst., ophthalmic department, St. Thomas's Hospital, London.
St. Bartholomew's Hospital, London:
  Badenoch, A. W., M.D. Aberd., F.R.C.S.: asst. surgeon.
  Gibb, W. E., B.M. Oxfd, F.R.C.P.: asst. physician.
Middlesex County Council:
  Baber, Margaret, M.D. Lond., M.R.C.P., D.C.H.: pædiatrician, Redhill County Hospital, Edgware.
  Doel, G. G., M.R.C.S., D.M.R.E.: radiologist, Chase Farm Hospital.
  Perkins, A. C. T., M.D. Lond., D.P.H.: deputy county M.O.
•Kent County Council:
Pathologists:
  Bowers, V. H., M.D., B.Sc. Lond.
  Close, H. G., M.D. Lond.
  Griffiths, L. L., M.B. Dubl., D.P.H.
Royal Liverpool Children's Hospital:
  Aitken, Henry, M.B. Aberd., F.R.C.S.E.: asst. ear, nose, and throat surgeon.
  McCann, J. A., F.R.F.P.S.: ophthalmic surgeon.
Examining Factory Surgeons:
  Cowan, J. M., M.B. Glasg.: Stafford.
  Craig, D. M., D.S.O., M.R.C.S.: Framlingham, Suffolk.
  Somerville, Arthur, M.R.C.S.: Beeston, Notts.

• Amended notice.

Births, Marriages, and Deaths

BIRTHS

Browne.—On March 25, at Haywards Heath, the wife of Dr. Hugh Browne—a son.

Cusack.—On March 18, in Bermuda, the wife of Surgeon-commander J. J. Cusack, R.N.—a daughter.

Guttmann.—On March 26, Dr. Elizabeth Rosenberg, the wife of Dr. Erich Guttmann—a son.

Parsons.—On March 23, the wife of Dr. H. M. Parsons—a son.

Payne.—On March 23, in Southern Rhodesia, the wife of Dr. Cyril Payne—a son and a daughter.

Thomas.—On March 24, at Bishop's Stortford, the wife of Flying-Officer Merley Thomas, M.R.C.S.—a son.

MARRIAGES

Hardisty—Jarnum.—On March 24, in Copenhagen, R. M. Hardisty, M.R.C.S., captain R.A.M.C., to Jytte Jarnum.

Owen—Lewis.—On March 22, in London, Kenneth Owen, M.B., to Barbara Caroline Lewis.

Towers—Leach.—On March 22, at Salthouse, Norfolk, John Towers, B.M., to Barbara Minnie Leach.

DEATHS

Colyer.—On March 26, at Croydon, Horace Charles Colyer, M.R.C.S., L.D.S., aged 63.

Main.—On March 26, at Forest Row, Sussex, William Ritchie Main, L.R.C.P.E., aged 82.

Ramsden.—On March 26, at Oxford, Walter Ramsden, M.A., D.M. Oxfd, aged 78.

Walker.—On March 26, at Effingham, Surrey, Reginald Field Walker, M.B.E., M.R.C.S., aged 82.

Watson.—On March 22, at Dublin, Edward John Macartney Watson, M.D. Dubl., F.R.C.P.I.

Wortabet.—On March 15, in London, James Rashid Wortabet, M.B. Glasg., D.P.H.

Notes and News

SAFETY FROM SPARKS

The risk of anæsthetic vapours becoming ignited in operating-theatres may be still further reduced by the introduction of a new form of rubber which will be exhibited at the British Industries Fair. The commonest causes of ignition are the cautery, diathermy, electrical switches, or similar appliances; or the overheating, short-circuiting, or breakage of the small electric bulbs used in endoscopy. But the static electricity generated by friction between non-conducting blankets or mats is another possible cause which has proved very difficult to overcome. In one test drawing a blanket rapidly over a rubber mat on a trolley produced a static charge of 30,000 volts, giving a spark which would be fully capable of igniting ether vapour. In its draft warning notice, circulated to hospitals three years ago[1] by the Ministry of Health, the Operating Theatres Electrical Apparatus Committee recommended the fitting of trailing chains to all apparatus insulated by non-conducting tyres or pads, and some hospitals have practised humidifying the atmosphere. These cumbersome precautions may be superseded by the use of electrically conductive rubber. Conductivity has been achieved by adding to the rubber mix very finely divided carbon, which, while blackening the material, increases its resistance to wear and tear. To prevent the generation of static charges all rubber articles in the theatre must be of this material—its partial installation might increase rather than diminish the danger of explosion. This substance, devised by the Dunlop Rubber Co. Ltd., is a development from earlier work on antistatic tyres for aircraft.

DEODORANTS REVIEWED

In America, deodorants seem to be sold more freely than here, both to hospitals and private people. The research department of the Hospital Bureau of Standards and Supplies Inc., of New York, has published a useful survey by Mr. Dewey H. Palmer of common deodorants and deodorising equipment, assessing their value.

Three types of deodorants are widely sold—liquid vaporising types, ozone generators, and substances which act by adsorption. Mr. Palmer reviews five popular vaporising liquids, one of them selling to the tune of 4 million dollars a year. Such liquids form the greatest proportion of all deodorants sold to institutions, but chemical analyses and tests have shown that any effect they have is due to their covering odours. Some contain formaldehyde, which reduces the sense of smell slightly but also irritates the nasal mucosa. Chlorophyll, much advertised as an important component of others, has no deodorising properties at all; it will not even vaporise at ordinary temperatures: if it did, as one chemist put it, green clouds would rise from every kettle of spinach. Two of the products reviewed had been investigated by the U.S. Naval Medical Research Institute and found to be completely ineffective. Claims that such vaporising liquids work by chemical action and oxidation have been proved on test to be unfounded; any such action was too slight to affect strong odours.

Ozone generators are also found to be ineffective. The Council on Physical Medicine of the American Medical Association consider that the smell of ozone may mask other odours and also fatigue the olfactory nerves; but "contrary to aiding well-being, exposure to ozone may result in irritation of the mucous membranes of the nose, throat, and lungs, headaches, drowsiness, fatigue, and a burning sensation in the eyes." So much for the favourite seaside tonic.

The Naval Medical Research Institute report that activated carbon is the only agent capable of reducing or removing odours. The air must pass through a substantial quantity of activated carbon, being pumped or sucked through canisters by various devices; but adsorbent devices which depend for their effect on the natural circulation of air are not a success. For foul-smelling wounds or other local physical troubles associated with smell the most successful method is pronounced to be the use of filter cloth, impregnated with activated charcoal, which was first described in The Lancet in 1942 (vol. i, p. 755). This can be cut to any shape and applied over dressings, or made into boots or other garments to cover and enclose an infected area.

Mr. Palmer concludes that washrooms and toilets can best be deodorised by frequent cleaning with soap and water,

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[1] See *Lancet*, 1944, ii, 57.

46.—Mr. GRIFFITHS replied: I sympathise with
is point but a number of anomalies would arise if this
rticular type of case were picked out for special treatment.
1e Family Allowance Scheme has only been running for just
er 6 months and I think we must have more experience of
s working before we contemplate further legislation.

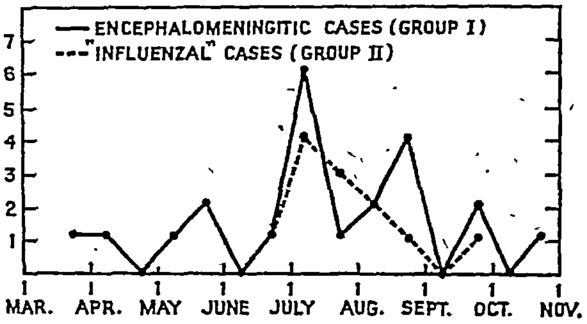
Industrial Injuries

Mr. D. J. WILLIAMS asked the Minister whether he had
ceived the report of the Interdepartmental Committee on
1e Assessment of Disablement due to Specified Injuries;
nd what action he intended to take in the matter.—Mr.
RIFFITHS replied: I have considered the recommendation—on,
the committee and I am prepared to accept them years,
inciple as a basis for the regulations which I ch—lleeu several
ake regarding the assessment of injuries ugnised as causes of
ijuries Scheme. wo-thirds of all cases of
Doctors in theuses as yet unknown. The
Mrs. AYRTON GOULD askedalso been associated with signs
he was aware that the yelitis; hence the term "benign
fficers and other ranks ijis," applied to the condition caused
han it was at the end of rong and Lillie (1934), is inadequate.
ake steps to reduce the neurotropic virus infections in which
ersonnel in the Servic cephalitic symptoms were prominent
OEL-BAKER replied ween March and November, 1946; and,
edical officers in the y not all have been due to the same
e war. There are currence within a comparatively brief
ut I share, nevertl mpted me to group them together for the
on. Friend. I scription and discussion. In this outbreak
onsultation with vith meningitis or encephalitis and 13 with
ns and symptoms were admitted to Redhill
ospital, and others were admitted in the
NGEL, R. E. Hospital, hood. The cases occurred chiefly during the
ARD, R. D., ment, St. ne numbers gradually declining after the first
Bartholome y (see figure). The patients came from a wide
BADENOCH, V. Middlesex: 11 from Edgware; 4 each from
GIBB, W. E. and Burnt Oak; 3 from Hendon; 2 each
iddlesex Cou BABER, MAR more, Kingsbury, Mill Hill, and Wembley;
Redhill h from Harrow, Golders Green, Queensbury,
DOEL, G. G. PERKINS, A. d, and Wealdstone.
Kent County ase was it possible to trace a direct contact
athologists: BOWERS, V. er case in the family, school, or work-place.
CLOSE, H. ppears to differentiate them from the 37 cases
GRIFFITHS, by Noone et al. (1936) in an outbreak of
oyal Liverpo AITKEN, H able encephalomeningitis in children, which
throat were somewhat similar to ours and showed an
MCCANN, J. tendency to drowsiness, arm tremors, and
xamining Fa COWAN, J. abinski responses.
CRAIG, D. culiar coincidence was the admission of case 11
SOMERVILLE ne day as a class-mate who had clinical polio-
There was, when these cases were seen, an
p of poliomyelitis in Middlesex and in the neigh-
part of Hertfordshire, and by courtesy of Dr.
Livingston I examined some of the cases then
ROWNE admitted to Hendon Isolation Hospital. These were
Brown ly, on clinical evidence, cases of acute polio-
J. itis, but others which were similar to those at Redhill
ICTORIA admitted at Hendon in the same period.
Dr. RSON odie's (1937) statement that half the poliomyelitis
NE in an epidemic are non-paralytic might suggest that
Pay IOMAS ases were atypical forms of poliomyelitis. Without
Offi ng any assumption about the nature of the infection
r somewhat varied cases, it may be said that they
ARDIST clinically not unlike those infected by the virus
M.B. WEN described by Armstrong and Lillie (1934), and whose
Barba haracteristic manifestation is "benign lymphocytic
OWERS Tower neningitis." MacCallum and Findlay (1939) have
that this virus sometimes causes an illness very
OLTER to poliomyelitis with weakness and wasting of
M.R.C. uscles. No similarity of this kind was observed in
AIN. L.R. of our cases, which, so far from showing muscular
UNDING and depressed tendon-jerks, often showed
O. ALKER eased reflexes and various degrees of Babinski
W nse. In case 10 alone was there much muscular
ATKON Wa rness, but this patient showed exaggerated deep
ORTAXES and transient ankle-clonus on one side.

s were neither more nor less varied than those
by Armstrong (1941), being meningitic or
lomeningitic (group I), or abortive and influenza-
THE ri roup II). But we found no hard and fast line
operatir een our two groups, and the distinction into groups
ductic made solely for the purpose of description. In group I
the cases varied greatly in severity from definite encephalitis
are to a very mild meningeal reaction; while group II
ar included 2 patients with cerebral symptoms compatible
with a mild encephalitis.

CLINICAL PICTURE

Most of the cases were in children or young adults. The illness usually began suddenly with fever and frontal headache, but there was in many of the cases about a week's prodromal period of fluctuating fever and headache before the onset of the more severe symptoms, and this was sometimes accompanied by increased fever and by shivering. But, though meningitic manifestations (headache, vomiting, photophobia, and stiffness of the neck) were almost constant at this stage, they were sometimes not well marked; neck stiffness was often very moderate and at times even so slight as not to be noted by anyone not looking specially for it. It was thus often quite difficult to draw a clear-cut line between prodromal and meningitic symptoms. Difficulty in diagnosis was also caused at first by the patients with normal cerebrospinal fluid (C.S.F.) who, like those just described, had severe headaches and very moderate neck stiffness—e.g., cases in group II and case 19 at the outset.



Half-monthly incidence of encephalomeningitic and "influenzal" cases (1 case in November and 1 case in December omitted).

Case 17 was admitted on the twenty-first day of his illness, case 4 on the fifteenth, case 2 on the tenth, and 9 patients in group I on the sixth or seventh day. The remaining patients in group I were admitted on the third or fourth day of the illness, and case 19 did not show C.S.F. changes until a few days after admission. Furred tongue and anorexia were common in the early stages, but faucial inflammation and coryza were uncommon. Diarrhœa and constipation were prominent in 3 or 4 cases. Only in 7 of the cases in group I did the prodromal phase appear to be absent.

The increased severity of headache, which probably often marked the onset of the meningitis, was apparently the determining factor in causing the admission to hospital of many of the patients, but in 5 children and 1 adult symptoms suggesting encephalitis (apathy, twitchings, severe drowsiness, delirium) were the main symptoms; headache and meningeal signs were less severe in these cases.

A striking occasional feature was the cranial-nerve weaknesses seen. In 4 cases there were unilateral facial palsies (supranuclear in case 7); in case 1 the auditory nerve was also involved, and in case 6 the hypoglossal nerve, in each case on the same side as the facial nerve involvement. In case 5 the internal strabismus improved rapidly: but the facial-nerve weakness recovered very slowly and still persists in 2 cases. Transient diplopia was noted in case 1, and 2 other cases showed slight nystagmus at first.

Case 1 had transient weakness of the right side of the body, cerebellar symptoms, and extreme giddiness. Three children during convalescence had rather prominent leg weakness with increased tendon reflexes, and it is possible that in these cases at least there was myelitis as described by Findlay et al. (1936). Sensory or sphincteric disturbance was not observed in our cases.

After admission the course of the illness was variable, but in most cases there was fever for about a week, and in many cases it was of low grade (99°–100° F). Several cases had temperatures of 102° F for the first two or three days, and in case 18 temperatures of 103° and 104° F were recorded. In case 8 there was low-grade fever for four weeks. Usually all signs and symptoms had disappeared by the end of the febrile period, but this was not true of the facial palsies: nor was it true in some of the more severe cases—e.g., cases 4 and 10. The temperature fell by lysis in all cases.

Leucocyte-counts were done in nearly all cases, and, though slight leucocytosis or slight leucopenia was seen in both groups, there was usually little abnormality in most counts. In a few of the abortive cases (group II) there was slight leucopenia and a relative lymphocytosis, but in no instance did the count strongly suggest infectious mononucleosis.

Paul-Bunnell and Widal tests, done in some cases, were negative.

The C.S.F. findings (table I) were used arbitrarily to divide the cases into group I, with positive findings, however slight (the meningitic and encephalomeningitic cases) and group II, with negative findings (the abortive, "influenzal," or non-meningitic cases). Case 35 in group II might be regarded as an intermediate case. Another case seen recently and not included in the series was also of this intermediate type. Here well-marked neck rigidity was associated with a blotchy rash on the limbs and with conjunctival and faucial injection; the C.S.F. contained 7 lymphocytes per c.mm. and 40 mg. of protein per 100 c.cm.

To illustrate the general pattern of the outbreak sample case-records are given from group I; and, though all these cases showed meningitic signs, they are subdivided, for convenience of description, into those which also had encephalitic symptoms or cranial-nerve palsies and those in which the meningitic signs predominated. This subdivision is an artificial one, since many of the "meningitic" cases had transient extensor plantar responses. In the same way the cases of group II have been put together for descriptive purposes and without implying a clear-cut pathological distinction.

GROUP I—ENCEPHALOMENINGITIS

Cases with Encephalitic Symptoms or Cranial-nerve Palsies

Case 1.—A woman, aged 47, was admitted on March 27, 1946, with a history of sudden onset of pain round rt ear, tinnitus, giddiness, and vomiting on the 20th, and two days later, rt facial weakness (lower motor neurone), and general weakness on rt side of body (reported by her doctor). Rt side of face felt numb for a short time. Some mental confusion and sphincteric incontinence before admission.

On admission she was rather drowsy and uncoöperative; unable to sit up, because of extreme giddiness; slight neck stiffness; Kernig negative; complete rt facial palsy (lower-motor-neurone type); nerve deafness of rt ear (drum normal); no facial sensory loss; no loss of power or of coördination in limbs; doubtful loss of tone on rt side of body; rt ankle-jerk definitely depressed, and doubtful extensor rt plantar response; all other tendon-jerks brisk, but abdominals absent.

C.S.F. (April 2): pressure 40 mm. H_2O; faint opalescence; total protein 20 mg. per 100 c.cm.; Pandy, faint trace; Wassermann reaction negative; polymorphs and lymphocytes 100 per c.mm.; sterile.

Further Course.—Very slow progress. Gradually able to sit up, with decreasing giddiness and lessening tendency to vomit on movement. Showed tendency to past-pointing to right for a time, and also brief period of diplopia on looking to left. Rt facial palsy and deafness very persistent. After a week tendon-jerks were all very brisk, and knee-jerks exaggerated (lt > rt). Plantars, lt flexor, rt extensor. After two weeks knee-jerks were less exaggerated, and plantars were both flexor.

C.S.F. (April 25): pressure very low; clear; total protein 20 mg. per 100 c.cm.; Pandy negative; 18 lymphocytes per c.mm.; sterile.

Much less giddy by end of first month, and after six weeks began walking. Great tendency to reel in either direction at first, but later deviated more to rt side.

Later made gradual improvement with instruction in walking and now gets about very well. Deafness in rt ear persists, as does much rt facial weakness, though this is still improving slowly (Nov. 8).

Case 6.—A boy, aged 4 years, was admitted on July 6 with a history of sudden onset of fever, sleepiness, apathy, and miserableness on the 5th. Also seemed to have pain in rt side of head, and a few hours before admission mother noted weakness of rt side of face.

On admission he was sleepy and apathetic; neck a little stiff and painful to flex; complete lower-motor-neurone lesion of rt facial nerve and deviation to right of protruded tongue; throat rather red, but nothing abnormal found in ears; temperature 101·4° F, pulse-rate 130.

Further Course.—Given short course of sulphadiazine for throat infection, and lumbar puncture done on second day of course.

C.S.F. (July 8): clear; pressure about 180 mm.; total protein 40 mg. per 100 c.cm.; Pandy, trace; chlorides 760 mg. per 100 c.cm.; lymphocytes 12 per c.mm.; sterile

White-cell count (July 8): 11,700 per c.mm. (polymorphs 45%, lymphocytes 47%, mononuclears 7%, eosinophils 1%)

Temperature fell to normal on third day, but drowsiness, miserableness, and apathy persisted two weeks. No weakness apart from rt facial weakness, and tendon-jerks all were definitely increased, especially on rt side. Plantars were flexor, but some bilateral withdrawal response was noted up to end of third week. Early walking caused leg pains, and progress at first was slow.

Follow-up (Oct. 8).—Now is very well, and only disability is a decreasing rt facial weakness of lower-motor-neurone type, though protruded tongue still deviates slightly to the right.

Case 7.—A boy, aged 4½ years, was admitted on July 9 with a history of having been tired and sleepy for three days before admission; two days before admission, from his mother's account, he seemed unable to walk, though "his legs did not look weak." On day of admission he fainted and showed weakness in the lower part of his face on the rt side

On admission he was alert and sensible; no headache, but unable to sit up, because of unsteadiness; neck stiffness; rt facial weakness of upper-motor-neurone type; cranial nerves otherwise normal, and no obvious weakness in limbs; Kernig negative; tendon-jerks increased in legs, particularly on rt side; plantar responses flexor, but withdrawal response of legs present on both sides; abdominals all present.

C.S.F. (July 9): clear; pressure 100 mm.; no block, total protein 40 mg. per 100 c.cm.; Pandy, trace; chlorides 700 mg. per 100 c.cm.; lymphocytes 31 per c.mm.; sterile.

White-cell count (July 9): 7900 per c.mm. (polymorphs 40%, lymphocytes 55%, mononuclears 4%, eosinophils 1%).

Further Course.—Made good recovery and became very active; soon lost neck stiffness; facial weakness diminished considerably, and emotional facial movements became normal; reflexes in limbs remained unchanged.

C.S.F. (July 17): clear; pressure 120 mm.; no block, total protein 40 mg. per 100 c.cm.; Pandy, trace; chlorides 720 mg. per 100 c.cm.; lymphocytes 7 per c.mm.; sterile.

Follow-up (August 15).—Only showed slight weakness on lt side of mouth during voluntary movement of facial muscles. Mother states that these muscles show involuntary spasms when he is excited.

Case 9.—A girl, aged 6½ years, was admitted on July 1 with a history of having been vaguely unwell, irritable, and off her food for a week; and of severe headache and photophobia for a day before admission, and of vomiting on the day of admission.

On admission she was flushed (temperature 103° F); herpes labialis; mentally clear and no headache; definite neck stiffness, but Kernig's sign negative; throat clear; nothing of note in any system, but tendon-jerks and abdominals were all depressed; plantars flexor.

C.S.F. (July 13): clear; pressure 200 mm.; total protein 20 mg. per 100 c.cm.; Pandy negative; chlorides 730 mg. per 100 c.cm.; cells 50 per c.mm. (lymphocytes 98%, polymorphs 2%).

Further Course.—Two days after admission temperature was falling to normal and child was comfortable; but, besides a persistent neck stiffness, she now showed a rt facial weakness of lower-motor-neurone type. The tendon-jerks were brisk; and, though the plantars remained flexor, there was an involuntary leg withdrawal response, more marked on the rt side. Subsequently the child made good progress, but occasional headaches and a little neck stiffness were noted during the first week.

C.S.F. (July 19): clear; pressure 170 mm.; total protein 20 mg. per 100 c.cm.; chlorides 740 mg. per 100 c.cm.; lymphocytes 12 per c.mm.

At discharge, rt facial palsy was little better, but child was otherwise well.

Follow-up (Oct. 22).—Fully recovered, apart from very occasional rt frontal headache; alert and well and free from facial palsy; all reflexes normal.

Case 10.—A boy, aged 3 years, was admitted on July 22 with a history of having been unwell and apathetic for a week before admission. No headache had been present, but parents had noted a tendency to muscular twitching during sleep. Persistent constipation.

On admission he was rather apathetic, apprehensive, and miserable; generally resistant to muscular movement and unable to sit up; held his back stiff if lifted, and kept hips and knees flexed; resistance to neck flexion, but no well-marked neck rigidity; Kernig's sign positive; knee-jerks slightly depressed, and ankle-jerks increased; plantars flexor; temperature 99° F; pulse-rate 120; otherwise normal, apart from a few enlarged glands in posterior triangles of neck; Mantoux 1 : 1000 negative; blood-sedimentation rate 7 mm. in 1 hour.

C.S.F. (July 21): clear; total protein 60 mg. per 100 c.cm.; lymphocytes 3 per c.mm.

White-cell count (July 22): 9000 per c.mm. (polymorphs 40%, lymphocytes 55%, mononuclears 5%).

Further course showed a persistent stiffness of neck and spine, and increased tone in the hamstrings, which led to the legs

TABLE I—C.S.F. FINDINGS IN ENCEPHALOMENINGITIC CASES

Case	Age (years)	Date 1946	Appearance	Pressure (mm.H_2O)	Total protein (mg. per 100 c.cm.)	Pandy test	Nonne-Apelt test	Chlorides (mg. per 100 c.cm.)	Total cells (per c.mm.)	Lymphocytes (%)	Polymorphs (%)
1	47	April 4	Very faint opalescence	40	20	Ft. tr.	..	..	100	..	..
		May 2	Clear and colourless	40	20	Neg.	..	..	18	100	0
2	42	April 11	Opalescent; large clot	160	400	+++	..	620	+++	95	5
		" 16	Clear; clot	120	240	++	..	690	100	95	5
3	11	May 27	Slight opalescence	120	30	Neg.	..	710	62	48	52
4	10	June 11	Clear and colourless	170	200	++	..	730	1	100	0
		" 15	" "	190	190	++	..	690	4	100	0
		" 26	" "	100	200	++	..	710	2	100	0
		July 16	" "	..	80	++	..	..	1	100	0
		" 23	" "	..	100	Hvy. tr.	..	..	4	100	0
		Aug. 24	" "	130	40	+	Neg.	730	2	100	0
5	5	July 5	Slight opalescence	210	60	+	Tr.	730	200	40	60
		" 17	Clear and colourless	100	40	+	..	710	5	100	0
6	4	July 8	" "	180 approx.	40	Tr.	Neg.	760	12	100	0
		" 18	" "	110	40	+	..	730	5	100	0
7	4½	July 9	" "	100	40	Tr.	Ft. tr.	700	31	100	0
		" 17	" "	120	40	Tr.	..	720	7	100	0
8	30	July 10	" "	110	40	Tr.	..	740	25	95	5
		" 19	" "	80	40	+	..	730	43	95	5
		" 31	" "	..	20	Ft. tr.	Ft. tr.	740	4	100	0
9	6½	July 13	" "	200	20	Neg.	..	730	50	98	2
		" 18	" "	170	20	Neg.	..	740	12	100	0
10	3	July 21	" "	..	60	+	..	..	3	100	0
		" 26	" "	250 approx.	80	+	..	730	6	100	0
		Aug. 6	" "	150	40	+	..	690	35	100	0
11	6	July 29	" "	180	30	+	..	730	85	63	37
		Aug. 8	" "	80	40	Neg.	..	..	4	100	0
12	4	Aug. 16	" "	100	40	Tr.	..	720	54	97	3
		" 29	" "	..	40	Ft. tr.	Neg.	..	3	100	0
13	13	Aug. 20	" "	75	30	Ft. tr.	Neg.	710	7	100	0
14	40	Aug. 25	" "	110	46	+	Neg.	700	178	58	42
		" 29	" "	40	25	Neg.	..	..	14	100	0
15	4	Aug. 25	Turbid	250	90	+	..	710	350	15	85
		" 27	"	Low	100	+	Tr.	705	225	10	90
		Sept. 6	Clear and colourless	Low	40	+	..	..	1	100	0
16	16	Sept. 3	" "	145	25	+	Neg.	720	15	66	34
		" 18	" "	15	20	Ft. tr.	..	710	2	100	0
17	26	Sept. 21	" "	70	20	Neg.	..	..	20	80	20
18	15	Oct. 5	" "	170	30	+	Ft. tr.	690	130	..	..
		" 11	" "	155	30	Tr.	..	..	30	90	10
19	17	Oct. 3	" "	Low	..	Neg.	..	..	2	100	0
		" 8	Slightly opalescent	40	30	Tr.	..	700	350	0	100
		" 14	Very slight opalescence	70	30	Neg.	..	..	12	84	16
		" 22	Clear and colourless	70	50	Tr.	..	..	40	100	0
20	10	July 15	Turbid	300	160	++	..	680	1000	20	80
21	49	May 12	Clear and colourless	230	160	+	Ft. tr.	..	1	100	0
		" 17	" "	40	80	..	..	..	1	100	0
		" 23	" "	..	55	..	..	..	1	100	0
22	25	Nov. 2	" "	160	50	Neg.	..	710	74	100	0
		" 8	" "	130	50	+	..	740	56	100	0
		Jan. 22, 1947	" "	90	40	Tr.	Neg.	..	2	100	0

.. indicates that test was not done. Fluids sterile in all cases. Wassermann reaction, done in adults, always negative.

being kept in a "frog-like" position. The stiff muscles were tender but showed no atrophy. Tendon-jerks all became increasingly brisk during his stay in hospital, and the rt ankle-jerk gave an almost clonic response. (There was a notable tendency to hold rt foot plantar flexed.) Abdominals were absent, and the plantars difficult to obtain but probably flexor. Gradual lessening of pain and stiffness in back, leg, and thigh muscles, and gradual return of free movements. Simultaneous lessening of apathy and increased cheerfulness.

C.S.F. (July 26): clear; pressure about 250 mm.; total protein 80 mg. per 100 c.cm.; Pandy positive; chlorides 730 mg. per 100 c.cm.; lymphocytes 6 per c.mm.; sterile.

C.S.F. (August 6): clear; pressure 150 mm.; total protein 40 mg. per 100 c.cm.; Pandy positive; chlorides 690 mg. per 100 c.cm.; 35 lymphocytes per c.mm.; sterile.

Follow-up.—After discharge, he gradually regained use of legs, and six weeks later (Sept. 30) was running about though a little unsteadily. Mother also thought that there was at that time a little unsteadiness in use of rt arm for fine movements. No muscular wasting, and all movements full and free. Some persistent exaggeration of ankle-jerks, especially on rt side, but both plantars definitely flexor. Ultimately made complete recovery.

Case 11.—A girl, aged 6 years, was admitted on July 29 with a history of sudden onset of severe frontal headache and temperature of 102° F six days before admission. Intermission in fever and headache had followed for two days, but in last three days before admission there had been fever and increasing headache and drowsiness. Delirium on day of admission.

On admission she was very drowsy and hard to rouse for first three days in hospital; neck stiffness, but Kernig negative; no cranial-nerve abnormality apart from slight nystagmus; no wasting or loss of muscle power; tendon-jerks all brisk, apart from lt knee-jerk, which was slightly depressed; plantars both extensor.

White-cell count (July 29): 15,700 per c.mm. (polymorphs 74%, lymphocytes 20%, mononuclears 5%, myelocytes 1%).

C.S.F. (July 29): clear; pressure 180 mm.; total protein 30 mg. per 100 c.cm.; Pandy positive; chlorides 730 mg. per 100 c.cm.; cells 85 per c.mm. (lymphocytes 63%, polymorphs 37%); sterile.

Further Course.—Child brightened rapidly after first few days, and temperature was normal on third day in hospital. Neck stiffness not noted after first week in hospital, but tendon-jerks all became exaggerated; and, though plantars became and remained indefinite, there was a slight reflex leg withdrawal for about two weeks. Abdominals absent. Cranial nerves normal. Walking at first was unsteady; but, ten weeks after onset of illness, child is strong and active, although ankle-jerks are slightly increased and plantar responses remain indefinite.

C.S.F. (August 8): clear; pressure 80 mm.; total protein 40 mg. per 100 c.cm.; Pandy negative; 4 lymphocytes per c.mm.

Case 21.—A woman, aged 49, was admitted on May 12 with a history of having had headaches and giddy attacks for two years, but neurological investigations had been negative. Severe attack of vomiting in the morning was rapidly followed by unconsciousness, and she was admitted in light coma.

On admission she was febrile (temperature 103·2° F) and was semi-conscious and frothing at the mouth; could just be roused but made no further response; neck showed very slight stiffness; pupils small and not reacting to light; cranial nerves otherwise normal, slow athetoid movements of arms; tendency to flexion of arms, wrists, and fingers, but legs held firmly extended at knees, and feet plantar flexed; great increase in tendon-jerks, especially on the right; abdominal responses absent, and plantars indefinite; blood-pressure 140/80; nil of note elsewhere; skull radiogram normal.

C.S.F. (May 12): clear; pressure 230 mm.; no block; total protein 160 mg. per 100 c.cm.; Pandy positive; 1 lymphocyte per c.mm.; sterile.

Blood Wassermann reaction negative.

Further Course.—Patient recovered consciousness during the next two days, and pupil reaction gradually returned in this time. She was noisy on the third night in hospital, but thereafter rational. Temperature was normal on third day. Central nervous system on fourth day, apart from accentuated tendon-jerks in the legs (rt > lt) and an equivocal rt plantar response, was normal.

Early in convalescence an involuntary shakiness of arms was noted, but subsequently this disappeared and patient made a good general recovery.

Mr. T. G. I. James, of the Central Middlesex Hospital, kindly excluded any local lesion of the central nervous system before patient was discharged, and I am indebted to him for some of the later observations on this case.

The possibility of encephalitis lethargica was considered but thought improbable, since, according to Hall (1924), sudden onset is unusual and a high C.S.F.-protein level is rare in that infection. The good progress made up to Nov. 15 also, to some extent, supports the inclusion of the case in this series.

Cases Showing Predominantly Meningitic Signs

Case 2.—A man, aged 42, was admitted on April 11 with a history of very sudden onset of severe general headache, vomiting, and mental confusion on April 1. He had vomited for four days, and then symptoms had begun to abate.

On admission he was lucid; well-marked neck stiffness; Kernig negative; fine bilateral nystagmus; tendon-jerks all very brisk, but not much exaggerated; abdominals just present; plantars flexor.

C.S.F. (April 11): pressure 160 mm.; opalescent; total protein 400 mg. per 100 c.cm.; Pandy + + +; chlorides 620 mg. per 100 c.cm.; leucocytes + + + (lymphocytes 95%, polymorphs 5%); sterile.

Further Course.—Later cleared well, but showed transient depression of lt ankle-jerk and exaggeration of lt knee-jerk; final complete recovery.

C.S.F. (April 16): pressure 120 mm.; total protein 240 mg. per 100 c.cm.; Pandy + +; chlorides 690 mg. per 100 c.cm.; leucocytes 100 per c.mm. (lymphocytes 95%, polymorphs 5%).

Case 3.—A girl, aged 11 years, was admitted on May 27 with a history of fever six days before admission. After a brief subsidence, this had returned two days before admission, with rigor, frontal headache, and generalised muscular pains There had been intermittent, general, and severe headaches and vomiting on the day before admission.

On admission she was febrile; tongue furred; frontal headache and mental irritability; slight neck stiffness; Kernig negative; tendon-jerks all exaggerated; abdominals all very brisk; plantars both extensor; cranial nerves all normal, and no limb weakness; chest clear.

C.S.F. (May 27): pressure 120 mm.; slight opalescence total protein 30 mg. per 100 c.cm.; Pandy negative; chlorides 710 mg. per 100 c.cm.; cells 62 per c.mm. (lymphocytes 48% polymorphs 52%).

White-cell count: 10,200 per c.mm. (polymorphs 66% lymphocytes 28%, mononuclears 6%).

Further Course.—Rapid recovery; symptom-free after four days, and afebrile after one week; but tendon-jerks were still very brisk, and plantars both extensor. Even at discharge lt plantar was indefinite, though rt was flexor.

Follow-up (Nov. 5).—Has remained perfectly well, and reflexes are now normal.

Case 4.—A boy, aged 10 years, was admitted on June 11 with two weeks' history of occipital and nuchal pain, soon followed by pains in lower limbs. Neck pains associated with stiffness of neck muscles. Leg pains greatly accentuated by sitting up in bed.

On admission he was thin and weakly; temperature 99·8° F; tongue furred; no headache, but pain on attempted flexion of neck; very marked neck stiffness, and Kernig very strongly positive; stiffness of back muscles; cranial nerves all normal; no muscular wasting, and no loss of power or of coördination in limbs; all tendon-jerks depressed, apart from knee-jerks, which were very brisk; abdominals all present; but plantars indefinite.

C.S.F. (June 11): pressure 170 mm.; clear; no block; total protein 200 mg. per 100 c.cm.; Pandy + +; chlorides 730 mg. per 100 c.cm.; 1 lymphocyte per c.mm.; sterile.

Further Course.—Gradual slow improvement, but low intermittent fever, with evening temperatures between 98·4° and 99·4° F until sixth week in hospital. Became generally brighter and stronger, but neck stiffness was still just present two weeks after admission. Kernig's sign was still strongly positive at end of month. Only occasional headaches by then. Tendon-jerks remained very brisk, particularly on lt side, and though plantar responses were flexor there was tendency to a withdrawal response in lt lower limb almost up to time of his discharge. Chest normal.

June 12: white-cell count 10,400 per c.mm.

June 17: blood-sedimentation rate 6 mm.; Mantoux negative 1 : 1000.

TABLE II—DETAILS OF NON-MENINGITIC ("INFLUENZAL") CASES

Case	Age (yr.)	Duration of prodromal malaise (days)	Onset	Duration of fever (days)	Duration of headache (days)	Vomiting	Neck stiffness	Photophobia	Mental changes	Diarrhœa	C.S.F. changes	Backache	White-cell count
23	33	..	Sudden	10	5	No	+	+	V. excitable	No	No	+	Normal
24	19	..	"	6	6	+	+	No	No	..	"	+	Slight leucopenia
25	5	28	"	6	5	+	+	+	Irritable	"	"	No	Normal
26	10	28	"	7	3	No	No	No	No	"	..	+	Leucopenia
27	18	..	"	6	6	+	"	"	"	"	..	..	Normal
28	26	..	"	4	4	No	"	"	"	"	..	+	Leucopenia
29	15	..	"	7	7	+	"	"	Drowsy	"	No	+	..
30	30	28	"	6	5	No	+	+	Confused and depressed	"	Ft. tr. of globulin	No	Slight leucopenia
31	15	..	"	5	4	"	No	No	No	..	4 lymphs. per c.mm.	"	Slight leucopenia
32	38	..	Gradual	10	9	"	"	+	"	+	..	"	Normal
33	63	2	Sudden	9	10	"	+	+	"	No	4 lymphs. per c.mm.	+	..
34	19	28	Gradual	10	4	"	No	No	..	+	..	+	Slight leucocytosis
35	4	21	Sudden	5	3	+	+	Slight	Drowsy	No	6 lymphs. per c.mm.	No	Normal

.. indicates test not done.

Follow-up (August 24).—Very well and free from signs and symptoms. (For later examinations of C.S.F. see table I.)

Case 19.—A boy, aged 17 years, was admitted on Oct. 2 with a history of severe headache several hours after a fall from a ladder four days before admission. Head not appreciably injured. Anorexia and fever with the headache, and next day more severe headache and vomiting. Nausea and severe occipital headache persisted up to the time of admission.

On admission he was flushed and febrile (temperature 102° F); coryza, with suffusion of conjunctivæ; slight neck stiffness; some mental dulling; all tendon-jerks brisk; plantars probably both flexor; abdominals all a little depressed.

C.S.F. was under low pressure and showed no abnormality (table I). Skull radiogram normal.

White-cell count (Oct. 8): 7200 per c.mm. (polymorphs 59%, lymphocytes 33%, mononuclears 3%, eosinophils 5%).

Further Course.—Remained unwell for a week after admission, with temperature rising to 103° and 104° F in first five days. Frontal headache and mental dulling persisted in this period, and the neck stiffness and a positive Kernig's sign were just apparent. The central-nervous-system signs remained little changed, though the rt plantar at times showed an extensor tendency.

Lumbar puncture was repeated on Oct. 8, with now definite meningitic findings; slightly opalescent fluid; total protein 30 mg. per 100 c.cm.; chlorides 700 mg. per 100 c.cm.; polymorphs 350 per c.mm.; sterile.

Thereafter steady improvement was made; and, though slight stiffness of the neck and occasional frontal headaches were noted for another ten days, temperature became normal and remained so. Plantar responses also became definitely flexor, and patient appeared fully recovered four weeks after his admission.

Subsequent C.S.F. examination showed fewer cells and a preponderance of lymphocytes (table I).

Had occasional headaches for a short while after discharge; otherwise well.

Case 12.—A girl, aged 4 years, was admitted on August 16 with a history of general malaise, irritability, anorexia, and fever for seven days, and neck stiffness and drowsiness for a day.

On admission she was drowsy, but coöperative when roused; neck very stiff: Kernig positive only on rt side; no muscle wasting and no loss of power; tendon-jerks normal, and brisk abdominals; plantars flexor; throat clear; tongue clean; temperature 99° F.

C.S.F. (August 16): clear; pressure 100 mm., total protein 40 mg. per 100 c.cm.; Pandy, trace; chlorides 720 mg. per 100 c.cm.; cells 54 per c.mm. (lymphocytes 97%, polymorphs 3%); sterile.

Further Course.—Made good progress, quickly becoming afebrile and losing meningitic signs in four days; but rt plantar was extensor during the second half of the first week in hospital, and the knee-jerks were very brisk at this time. Fully recovered by discharge (Sept. 4).

C.S.F. (August 31): clear; total protein 40 mg. per 100 c.cm.; Pandy, faint trace; 3 lymphocytes per c.mm.

This last case might be taken as characteristic of the predominantly meningitic cases, those not described here in detail showing similar courses and signs.

GROUP II—NON-MENINGITIC CASES

There were 13 cases (table II) in which the symptoms and signs were very similar to those just described, but the changes in the C.S.F. (when this was examined) were absent or so slight as to have little diagnostic weight. These cases were again largely in children and young adults, and headache and slight stiffness of the neck were again the chief features in a brief febrile illness usually of sudden onset. Sore throat and coryza occurred occasionally, and chest, lumbar, and limb pains were sometimes noted. Diarrhœa was reported twice. In cases 23 and 30 there was transient mental confusion and excitement which may have been due to mild encephalitis; in the others the mind remained clear. Accentuated tendon-jerks were again noted in many patients, but the plantars were flexor in all cases except a child (case 35) seen at the end of November with a history of sudden headache following a period of malaise, and with mild meningitic signs and transient extensor plantar responses.

The others appeared during the same period as the encephalomeningitic cases just described, and the peak of incidence of the two groups fell within the same period (see figure). The chief features of these patients, who seemed to be less intensely affected by the same causal virus as was active in cases 1–22, are detailed in table II. The headaches were either predominantly or entirely frontal, and the fever tended to be irregular and intermittent. In nearly all cases temperatures of 102° to 103° F were recorded. In case 23 the spleen was just palpable for the first few days. As in the meningitic cases, there was in the blood a tendency to leucopenia and relative lymphocytosis rather than leucocytosis. The Widal and Paul-Bunnell tests were done in some of the cases and were negative in each instance.

Though in all cases the severe symptoms came on suddenly, there was in some of them a period of a few weeks in which there had been lassitude and subnormal health (cf. cases 8 and 17 in group I).

The diagnosis of "influenza" might have been applied to these cases had they not occurred in the same districts of N.W. Middlesex at the same time as the evident neurotropic-virus infections. That fewer of them were seen in hospital than the frankly encephalomeningitic types was probably due to the fact that other patients were not sufficiently ill to need hospital treatment. Cases 28, 30, and 34 were members of the Redhill Hospital nursing staff.

As in group I all the cases in group II made full and lasting recoveries.

CEREBROSPINAL FLUID FINDINGS

Table I shows that a great variety of results was obtained in the C.S.F. examinations, but not more than in other features. Some cases showed a very low cellularity, making them hardly separable from the "non-meningitic" cases. In cases 2 and 21 the cell-counts reached four figures. Usually our cases showed much fewer cells than did those detailed by Armstrong (1941). Polymorphs predominated at the outset in cases 3, 5, 14, 19, and 21, but in the other cases, though various numbers of polymorphs were seen early on, lymphocytes predominated.* In all cases where repeated observations were made the cells became increasingly lymphocytic as the illness took its course; and in the great majority no treatment, apart from the lumbar punctures, was used. The protein content was normal or only slightly increased in most cases, and its increase appeared to bear no constant relationship to the cell-count. The cases with high protein contents were the most severe in the series, and some of these showed very few cells. These cases may have been infected with a different virus from that in other cases. The protein showed no real tendency to rise, but was usually less in the later lumbar punctures. The chlorides, except for a fall in 1 case to 620 mg. per 100 c.cm., were little if at all reduced, and so support the view that they are a useful diagnostic aid in excluding tuberculous meningitis. On the other hand, cases of tuberculous meningitis may show a delay in the fall of chlorides, which causes a temporary difficulty in diagnosis.

The pressures recorded in the C.S.F. were extremely variable, and, allowance being made for the fact that in some of the small children the pressure was probably raised by nervous activity, there were a surprising number of low readings.

In all cases the fluid steadily returned towards normal in two or three weeks, but in several cases there was some excess of lymphocytes at the end of this time.

COURSE AND TREATMENT

The patients all made good recoveries, though 3 complained of occasional headaches for several weeks after discharge, and 2 with facial paralysis have yet to recover completely from these palsies. Most patients were in hospital two or three weeks; in the mildest cases the illness lasted about a week, but 3 of the patients most severely affected were ill six weeks. Case 8, with simple meningitic signs, showed a low fever for four weeks.

Treatment appeared to have little effect on the illness. Short courses of sulphonamides were given in cases 6, 15, and 20, but these patients did no better than many who had no treatment. Of 2 cases of equal severity, both treated with sulphonamides and penicillin, case 15 showed prolonged meningeal signs and case 20 showed rapid improvement. Other writers have not found sulphonamides effective in lymphocytic meningitis, but from our brief experience it is impossible to draw any conclusions about the effect of penicillin. There is rarely much need for special therapy, apart from the usual analgesic treatment for headaches.

Lumbar puncture gave symptomatic relief where the headache was associated with a raised C.S.F. pressure.

DISCUSSION

In 35 cases of infection, with headache and other features in common, seen in a large district during eight months, only rarely was there good evidence of the initial upper respiratory infection noted in benign lymphocytic choriomeningitis (Armstrong and Dickens 1935), but the illnesses were, in many cases, at first general and of sudden onset, the signs of nervous syst involvement following several days later. These nerv signs at times were well marked; at other times they v slight enough to be obscured by the general illness an make the clinician hesitate about lumbar puncture. spite of variable intensity of the illness and of the vari involvement of the nervous system, it is suggested t many of these cases were due to the same virus. is obviously impossible, without further examinati to say what that virus may be, but it may be no without any implications, that its effect on the nerv system resembles that of the virus of so-called "ben lymphocytic choriomeningitis" (Armstrong and Li 1934). *Our cases fall readily into Armstrong's* (19 purely descriptive classification of "influenzal," men gitic, and encephalomeningitic types (see also Armstr and Hornibrook 1941, and Keliher 1944). According Wyburn-Mason (1944), they also resemble cases infec with this virus in that most of them show a prodro premeningitic phase. A point of difference is the m incidence of our cases about midsummer (see figu whereas the group described by Armstrong occurr mainly in spring and autumn. Our cases also show much fewer cells in the C.S.F., on the average, than we found in his (Armstrong 1941). A further distincti between our cases and Armstrong's is the slender eviden in favour of a mouse-carried infection in the Middles cases (see below).

In looking for the source of the infection we have bor in mind Armstrong's (1940) report of the work of Lil and himself in which grey mice trapped at random w found to be harbouring the choriomeningitis virus. Th found also that mice caught in the homes of vir meningitis patients were very often infected with t virus.

Our inquiries on this subject gave various, but main negative, answers. Cases 3 and 6 came from hom "overrun with mice," and cases 4, 7, 9, and 19 had so mice in their homes. Yet case 14 had no mice at hom but had just spent a holiday in an old house in the countr In 22 cases, including 12 in group II, there were no mi in the homes. The houses in the district are for the mo part new; and many homes had cats, to which d tribute was paid.

In view of the prevalence of abortive influenza-li attacks in the past year, it is possible that some of the may be examples of a very mild type of neurotrop virus infection. Armstrong found considerable eviden of abortive choriomeningitis infection in the Unit States, where 11% of 2000 sera collected at random fro persons without history of nervous disorder contained an bodies for the virus. The possibility of such human agen in spreading these infections has yet to be fully exclude

Infections which may cause meningitic illnesses similar to those of our cases are mumps, glandular fever, Weil's disease, herpes zoster (Armstrong 1943), swineherds' disease (*Durand et al.* 1936), and pseudolymphocytic choriomeningitis (MacCallum et al. 1939). No evidence to support the first four conditions was found, and the fifth is mainly confined to France and Italy.

Though less similar, polioencephalomyelitis has to be considered in certain cases, such as 4 and 10, in our series, where the C.S.F. protein was raised and the cells little increased. In case 21 encephalitis lethargica has been considered as a possible cause of the illness; but it has been felt justifiable to include all three in the series. If their inclusion provokes disagreement, it is hoped that it may also serve as a reminder that in cases of this type the clinician greatly depends for an exact diagnosis on the help of the expert in virus infections.

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* Since the end of this series two further cases of virus meningitis have been seen with well-marked initial polymorph predominance (80–90%) in total cerebrospinal fluid cell-counts of 300 per c.mm.

The virus of lymphocytic choriomeningitis (Armstrong and Lillie 1934) may cause a severe general infection and death, and Smadel et al. (1942) have described pneumonic lesions in two such cases. Though one of our cases had transient chest pain, we found no evidence of pneumonia in any of them, and so were unable to link the condition in any way with the virus pneumonias which have been prevalent in recent years, often with severe headache as a troublesome symptom.

In the group of cases described by Noone et al. (1936) one died of encephalitis, and another death was reported by Viets and Shields (1937). Whether due to the virus of Armstrong and Lillie or to a similar neurotropic infection, there is no need, at this point, to emphasise the fact that all these infections, though often transient, sometimes are not "benign" and are liable to be much more than a mere "choriomeningitis." The term "lymphocytic" also may not always be applicable in the early stages, if the Middlesex cases are to be taken as a guide; Wyburn-Mason (1944) also cites other authors who have noted a predominance of leucocytes in the early stages of virus meningitic infections.

In an attempt to isolate the causal agent, the following experiments have been carried out by Dr. F. O. MacCallum at the Central Public Health Laboratory, Colindale. Seven specimens of C.S.F. obtained on the sixth to tenth days from onset of illness, and nine specimens of blood obtained on the seventh to twentieth days from onset, were used for the inoculation of mice, guineapigs, white rats, cotton-rats, and rhesus monkeys. Three pools were used for mice and guineapigs, and one for rats, cotton-rats, and monkeys. The C.S.F. were inoculated intracerebrally, and blood and C.S.F. intraperitoneally. There has been no evidence of illness following inoculation of these animals. Examination of convalescent sera for antibodies for various neurotropic and other virus diseases will be done later.

CONCLUSION

It may be said that the weight of evidence is against these cases being due to an infection by the virus of Armstrong and Lillie. Whether one or more viruses were responsible for the infections also remains to be shown: and whereas it is easy to dismiss such a group of cases as due to various infections, it is more difficult to adduce certain evidence either for or against this conception. On the one hand, the well-known variations in the C.S.F. findings and the clinical picture, even in a recognised infection such as Armstrong's virus, and, on the other hand, the number of neurotropic viruses as yet not isolated, both make exact diagnoses difficult. An outbreak of virus infections of the nervous system, such as has been described from one district, always requires identification by an expert in virus diseases.

I am indebted to Dr. F. O. MacCallum and Dr. Robert Cruickshank, of the Central Public Health Laboratory, Colindale, for their help with the virus investigation of these patients; to Dr. J. Hamilton-Paterson and the Pathological Department at Redhill County Hospital for the other laboratory investigations; to my colleague, Dr. L. I. M. Castleden, for showing me three of the cases: and to Dr. F. Ashton for help with the investigation of the younger children.

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CONTINUOUS INJECTION OF PENICILLIN

THE SECUNDERABAD APPARATUS

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THE penicillin research team (India Command) was associated with the war wounds research centre at the India Command Orthopædic Hospital in Secunderabad, to which British troops were evacuated from Burma. The cases treated at the centre were mainly unhealed compound fractures of the femur. The average period between wounding and admission to the centre was three months, and in these cases penicillin often had to be administered over long periods. The general condition on admission was exceptionally low owing to the long-continued sepsis, malaria, dysentery, nutritional macrocytic anæmia, effects of heat, and other conditions inseparable from active service in this theatre.

The difficulties experienced in these cases, when penicillin was administered by three-hourly injections or by ordinary Army saline-giving sets, prompted the development of a method for continuous administration in small volume. In this we were encouraged by the results reported by the pioneers in continuous injection of penicillin (McAdam et al. 1944, Morgan et al. 1944) and by Army medical reports from Middle East and Europe by Brigadier J. S. K. Boyd, Lieut.-Colonel G. K. G. Mitchell, Major K. E. A. Hughes, and Major S. T. Cowan on their experiences with available methods of continuous injection. We concluded that penicillin should be injected continuously in as small a volume as possible, and that rubber tubing should be avoided. Since the amount of sodium penicillin commonly administered in twenty-four hours is readily soluble in 2 ml. of water, we formed the opinion that a syringe should be attached to the patient and some means evolved to depress the piston slowly over a period of hours.

Lieut.-Colonel H. R. Harley, who commanded the war wounds research centre, Captain R. A. Ree, R.E.M.E., and Lieutenant W. C. Osbourne, R.E.M.E., were associated with us in the development of the apparatus.

THE APPARATUS

The apparatus (fig. 1) consists of a 2 ml. syringe mounted on the convex surface of a small aluminium base plate: the syringe is retained in position by front and rear clasps. The concave surface of the plate is secured to the patient's skin with short 'Elastoplast' straps (fig. 2). Arranged on the base plate, behind and in line with the syringe, there is a lead-screw * which engages a screw-threaded hole in the centre of a sliding block (fig. 1). The block is supported by, and slides along, two guides which transfix the block and lie one on each side of, and parallel to, the lead-screw; these guides prevent rotation of the sliding block. The block is moved away from or towards the syringe by clockwise or anti-clockwise rotation of the lead-screw. The enlarged rear end of the piston rod is clasped in a suitable recess provided in the sliding block. The to-and-fro movement of the sliding block is communicated through a hollow piston rod to the piston block in the syringe barrel.

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* A screw whose rotation causes an object threaded on to it to move to and fro along the axis of the screw: vices and adjustable spanners are examples of the principle.

The pitch of the thread cut in the lead-screw is such that twenty-four complete revolutions cause the piston to move up or down the syringe barrel a distance of 33 mm.; these excursions of the piston effect complete charge or discharge of the 2 ml. injection syringe.

To prevent clothes becoming caught up in the rotary mechanism, a transparent plastic removable cover (fig. 2) stretches from side to side over the lead-screw, syringe, and plate.

The lead-screw is rotated by an alternating-current electric motor acting through a flexible drive in the form of a motor-car speedometer cable in a flexible plastic sheath (fig. 2). The inner cable is attached to the lead-screw by inserting its square end into a square hole at the rear end of the lead-screw; the outer cover cable is attached to the base plate with a thumb-screw. Both inner and outer cables are therefore readily detachable. Each cable is 9 ft. long, and cables can be joined together lengthwise with simple junction pieces. Before the injection can start, sufficient torque must be built up in the inner cable; this occupies 5–7 min. for each 9-ft. length, attached lengthwise between motor and syringe, at the slow speed of rotation by the specially low-geared motor.

Between the motor and the flexible drive cable a reduction gearing system is interposed to produce twenty-four revolutions in twenty-four hours in the lead-screw on the base plate; it thus takes a day to evacuate the syringe.

To cope with fluctuations in voltage, a centrifugal constant-speed device is incorporated between the motor and the reduction gearing system.

To recharge the syringe, rotation of the flexible drive is performed by hand with a gramophone winding handle, after disconnecting the reduction gearing and motor from the flexible drive with a clutch.

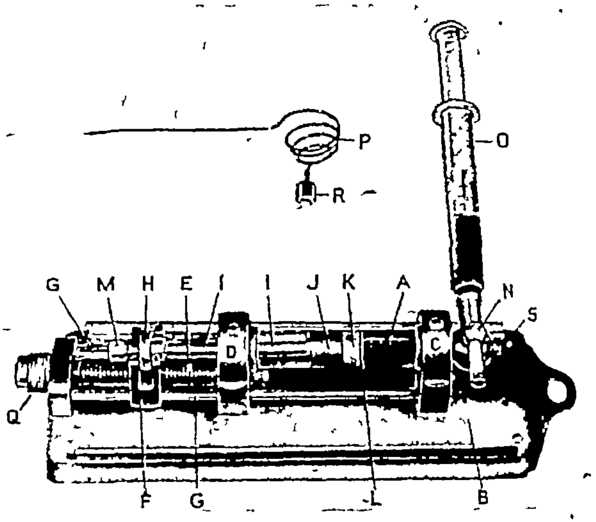

Fig. 1—Base plate and injection syringe (with needle and flexible drive detached) to show details of lead-screw and loading syringe in position: A, injection syringe; B, base plate; C and D, front and rear clasps; E, lead-screw; F, sliding block; G, sliding block guides; H, enlarged rear end of piston rod; I, hollow piston rod; J, piston block; K, ring of resilient material; L, circular disk; M, regulating thumb-screw to adjust K; N, three-way tap; O, reloading syringe; P, flexible coiled injection needle; Q, thread to attach thumb-screw of flexible drive outer cable; R, needle-retaining nut; S, thread for R.

Owing to the slow advance of the piston during injection of 2 ml. in twenty-four hours the liquid in the syringe tends to leak past the piston. To obviate leakage at this point the piston is fitted with a ring of resilient material disposed between a shoulder at the front of the piston block and a circular disk, the diameter of which is a shade less than the bore of the syringe (fig. 1). The position of the disk is controlled with a rod fixed to its rear flat surface. The rod extends axially of the piston rod, which is tubular, and is provided at its free end with a regulating thumb-screw. By moving the disk towards the shoulder with the thumb-screw, the ring of resilient material is expanded in diameter and can thus be brought into very close engagement with the interior of the syringe barrel and in this way prevents any leakage past the piston. The regulating thumb-screw can be adjusted while the piston is in motion.

The end of the syringe to which the needle is not attached is closed with a small pledget of wool inserted between the inner surface of the barrel and the piston rod; this maintains sterility inside the syringe during the daily excursions of the piston. The wool is kept in position with a cap which fits over the syringe barrel and is enclosed by the rear clasp retaining the syringe on the plate.

The end of the syringe to which the needle is attached is provided with two exit openings controlled with a three-way tap (fig. 1). One of the openings forms an adapter for the nozzle of a second syringe, with which the injection syringe can be automatically recharged by twenty-four manual rotations of the lead-screw through the flexible drive. This adapter is flamed before reloading, and sterility is maintained during the twenty-four-hour injection period with an air-tight cap.

The second exit opening from the injection syringe forms the

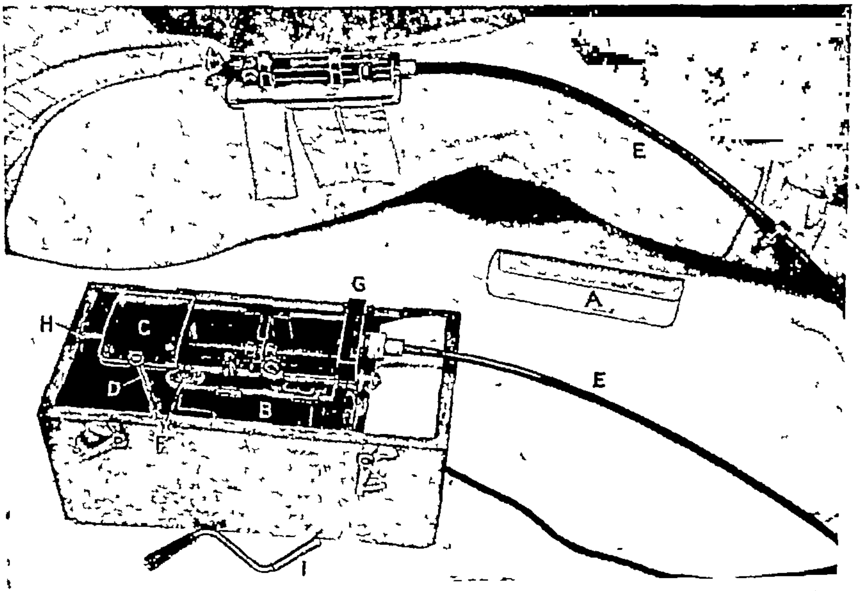

Fig. 2—Apparatus set up for use on patient: A, plastic cover to protect syringe and coiled needle; B, motor; C, reduction gear-box; D, clutch handle; E, flexible drive (speedometer cable); F, tripswitch; G, distribution box; H, spindle for reloading; I, handle for reloading.

concavity into which the bulbous end of the special injection needle is clamped with a retaining nut; the method is similar to the fixation mechanism between needle and syringe in the type of all-metal syringes used to induce local anæsthesia in dentistry.

An intermediate portion of the needle is coiled like a delicate spring (fig. 1) to impart flexibility to the needle; the coil takes the place of rubber or plastic tubing in other methods of continuous injection. The needle can be suitably shaped for intramuscular, subcutaneous, or intravenous injection.

ADVANTAGES

This method has the following advantages over other methods described for continuous injection:

(1) The mechanical advantage inherent in rotary drive through a lead-screw ensures an absolutely constant injection; this in turn ensures a maximal constant blood-penicillin level at minimal expenditure of the drug.

(2) The mechanism of the sliding block is identical with that of an ordinary vice, and the potential pressure under which the injection is effected is 52 lb. to the square inch; this eliminates the possibility of blockage in the needle during injection.

(3) Supervision is unnecessary, except when the apparatus is set up on the patient and when the syringe is recharged at intervals of twenty-four hours. The penicillin produced by most manufacturers causes some tissue damage at the site of continuous injection; this is rendered apparent on the fourth or fifth day by the onset of tenderness near the needle. It is advisable to avoid the possibility of abscess formation by changing the site of the needle every four or five days.

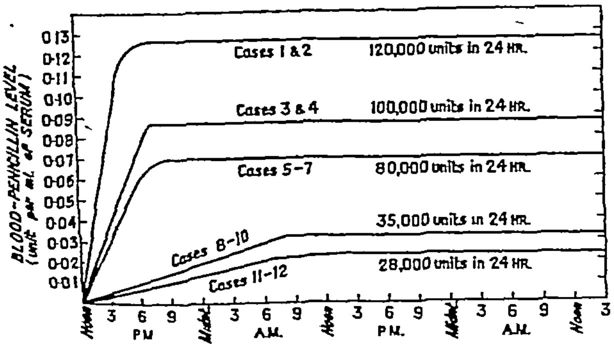

Fig. 3—Average blood-penicillin levels in patients on same doses, assayed three-hourly and adjusted for a standard body-weight of 140 lb.

(4) The small volume (2 ml.) in which the penicillin is injected reduces proportionately (*a*) pain and local œdema, and (*b*) deterioration of the penicillin at room temperature.

(5) The patient is not confined to bed but to the length of his cable. He can sit at the bedside and, since the flexible cable drive is attached to the syringe base plate with a thumb-screw, he can leave the ward by separating the cable at this point.

TABLE I—CONSTANT BLOOD-PENICILLIN LEVELS UNDER CONTINUOUS ADMINISTRATION OF PENICILLIN

Case no.	Body-weight (lb.)	Daily dose of penicillin (units)	Constant blood-penicillin level attained within 48 hr.	Figures in previous column corrected for standard body-weight of 140 lb.	Dose, calculated from daily dose and blood-penicillin level, required to maintain a constant level of 0·02 unit of penicillin per ml. of serum per 140 lb. of body-weight
1	142	120,000	0·128	0·13	18,500
2	135	120,000	0·128	0·123	19,500
3	180	100,000	0·068	0·087	23,000
4	175	100,000	0·068	0·085	23,500
5	138	80,000	0·068	0·067	24,000
6	160	80,000	0·068	0·077	20,500
7	136	80,000	0·068	0·066	24,000
8	136	35,000	0·032	0·032	22,500
9	170	35,000	0·023	0·028	25,000
10	140	35,000	0·032	0·032	22,000
11	140	28,000	0·023	0·023	25,000
12	134	28,000	0·023	0·022	25,500
13	132	28,000	0·023	0·022	26,000

(6) Booster doses can be given at any time during treatment—e.g., in the operating theatre—by manual rotation of the flexible drive.

(7) According to the number of cable adapters fitted to the distribution box on the motor, any number of patients in a ward can be treated simultaneously.

(8) The penicillin is not in contact with rubber tubing, which may have a deleterious action on it. Soft flexible tubing of any sort entails dead space and limitation of movement on the part of the patient in avoiding kinks.

BLOOD-LEVELS OBTAINED

Assays of penicillin were performed at short intervals on the serum of patients under continuous administration with this apparatus, to determine whether the blood-penicillin level was constant or rose during the night, and whether it varied among individuals on the same dose.

The blood-penicillin level was assayed by a slide-cell test based on that of Colebrook et al. (1923), as modified by Florey and Florey (1943), Heatley (1944), and Fleming (1943 and 1944).

Since it was desirable that abnormal blood volumes should not distort results, and since blood would have to be taken at short intervals during the day and night, we used volunteers among convalescent patients.

Two patients were put on 120,000 units per twenty-four hours, two on 100,000, three on 80,000, three on 35,000, and three on 28,000. The penicillin used was 'Lederle' no. 782 H134C, expiry date Sept. 23, 1945.

The constant blood-penicillin level attained in each case is given in table I, with the patient's weight and the

TABLE II—CALCULATION OF BLOOD-PENICILLIN LEVEL FROM BACTERIOSTATIC LEVEL

Bacteriostatic level (completely bacteriostatic dilution indicated by the sign –)								Amount of penicillin present per ml. of serum	
1/1	2/3	1/2	1/3	1/4	1/6	1/8	1/12	When the sensitivity of the test organism in serum is between 0·016 and 0·02 unit per ml.	When the sensitivity of the test organism in serum is between 0·02 and 0·033 unit per ml.
–	+	+	+	+	+	+	+	(0·016 + to 0·03 –) = 0·023 (±0·007)	(0·02 + to 0·048 –) = 0·034 (±0·014)
–	–	+	+	+	+	+	+	(0·024 + to 0·04 –) = 0·032 (±0·008)	(0·03 + to 0·064 –) = 0·047 (±0·017)
–	–	–	+	+	+	+	+	(0·032 + to 0·06 –) = 0·046 (±0·014)	(0·04 + to 0·096 –) = 0·068 (±0·028)
–	–	–	–	+	+	+	+	(0·048 + to 0·08 –) = 0·064 (±0·016)	(0·06 + to 0·128 –) = 0·094 (±0·034)
–	–	–	–	–	+	+	+	(0·064 + to 0·12 –) = 0·092 (±0·028)	(0·08 + to 0·192 –) = 0·136 (±0·056)
–	–	–	–	–	–	+	+	(0·096 + to 0·16 –) = 0·128 (±0·032)	(0·12 + to 0·256 –) = 0·188 (±0·068)
–	–	–	–	–	–	–	+	(0·128 + to 0·24 –) = 0·184 (±0·056)	(0·16 + to 0·384 –) = 0·272 (±0·112)

dose, calculated by proportion, which would have been necessary, in twenty-four hours, to maintain a level of 0·02 unit of penicillin per ml. of serum at a body-weight of 140 lb.

The values obtained from the three-hourly test results in patients on the same dose were combined after adjusting for a standard body-weight of 140 lb., and the resultant blood-penicillin curves are shown in fig. 3.

In view of the small number of patients and the range of experimental error in the slide-cell test, the results shown in table I and fig. 3 indicate that, in patients under continuous injection of penicillin, the blood-penicillin level becomes constant after a "building-up" period, does not vary appreciably in different individuals on the same dose, and is directly proportional to the dose and inversely proportional to the weight.

TECHNIQUE OF SLIDE-CELL TEST

Before giving penicillin we obtained sufficient serum from the patient for use, undiluted, as the diluent in the serial doubling dilutions of all assays to be performed in his case. The test was performed only once a day—not immediately the specimen was taken. The sensitivity of the test organism (N.C.T.C. 6571 A) was determined daily.

From each patient, *at three-hour intervals for forty-eight hours*, 0·5-ml. samples of blood were collected in capillary tubes made from lengths of glass tubing (3 mm. internal diameter) drawn off and sealed at both ends in lengths suitable for centrifuging. The tubes were stored vertically at 4° C until centrifuged immediately before the test; we could detect no reduction in the penicillin content of specimens stored in this way up to thirty hours. The specimen was well mixed, and immediately afterwards volumes of 25 c.mm. were removed with a micropipette and placed clockwise round 6-in. petri dishes selected for flat surfaces on the inner aspect of bottoms and lids. A 3 : 2 and then doubling dilution series were interpolated between dilutions in the 1 : 2 series.

The inoculum consisted of a 2 mm. loopful from a well-shaken suspension of the test organism, prepared just before the test, by inoculating 10 ml. of nutrient broth of pH 7·4 with two loopfuls from a well-shaken 10-ml. 16–18-hour broth culture of the test organism which had not been subcultured in broth more than eight times. The strain was maintained on nutrient agar slopes of pH 7·4 and subcultured once a week.

Since we desired to express the highest completely bacteriostatic dilution of the serum in terms of the number of units of penicillin per ml., it was necessary to know the sensitivity of the test organism; this varied between 0·016 and 0·033 unit per ml. in undiluted serum. A slide cell sensitivity test in triplicate, using P.B.S. in serum in the dilutions 0·08, 0·04, 0·033, 0·02, 0·016, 0·01, and 0·008 unit per ml., was therefore put up in parallel with each day's test.

The highest dilution of the test serum showing complete bacteriostasis having been determined, the equivalent in terms of units of penicillin per ml. of serum was expressed from table II, compiled for the purpose.

ESTIMATION OF DOSAGE REQUIRED

The dose of penicillin required for any particular patient may be estimated if the resistance of the invading pathogen and the patient's body-weight are known.

The blood-penicillin levels described above indicate that a dose of 25,000 units will maintain a blood-penicillin level of 0·02 unit per ml. for every 140 lb. of body-weight. From this datum the dose required to obtain the required blood-penicillin level in any particular patient can be calculated easily by proportion. For instance, if the organism is sensitive to 0·16 unit of penicillin per ml. (eight times more resistant than the Oxford staphylococcus) in a patient with endocarditis whose weight is 7 st., a booster dose of 10,000 units followed by a 24-hour maintenance dose of 140,000 units given continuously would be required.

SUMMARY

The development of an apparatus with which penicillin can be injected continuously in a very small volume of diluent was prompted by the disadvantages, mainly from the patient's point of view, of the methods used for continuous injection, especially over a long period. At the same time some difficulties, such as needle blockage and those associated with connecting tubing of any sort, have been avoided.

Blood-penicillin levels, observed in a few patients under continuous injection, indicate that the level becomes constant throughout the day and night after a "building-up" period and is directly proportional to the dose and inversely proportional to the patient's weight.

For every 0·02 unit of penicillin per ml. required in the serum, a dose of 25,000 units a day per 140 lb. of body-weight must be given.

The apparatus might be used in research on the action of other drugs.

Lieut.-Colonel A. Sachs, assistant director of pathology, India Command, suggests that, if high blood-penicillin levels were required at intermittent periods, such as those resulting from three-hourly injections of 15,000 units, a suitable gear wheel to effect this could be included in the reduction gearing system.

An application for a patent, together with a provisional specification, has been lodged at the Patent Office, and all patent rights have been assigned to the Ministry of Supply.

The apparatus is being made by Surgical Equipment Supplies Ltd., Westfields Road, N. Acton, London, W.3, to whom the Ministry of Supply have granted an exclusive licence to manufacture without payment of royalties.

We have pleasure in acknowledging the help of Brigadier F. Harris, Brigadier G. K. Fulton, and Colonel E. H. Hall, who formed and equipped the team and later directed the work. Special facilities were extended to the R.E.M.E. officers wit whom we worked by Major-General D. R. Duguid, who too an active interest in our problems. For their coöperation w wish to thank Colonel D. C. M. Ettles, who commanded th hospital to which we were attached; Lieut.-Colonel J. S Maxwell, in charge of surgical division; and Nursing Officer D. Eales, of the war wounds research centre.

The photographs were taken by Mr. E. V. Willmott, A.R.P.S. in charge of the photographic department, British Postgraduate Medical School.

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MAMMARY CYSTS

AND THEIR TREATMENT

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A FAVOURABLE experience in treating hydrocele of th tunica vaginalis and cysts of the epididymis by aspiratio and injection of quinine and urethane[1] led to trial of thi treatment in 1934 for a mammary cyst in a patient wh had previously had two removed at some years' interval Its success justified its use in 2 further cases early i 1935, the successful results of which have been pub lished.[2] A further experience of 21 cases dealt with b this method has suggested a more detailed and complet report.

Incidence

The "single" cyst, as its name suggests, may be th only mammary lesion during a lifetime. There ar exceptions, however: a further cyst may develop month or years afterwards, or a cyst may develop simultaneousl or subsequently in the other breast. Thus the conditio is essentially different from those rarer lesions wher multiple cysts are present, and from those associated with papillomata. It is a condition of middle age and is about equally divided between the parous and non-parous. Observation of some patients for twelve years shows that the breasts may remain otherwise normal. The presence of a single cyst therefore does not suggest the existence or necessary development of any serious disease.

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[1] Pybus, F. C. *Brit. med. J.* 1930, i, 239.
[2] Pybus, F. C. *Lancet*, 1936, ii, 853.

The *contents* of such cysts are almost invariably a turbid greyish-green fluid, which leaves a brownish stain on linen. The contents of some of them have been investigated chemically by Dr. Freda Herbert, who reports that they contain mainly cholesterol, phospholipins, and a variable amount of protein but no sign of hæmoglobin or its derivatives. The amount varied from 1 to 30 c.cm., with an average of 5 to 10 c.cm. It is suggested that the contents are a liquefaction of the greyish-green greasy material which occupies the ducts of many breasts in middle age.

From a study of a table of *symptoms* it appears that about half the patients discover the lump accidentally, and the other half had pain or discomfort lasting from a few days to months.

The *physical signs* are, as might be expected, very variable. This depends partly on the size of the breast, the size of the cyst, and its situation in relation to depth and whether placed centrally or radially. Thus in a small breast a moderate-sized cyst may be visible or readily palpable as a tense, rounded, or oval swelling which appears to move about within the breast tissue but actually moves with the breast substance. In larger breasts the cyst tends to be less readily defined; and, if placed centrally, it may closely resemble a scirrhus—a central hard ill-defined lump, except for the absence of signs of infiltration or gland metastasis. In many cases the cyst closely resembles a fibro-adenoma (an uncommon tumour) and can be distinguished only by puncture.

It is only occasionally that fluctuation can be obtained, depending on size, absence of undue tension, a superficial position of the cyst, or a dome-like projection on the surface. A suitable apparatus for transillumination has not been available. Final confirmation can be obtained by *puncture*, when the loss of resistance of the needle on entering the cyst is characteristic and the usual fluid appears in the syringe.

Treatment

After aspiration of the contents, 1 or 2 c.cm. of quinine and urethane (*B.P.C.*) is injected. No pain is felt and there is an absence of discomfort or inflammation. No dressing or bandage is used, the cavity remaining obliterated by atmospheric pressure.

After the original report,[2] it was felt that aspiration alone might cure: 3 patients were dealt with in this way, and in each case the cyst filled within three months. Subsequent aspiration and injection have led to cure.

Results

Of the 24 patients treated all have remained free from recurrence for 1–12 years. In 3 cases a cyst developed in the other breast, and was dealt with in the usual way.

A further case was missed and operated on under the impression that it was an adenoma, while in 2 other cases puncture was done on lumps resembling cysts, one a chronic abscess and the other a small hard oval scirrhus.

SUMMARY

The mammary cyst can generally be recognised from the symptoms and physical signs, but puncture should be used more often as a diagnostic method.

Aspiration followed by injection of quinine and urethane can cure such cysts, saving unnecessary operations.

Knowledge that some 25% of "breast lumps" may be cured by this means may reduce the reluctance of women to seek timely advice.

SCRUB-TYPHUS VACCINE

FIELD TRIAL IN SOUTH-EAST ASIA

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WITH the early realisation in 1943 that scrub-typhus would form a major medical problem in operations in South-East Asia, all measures likely to combat it were reviewed, and as a result work was started at the National Institute for Medical Research on the production of a vaccine. This experimental work proceeded with such vigour that the first small consignment of cotton-rat-lung vaccine arrived in Delhi in November, 1944. The experimental work leading to its preparation has been described by Fulton and Joyner (1945), and Buckland et al. (1945). This vaccine had been shown to protect laboratory animals, and it was decided, in view of the urgent need, to press for large-scale production forthwith, without waiting for the results of field trials.

Early in 1945 attempts were made to organise field trials in North Burma with the earlier experimental batches. Our rapid advance in Burma, however, followed by the withdrawal of the Fourteenth Army to India to prepare for the next phase of the campaign, frustrated these attempts.

A fresh start was made in July, 1945, on troops of a selected corps of the new Fourteenth Army, but the Japanese surrender before these left India diminished the likelihood of any adequate field trial for the following reasons:

(1) In the absence of jungle fighting, the risk of infection would be greatly reduced. An army of occupation living under relatively static conditions is rarely in close or protracted contact with the terrain associated with scrub-typhus.

(2) The use of dibutyl phthalate (D.B.P.), or other mite-repellent, as borne out by the experience of the Australian and American armies, profoundly diminishes the attack-rate of scrub-typhus. Repellants were now being energetically employed in South-East Asia.

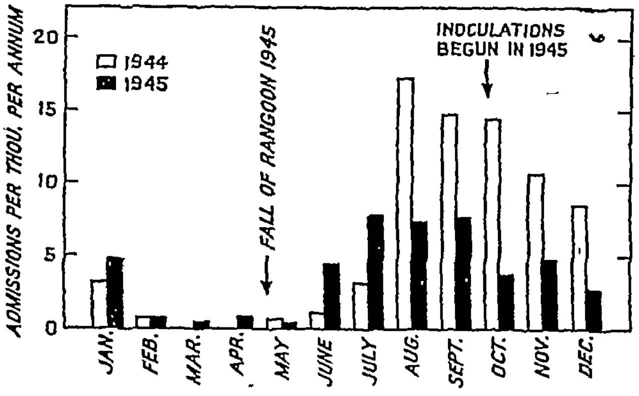
(3) The main criterion of the value of the vaccine must lie in its effect on mortality. In the Allied land forces in South-East Asia (ALFSEA) and the Pacific area, the case-mortality rate was about 10%; but this mortality had only occurred in troops exhausted by battle and where early treatment was difficult to obtain. Where fresh troops doing jungle training with immediate access to hospitals were attacked—e.g., in the Ceylon outbreak in 1943, and in the jungle training school in Mysore—the case-mortality was only 2%. If this were to be the figure in the army of occupation, many hundreds of cases in the inoculated and uninoculated groups would be required to provide significant data. Owing to the conditions stated above it was very doubtful if sufficient numbers of cases would arise.

This pessimistic forecast of the proposed field trial was ultimately justified by events, but it was felt that every effort at evaluation of this vaccine should be made.

METHOD OF INVESTIGATION

By this time (September, 1945) vaccine was arriving in fair amounts, and it was decided to distribute it to 10,000 troops on a controlled basis, while the remainder was allotted to Burma Command, where uncontrolled inoculation of those troops most exposed to risk was carried out.

The original plan for controlled inoculation provided that for every man receiving the vaccine there should be a control exposed to the same risk, in view of the pin-point distribution of infected areas and possible variations in strain virulence. The size of the groups should be, so far as possible, a section of 10 men. It should be made clear that controlled inoculation was perfectly justifiable, since there was insufficient vaccine for every man. Avail-



Incidence of scrub-typhus in Burma.

able vaccine was never withheld. This ideal plan had to be modified in practice since commanding officers, aware of the vaccine, expected it to be given to all troops at risk. A compromise course was usually adopted, two-thirds of the unit being vaccinated, leaving a third—normally the H.Q. troops—as controls. The units chosen were those considered to be most at risk—i.e., engineer companies engaged in bridge-building and jungle clearance, drainage, &c., and infantry units engaged in patrolling, surrounding, and searching villages. In all, between July, 1945, and February, 1946, sufficient vaccine was distributed for the vaccination of over 60,000 men, though only 10,000 of these were inoculated on a controlled basis.

As recommended by the Medical Research Council, 1 c.cm. of vaccine was given on three occasions at weekly intervals. No reactions were observed, and troops were always fit for arduous training next day.

The use of D.B.P. or other mite-repellent was not withheld where it was available to units. The men had been drilled in its use in the Burma campaign; it was not considered justifiable to forbid it after the Japanese surrender.

The plan for the follow-up of cases of scrub-typhus included a special proforma distributed to all medical formations to be forwarded on completion to the director of medical services, ALFSEA. This proforma carried a list of those symptoms and signs whose presence would enable the severity of the attacks to be estimated.

RESULTS

In South-East Asia, in the period under consideration, 33 cases of scrub-typhus developed in inoculated persons. Of these, 2 were infections in research-workers in the scrub-typhus research laboratory, ALFSEA, and 31 were in troops. Of these 31 troops, 7 had received the full course of three inoculations. The remaining 24 had begun the course while actually incubating scrub-typhus, and the onset of the disease had prevented their receiving more than one or two doses.

It was thought that the effect of the vaccine might possibly be demonstrated by one or more of the following results:

(1) A modified clinical course in inoculated persons.

(2) Changes in the serological reactions during the course of the disease.

(3) A fall in mortality-rate in inoculated persons.

(4) A lowered incidence among inoculated persons.

Clinical Course in Inoculated Persons.—There were 9 cases of scrub-typhus in fully protected persons: 2 of them in research-workers, and 7 in troops. Of these 9 patients 7 had mild attacks, 1 had a severe attack, and 1 was very severely ill and nearly died. In 4 of them the duration of fever was less than fourteen days, and in 5 of them fourteen days or more. These cases gave no indication that inoculation with the vaccine had any pronounced effect on the duration, severity, or complications of the disease.

Van den Ende et al. (1946) have described 4 cases of scrub-typhus in immunised research-workers. All the patients were severely ill, and there was little modification of the disease. The patients in South-East Asia, however, were infected by mites, whereas the cases reported by van den Ende were due to accidental infection in the laboratory and may therefore have received relatively enormous infections.

Serological Reactions during the Disease in Inoculated Patients.—A study of the case-records does not reveal any great difference in the serological reactions of the second and third weeks between inoculated and uninoculated patients.

Effect of Vaccine on Case-mortality.—The period covered by the field trial was from July, 1945, to January, 1946, inclusive. During this period the case-mortality rate in unprotected troops was 3%, whereas no deaths took place among the 33 protected persons who contracted scrub-typhus. To show that this fall in case-mortality from 3% to nil was significant, it would be necessary to obtain a series of about 200 cases in inoculated persons without a death. From this evidence, therefore, no conclusion can be drawn about the effect of the vaccine on the mortality.

Effect of Vaccine on Incidence of Scrub-typhus.—Controlled inoculation had been carried out on two divisions, and it was thought that the incidence in inoculated troops might prove to be significantly lower than that in the controls. But in the areas occupied b these two divisions scrub-typhus was much less commo than was expected, only 6 cases and 3 cases arising durin the period from October, 1945, to January, 1946 inclusive; the effect of the vaccine cannot therefore b assessed.

In Burma, however, the overall incidence of scru typhus remained fairly high. The admission-rate fo 1944 and 1945 is shown in the figure. This shows th well-marked seasonal variation and the reduced incidenc in 1945. This reduction was probably due to the us of D.B.P., which was started in December, 1944, and t the cessation of fighting after the capture of Rangoo in May, 1945.

CONCLUSIONS

An attempt to assess the value of the vaccine from th admission-rates in Burma leads to the following conclu sions. In November and December, 1945, and January 1946, there were 7 cases of scrub-typhus in persons wh had received a full course of three inoculations. Sinc the average number of fully protected troops in Burm during this period was about 15,000, this is an incidenc of 1·8 per thousand per annum. The incidence i unprotected troops over the same period was 3·1. Th difference is not statistically significant.

The failure of the field trial to produce conclusiv results is due to the low incidence of scrub-typhus i South-East Asia since July, 1945. The predominantl static rôle of our troops since that date was partl responsible for this low incidence. But a large part o the credit must go to unit commanding officers; wh have throughout keenly appreciated the danger of scrub typhus and have shown their determination to preven it by insisting on the regular use of D.B.P. and protectiv clothing by their men.

SUMMARY

A field trial of scrub-typhus vaccine is described.

There were 9 cases of scrub-typhus in fully protecte persons, and 24 in partially protected persons.

It is impossible, on the limited evidence, to say whethe or not the vaccine has any effect on the mortality o incidence of the disease.

The available evidence suggests that the vaccine has no well-marked effect on the clinical course or serological reactions of scrub-typhus.

We wish to thank Lieut.-Colonel M. H. P. Sayers, R.A.M.C., assistant director of pathology at the War Office, for his help throughout the work; and the Director-General, Army Medical Services, for permission to publish this paper.

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EPILEPSY AND HYSTERIA

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THE differentiation of hysteria from epilepsy is a not unusual problem in peace-time. In war-time it arises even more often, because the epilepsy commonly met with in the Services is milder, and because strong desires to stay in or leave the Services affect the patient's description of his symptoms.

When undoubted epileptic phenomena develop, an electro-encephalogram (E.E.G.) is unnecessary, although Wassermann and other tests may be imperative. The first of the two purposes of this brief note is to emphasise that, when doubtful epileptic manifestations develop in the presence of an acceptable psychological setting and in the absence of organic changes, it is still wise to have an E.E.G., for an organic factor may be revealed, and it is well to take every precaution against mistakes in diagnosis.

In the problem cases considered here I have found the psychiatrist's reliance on psychological mechanisms more prone to be false than the neurologist's insistence on pathology. This is because hysterical symptoms often grow from an organic nidus, congenital or acquired, under the influence of psychological fertilisation. Brain lesions predispose to psychogenic symptoms referable to the brain, and a liability to occasional or frequent epileptic phenomena may be accompanied by hysterical amplification in any proportion. The difference between the two is sometimes denied and hysteria regarded as "psychic" epilepsy (Lennox 1941).

A family or personal history of neurotic traits and an intelligence less than average are common in epilepsy and hysteria. Emotion, fatigue, the menstrual cycle, and alcohol can precipitate attacks of one or the other. I have seen several youths whose epilepsy has become manifest after heavy drinking on leaving home for military service. The fluid intake may be the important factor here, however. Minor physical signs are uncommon in both epilepsy and hysteria, and although diminished or lost reflexes or slight differences on the two sides, spastic eye movements, and so on, are more often met in epilepsy they are not conclusive. A passive reliance on the doctor's opinion favours epilepsy, as does a keenness to continue service in military cases, accompanied by pleading rather than a protest, but these points are not pathognomonic. In over 50% of doubtful cases there was no history of relevant symptoms before service. The age of onset in the epileptics was 21–38 years and averaged 29 years.

Rosenberg (1943) has decried the value of the E.E.G. in circumstances of doubt, but one feels he asks too much. A report on an E.E.G. may say that there is "no evidence of ——," "a possibility of ——," "support for ——," or "typical of ——," epilepsy. With the last three it is wiser to accept an organic factor. "No evidence ——" leaves one's opinion as before.

CASE-RECORDS

Case 1.—Man, aged 40, mental age 13 (normal 14). Unhappy in the Service. His wife and son had tuberculosis, and separation was distressing. Was bitter in the belief that boys half his age, of less ability, were promoted over his head. Complained of attacks of unconsciousness lasting 30 min.; no injuries, no incontinence, no twitching. His mother was highly strung and had similar faints under the influence of emotion. After his turns he trembled violently. He had often stopped attacks by "will-power." Yearly attacks began at 16, but the last three had been at two-month intervals. No medical or Service confirmation. The E.E.G. report was: "Typical, with bursts of fast activity quite characteristic of grand mal epilepsy."

Case 2.—Man, aged 21. He had his first attack at 14 when he saw his younger sister run over and killed by a lorry. Seven attacks followed in the next 4 years, but the succeeding 3 years were clear. On one occasion he fell and sustained mild concussion. The attacks began with tingling and numbness which started in the left foot and spread up the limb. When they reached the top of the thigh the patient fainted. He could stop attacks when walking by a tremendous effort of will, and when sitting by putting his head between his knees; but he then saw double and trembled. Attacks came on during drug therapy, and he was finally relieved, before service, by psychotherapy and hypnotism. He was a prospective member of aircrew and had recently had another attack. The E.E.G. findings of Dr. Denis Williams supported the diagnosis of epilepsy.

The second purpose of this report is to serve as a reminder of the type of case which might be dismissed as a migrainous headache, where there is nausea and sometimes a tendency to "blackout" with the pain. There were 4 such men among 20 "problem" cases, the diagnosis lying between migraine, epilepsy, and hysteria.

Case 3.—Man, aged 21. Over the last 6 months he had had severe one-sided headaches accompanied by nausea lasting up to 3 hours, brought on by wearing a steel helmet. He lost his ability to concentrate on his work, became giddy, and saw spots before his eyes. He felt himself stopping and staring for no reason and was listless after the attacks. The E.E.G. report was "Possibility of epilepsy."

It is advisable not to enlist epileptics. When they are already serving, especially if trained for work involving no danger, it is often possible to retain them, and more than half the epileptics I have seen have been so retained. Their work must not be dangerous.

The diagnosis between epilepsy and hysteria is sometimes impossible, and further evidence must be awaited. Anticonvulsive drugs are better avoided in doubtful cases.

CONCLUSION

Hysterical and migrainous symptoms are sometimes embellishments of epilepsy. An electro-encephalogram in such cases is often valuable but may not be conclusive.

REFERENCES

Lennox, W. G. (1941) Science and Seizures, New York and London.
Rosenberg, S. J. (1943) *Amer. J. Psychiat.* 99, 864.

"... The other new decision is to set aside twenty State scholarships for older students who have missed a university education but have shown their qualification for one in later life. It is a small beginning, but much can be expected from it, and the provision of scholarships in this adult field should be rapidly increased. In all universities at present the merit of the ex-Service students, who are in so great a majority, is recognised as outstanding. They are resolute in study, and their responsiveness, their ready intellectual grasp, delights their teachers. No greater proof is needed of the wisdom of enabling men and women of mature mind and wide experience of life to attend the universities."—*Times*, March 28.

Preliminary Communication

MODIFICATION OF HUMAN RED CELLS BY VIRUS ACTION

AGGLUTINATION BY "INCOMPLETE" RH ANTIBODY

BOTH the virus-hæmagglutination phenomenon and the "incomplete" Rh antibodies have lately received the attention of several workers.

Burnet et al.[1] have shown that the treatment of human red cells with cholera filtrate removed the receptors on the cells for the influenza group of viruses. Pickles[2] has shown that Rh-positive cells sensitised with "incomplete" Rh antibodies were agglutinated when cholera filtrate was added. Agglutination also took place when Rh-positive cells, previously treated with cholera filtrate, were exposed to a serum containing the "incomplete" Rh antibody and from which the panagglutinin had previously been absorbed.

In a few preliminary experiments we have confirmed the observations of these workers. It occurred to us that several points of analogy existed between the influenza group of viruses and the cholera-filtrate factor, *in so far as their actions on red cells* were concerned. Our experiments show that the treatment of Rh-positive cells with certain viruses modifies the cells so that they may be agglutinated by the "incomplete" anti-D Rh antibody.

MATERIALS AND METHODS

Four viruses were used: influenza A, PR 8 strain; influenza B, Lee strain; swine influenza, Shope; and Newcastle disease virus, Doyle's strain (N.D.V.).

The viruses were grown in the allantoic sac of ten-day-old chick embryos. For each virus the allantoic fluid from six eggs was collected 48 hours after inoculation and pooled. The virus titre[*] of each was determined by hæmagglutination tests against human and fowl red cells, and the identity of each virus was checked by hæmagglutinin inhibition tests with specific immune sera.

All preparations were bacteriologically sterile, kept at 4° C, and used within three weeks after collection.

The virus treatment of the human Rh-positive and Rh-negative red cells was carried out as follows:

To 0·25 c.cm. of virus-infected allantoic fluid was add an equal quantity of a 2% suspension of washed hum red cells. The tubes were kept at 4° C for $^1/_2$–1 hour, b which time the cells were agglutinated by the virus and h completely settled out. The tubes were then placed in 37° C water-bath, with periodic shaking, for two hou In this way the viruses were eluted from the red cells, whi then became more or less stable in suspension. The treat cells were then centrifuged down and, after the supernata fluid had been removed, washed once in saline and resuspend in saline to 2% strength. Cells similarly treated with sali were included as controls.

The agglutination of these virus-treated cells by a "incomplete" Rh antibody was carried out with th use of a serum diluted 1/32 which contained the "incom plete" form of the anti-D Rh antibody to a titre *1/256 and from which the anti-A and anti-B* is agglutinins had been absorbed. A normal human serum was used as control. The tests were incubated at 37° until the cells had settled to the bottom of the tube and the results were read macroscopically and microscopically.

Cells treated with N.D.V. and influenza B were usually completely stable after elution. Those treated with influenza A and swine influenza were usually only moderately stable. This, however, did not interfere with the readings, as virus-agglutinated cells were very

---

[*] The hæmagglutination titre of the four viruses against 0·5% red cells were:

	Influenza A	*Influenza B*	*Swine Influenza*	*N.D.V*
Human cells ..	1/640	1/1280	1/80	1/80
Fowl cells ..	1/640	1/640	1/160	1/1280

1. Burnet, F. M., McCrea, J. F., Stone, J. D. *Brit. J. exp. Path.* 1946, 27, 228.
2. Pickles, M. M. *Nature, Lond.* 1946, 158, 880.

AGGLUTINATION OF VIRUS-TREATED RED CELLS BY THE "INCOMPLETE" Rh ANTIBODY

Red-cell genotype		Primary virus treatment														
		N.D.V.			Swine influenza			Influenza B			Influenza A			Saline		
		Exposure to serum														
		Saline	Δ′	N.H.S.	Saline	Δ′	N.H.S.	Saline	Δ′	N.H.S.	Saline	Δ′	N.H.S.	Saline	Δ′	N.H.S.
Rh-POSITIVE																
O	R_1R_2	−	++	−	−	++	−	−	++	−	±	++	±	−	−	−
A	R_1R_2	−	++	−	−	++	−	−	++	−	−	+	−	−	±	−
A_1	R_1r	−	++	−	−	++	−	−	++	−	±	+	±	−	−	−
A	R_1R_1	−	++	−	−	++	−	−	+	−	−	+	−	−	−	±
A_2	R_1r	−	++	−	−	+	−	−	+	−	−	+	−	±	±	±
O	R_2r	−	++	−	−	++	−	−	+	−	−	+	−	−	−	−
B	R_0r	−	++	−	−	+	−	−	+	−	−	−	−	−	−	−
A_2	R_1r	−	++	−	−	+	−	−	+	−	−	+	−	−	−	−
A_1	R_1R_1	−	++	−	−	+	−	−	−	−	−	±	−	−	−	−
O	R_1R_1	−	++	−	..	..	..	−	−	−	..	..	..	..	..	..
O	R_1R_1	−	++	−	−	−	−	−	−	−	−	−	−	−	−	−
O	R_1R_1	−	++	−	−	+	−	−	±	−	−	±	−	−	−	−
A_1	R_1R_1	−	++	−	−	−	−	±	−	±	−	±	−	±	−	±
A	R_1r	−	++	−	−	++	−	−	−	−	±	+	±	−	−	−
A	R_1r	−	++	−	−	+	−	−	−	−	−	−	−	−	−	±
O	R_1R_0	−	+	−	±	−	±	−	±	−	−	−	−	−	−	−
Rh-NEGATIVE																
A_1	r r	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
A_2	r r	−	−	−	−	−	−	−	−	−	−	±	−	−	−	−
A_1	r r	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
A_1	r r	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
B	r r	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
O	r r	−	−	±	−	−	−	−	−	−	−	−	−	−	−	−
A_1	r r	−	−	−	−	−	−	±	±	±	−	±	−	−	−	−
O	r r	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−

Δ′, serum 1/32 containing the "incomplete" anti-D Rh antibody. N.H.S., normal human serum 1/32.

Readings under the microscope: + +, definite strong agglutination; +, definite but weak agglutination; ±, doubtful trace of agglutination; −, no agglutination.

readily redispersed when gently pipetted and spread on a 3 in.×1 in. microscopical slide, with the result that they appeared unagglutinated when examined microscopically. Treated cells sensitised with the "incomplete" Rh antibody showed definite agglutinated clumps macroscopically and under the microscope.

Twenty-four specimens of human red cells, including 16 Rh-positive and 8 Rh-negative, have been examined so far. The results of the tests are shown in the accompanying table.

RESULTS

The strongest and most clear-cut results were obtained with the N.D.V.-treated cells. Only the Rh-positive treated cells which contain the D Rh antigen were agglutinated by the "incomplete" anti-D Rh antibody. Treated Rh-negative cells, which do not contain the D Rh antigen, were not agglutinated. With the other viruses the reactions were weaker and more irregular, variations in the susceptibility of the individual cells being noted. In general, however, it was clear that there was a gradation of activity of the four viruses, which, in the order of their strength, were N.D.V.>swine influenza>influenza B>influenza A. Irrespective of whichever virus was used, the Rh-negative cells invariably *gave negative results.*

Burnet et al.[1] have shown that virus-treated cells become panagglutinable in many mammalian sera. We have confirmed their results with all four viruses, using human serum. With the few normal human sera tested, however, the panagglutinin rarely exceeded a titre of 1/4. The normal human sera diluted 1/32, which were used as controls, agglutinated neither Rh-positive nor Rh-negative human cells which had been treated with viruses.

DISCUSSION

The observations of Pickles[2] on the effect of cholera filtrate on red cells may, as she has stated, help towards elucidating the properties of the "incomplete" Rh antibodies. In the same way these experiments may help in the understanding of virus action on red cells and of the nature of "incomplete" antibodies. At the moment nothing can be said on the mechanism of the reaction. It is interesting, however, to recall that both the viruses and the cholera-filtrate factor apparently exert three analogous sets of actions on red cells. They remove virus receptors, produce panagglutinability, and render appropriate cells susceptible to agglutination by the "incomplete" Rh antibody.

Normal allantoic and amniotic fluid from twelve-day-old chick embryos showed no similar action on cells.

As regards the possibility of a soluble component in the virus-infected fluid being responsible for the modification of the cells, filtration of the N.D.V. preparation through a 0·16μ gradocol membrane removed both the hæmagglutinating activity and its capacity to render appropriate cells susceptible to agglutination by the "incomplete" antibody. This does not exclude the adsorption of any soluble factor by the filter.

SUMMARY

The treatment of human red cells of appropriate Rh genotype with certain viruses of the influenza group renders the cells susceptible to agglutination by the "incomplete" anti-*D* Rh antibody.

We wish to thank Dr. A. E. Mourant, of the Blood-Group Reference Laboratory, Lister Institute, for supplying the serum containing the "incomplete" anti-D Rh antibody.

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Medical Societies

ROYAL SOCIETY OF MEDICINE

Laboratory Diagnosis of Virus Infections

The pathology section of the society met on March 18, with Dr. A. B. ROSHER, *the president, in the chair.*

SMALLPOX

Prof. A. W. DOWNIE said that in the early eruptive stage of smallpox scrapings from a papule or the base of a vesicle smeared on a slide and stained by Gutstein's method will often reveal large numbers of elementary bodies which, while not diagnostic, are highly suggestive of smallpox. The most reliable test is the complement-fixation reaction of Craigie, using macerated crusts or vesicle fluid as antigen (6 crusts or fluid from 6 vesicles is enough) and a rabbit antivaccinial serum as antibody. The results can be reported within 24 hours. Another very useful test is the characteristic lesion on the chorio-allantoic membrane of the chick embryo, which is elicited with the scantiest material but takes 2–3 days to develop. The demonstration of antibodies in the patient's serum may be used as a late confirmatory test; but while the reaction is usually positive in smallpox it may also be positive with sera from recently vaccinated persons (such as smallpox contacts are likely to be), so it cannot be regarded as specific.

INFLUENZA

Dr. J. A. DUDGEON described the methods used for the laboratory diagnosis of influenza A and B. For the demonstration of the virus during the early stages of infection, throat garglings may be instilled intranasally into ferrets, which may or may not show clinical signs of influenza but usually develop specific antibodies. In typical virus-A epidemics the proportion of clinical takes in the ferret is high, but in mild or sporadic infections and in virus-B influenza diagnosis may have to depend on a specific antibody response. Alternatively, throat washings or sputum treated with penicillin and sulphadiazine is inoculated on to the chorio-allantoic membrane, or preferably into the amniotic cavity of the chick embryo, which is tested after 4 days' incubation for the presence of virus, using the red-cell agglutination technique with both guineapig and fowl blood. Again, better results are obtained with this technique in virus-A than in virus-B infections. A significant rise in antibody titre in the patient's serum during convalescence is also a useful index to the diagnosis, using either the red-cell agglutination test or the complement-fixation reaction. Samples of blood should be taken at onset and 10–14 days later; to avoid a hæmolysed specimen the serum should be separated as quickly as possible from the clot.

PSITTACOSIS-LYMPHOGRANULOMA GROUP

Prof. S. P. BEDSON, F.R.S., pointed to the close serological association between the viruses of psittacosis, *ornithosis*, and lymphogranuloma venereum, and the looser link between these and the viruses of trachoma, inclusion conjunctivitis, and mouse and cat pneumonia. These are large viruses of 150–250 mμ diameter; they stain readily and specifically, and show a developmental cycle. While direct microscopical examination is not usually possible with material from human cases of suspected psittacosis, Castenada-stained smears of the spleen or air sacs of infected birds (fulmars, pigeons, and fowls, besides the parrot family, may be affected) will often yield positive results. Virus particles can also be demonstrated in the large mononuclear cells of pus from a lymphogranuloma bubo. Mice are readily infected intraperitoneally or intranasally with sputum from cases of psittacosis, the intranasal route being particularly useful for pigeon strains; the chick embryo is also susceptible. Pus from lymphogranuloma buboes may be injected intracerebrally into mice or into the yolk-sac of the developing chick. As in other infections the complement-fixation test may be used for diagnosis in this group when it is *no longer* possible to isolate the virus; but the reaction is not specific, since positive results from cases of lymphogranuloma may be obtained with psittacosis-virus antigen as well as with the homologous virus. There is the same lack of specificity with the Frei skin test.

NEUROTROPIC VIRUSES

In discussing the large group of neurotropic viruses, Dr. F. O. MACCALLUM said the most important point in laboratory diagnosis was the proper collection and preservation of material, such as cerebrospinal fluid, throat garglings, blood, and post-mortem tissue; most *viruses survive best if kept at the lowest possible temperature*. In the various types of encephalitis, much more common in the U.S.A. than here, and in louping-ill, the virus can rarely be isolated from cerebrospinal fluid; the most suitable material is tissue from the central nervous system, but specific antibody can usually be demonstrated in convalescence. In lymphocytic choriomeningitis, mumps meningo-encephalitis, and herpetic encephalitis the virus can most readily be recovered from cerebrospinal fluid or blood by inoculation of either laboratory animals or the chick embryo.

DISCUSSION

Dr. J. CRAIGIE, F.R.S., pointed out that vaccinia virus contained a stable (S) and labile (L) antigen, and that for the complement-fixation test rabbit serum containing the S antibody was essential. Dr. MERVYN GORDON, F.R.S., asked if an agglutination reaction might serve to distinguish lymphogranuloma from psittacosis. Prof. WILSON SMITH remarked on the epidemiological value of laboratory diagnosis in virus infections, but thought a negative reaction—e.g., in suspected influenza—had a very limited value. Prof. RONALD HARE said his experience in the isolation and identification of influenza virus in Canada had been very similar to that recorded by Dr. Dudgeon. Dr. J. M. ALSTON doubted whether the techniques described could be used at present by the clinical pathologist; and the PRESIDENT suggested that a pamphlet indicating the material required for diagnosis, and how and where it was to be sent, would be useful. In answer to a question, it was stated that antibody could be demonstrated by the seventh or eighth day of most virus infections, and probably reached its maximum titre in 2–4 weeks.

Reviews of Books

Textbook of Midwifery

(2nd ed.) WILFRED SHAW, M.D., F.R.C.S., F.R.C.O.G., surgeon-in-charge, gynæcological and obstetrical department, St. Bartholomew's Hospital, London. London: J. & A. Churchill. Pp. 649. 21*s*.

THIS substantial volume begins with an introduction containing some sound advice on the care of the pregnant and parturient woman; the student would be wise to read it when he has reached the last page of the book. In the section on the physiology of reproduction the anatomy and physiology are well up to date, and the text, besides being easy to read, is enhanced by beautifully clear illustrations of early ova. The section on clinical midwifery includes the physiology and management of pregnancy, normal labour, and the puerperium. The account of management of the first stage of labour is largely a detailed and careful description of how to perform a vaginal examination, and not enough is said about the management of the patient, her feeding, the avoidance of retention of urine, and many other points. The dangers of pituitary extract are discussed: Mr. Shaw believes that these have been exaggerated and that, used with intelligence and skill, it is perhaps the most useful drug in practical midwifery. In this he treads on thin ice, for subsequently 'Pitocin' is advised in the treatment of hæmorrhage in the third stage of labour, in postpartum hæmorrhage, and in the treatment of primary and secondary inertia. He successfully points out the different, and often conflicting, opinions held on various forms of treatment, but in the chapters on delivery of the breech, on the management of suspected disproportion, and on antepartum hæmorrhage, the wisdom of this policy is questionable, since it masks the valuable lead he could give from his own experiences. In his desire to be fair to others, Mr. Shaw has not perhaps been kind enough to himself, and the book als contains much dead wood that might well be cleare away. Even mention of such things as de Ribes ba in the treatment of placenta prævia, the induction o labour by bougies, the stomach-tube, the hydrostati bag, and the use of antistreptococcal serum in puerpera sepsis might be regarded as unnecessary in such a wor as this: their place, now, is surely in a history of midwifery. In the section on the resuscitation of the bab *born in white asphyxia, three illustrations of an uncovere* baby being revived by artificial respiration hardly bea out his sound assertion that the guiding principle should be to avoid rough handling.

In Darkest Germany

VICTOR GOLLANCZ. London: Gollancz. Pp. 128. 8*s*. 6*d*

WITH no claims to literary form, this is a series of impressions flung together in haste and copiously illustrated. It represents the outcome of a visit to Germany last autumn, when Mr. Gollancz toured a number of the worst areas, including Düren, Aachen, and the Ruhr, and within a few weeks gathered a surprising amount of information. Much of the material has already appeared in letters to newspapers, and is reproduced in its original form. Writing with manifest sincerity, he has in the main managed to avoid sentimentality, and has obviously done his utmost to present facts rather than vague generalities.

The effect of this book must be shocking to anyone who has not become completely case-hardened. Admittedly almost everything he describes—the pallor, the hunger œdema, the "misery of boots," the families huddled together in cellars and ruins—could be paralleled elsewhere, but the *whole story is one* which makes unspeakably depressing reading. It would be misleading to quote single observations, since the author as far as possible keeps to the rules of good propaganda, and when he describes an incident he has observed himself usually he follows it with any relative statistics he has been able to muster. It may be objected that he tells too little of what has been done by Military Government, and too much of what has not; but it is darkest Germany he is describing, and it is his contention that much more must be done for the physical, intellectual, and spiritual needs of Germany if the coming generation is to believe that democracy holds anything better than the Nazi doctrine. However far the reader may go with the author in this belief, he cannot but be affected by the facts related, and the illustrations which, while not in any sense "horror pictures," tell the tale of day-to-day wretchedness and deprivation.

Practical Handbook of the Pathology of the Skin

(3rd ed.) J. M. H. MACLEOD, M.D., F.R.C.P., physician and director of the pathological department, St. John's Hospital for Diseases of the Skin, consulting physician for diseases of the skin, Charing Cross Hospital; I. MUENDE, M.B., M.R.C.P., physician with charge of pathological department and lecturer at St. John's Hospital. London: H. K. Lewis. Pp. 415. 50*s*.

Atlas of Histopathology of the Skin

G. H. PERCIVAL, M.D., PH.D., F.R.C.P.E., Grant professor of dermatology, University of Edinburgh, physician to the skin department, Royal Infirmary, Edinburgh; A. MURRAY DRENNAN, M.D., F.R.C.P.E., professor of pathology in the university, pathologist to the infirmary; T. C. DODDS, F.I.M.L.T., laboratory supervisor in the department of pathology of the university. *Edinburgh E. & S. Livingstone. Pp. 494. 75s.*

THESE two works are complementary. In the new edition of the *Handbook* there has been very little alteration of the text of the second edition, which was almost a complete revision of the first. It is still the standard work on the subject. The *Atlas*, on the other hand, is something quite new, being a splendid collection of 376 first-class coloured photomicrographs, covering a very wide range of skin diseases. The text has been kept to a minimum. Both works are intended for dermatologists, pathologists, and postgraduate students, and an excellent plan for study would be to use them side by side.

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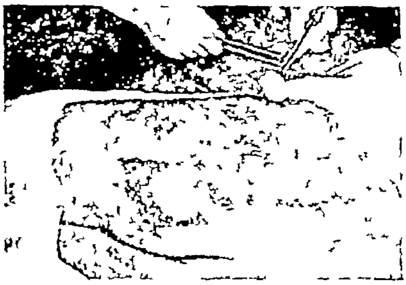


Fig 1

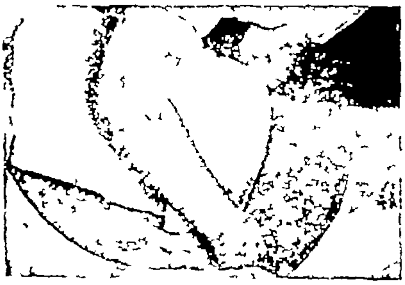


Fig 2

CASE HISTORY—The patient, a young man, was admitted to hospital, having been burnt by an electric blanket The raw area measured 162 square inches. Excision of the burnt area was performed on the same day. Tulle gras (Jelonet) was applied. Fixation by Gypsona plaster of Paris bandages applied over the whole area, abdomen and thigh The patient was given a blood transfusion. Seven days later, the affected part was covered with thin razor grafts from both thighs and a pressure dressing of Elastocrepe applied. Fixation was again secured with Gypsona plaster of Paris.

The patient was discharged to duty 7 weeks later.

The details and illustrations above are of an actual case. T. J. Smith & Nephew Ltd, Hull, manufacturers of Elastoplast, Elastocrepe and Jelonet, are privileged to publish this typical instance of the use of their products with success in the belief that such records will be of interest.

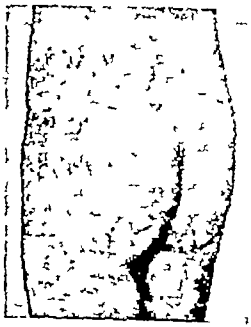
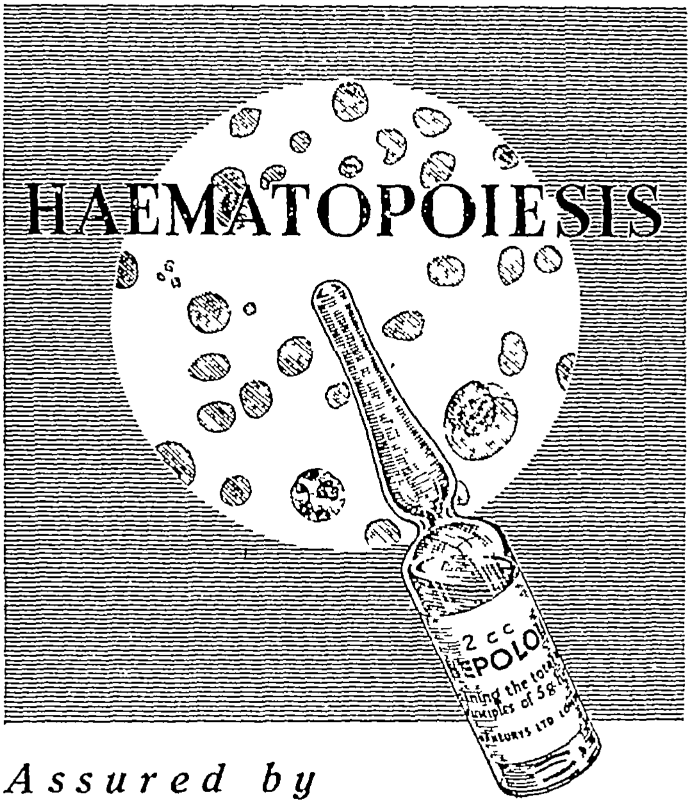


Fig 3

HAEMATOPOIESIS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THE LANCET

LONDON: SATURDAY, APRIL 12, 1947

Leprosy in Britain

THE sensational treatment by the lay press of the periodical reports of cases of leprosy in this country is based on the popular tendency to regard such cases as a social problem of the first magnitude and their immediate incarceration as imperative to the public welfare. The unreasoning fear which a diagnosis of leprosy engenders dates from the Middle Ages. In actual fact the chances of dissemination under our modern conditions of life are negligible. It was estimated before the war that there were 250 lepers in the British Isles, and this number has doubtless been augmented by the influx of immigrants from the endemic areas during the last decade. Yet no autochthonous case of infection in Britain has been reported for many years.

Leprosy was at one time common throughout Europe and in this country, but it began to decline in Europe about the fifteenth century; and it has shown no sign of re-establishing itself in Britain in spite of its repeated reintroduction from the tropics and subtropics, where it still flourishes. Our freedom from serious infection can be ascribed to the improvements in personal hygiene and sanitation, and the better standards of housing and of living, with the consequent diminution in child infection. Leprosy is not a highly infectious disease, and the long and intimate association of susceptible persons with an infective case is necessary for the continuance of the disease. Adults are refractory to infection, and probably the majority are immune to leprosy; but children are less resistant and may acquire it from close and protracted contact with "open" cases.

Only a small proportion of cases of leprosy are potentially infective to others. The clinical forms of the disease may broadly be divided into the neural and the lepromatous types, of which the former greatly preponderate in the endemic areas. These neural cases may ultimately suffer from the crippling lesions and deformities associated with secondary nerve changes; but they are not infective to others, since bacilli can rarely be recovered from them and then only in very small numbers after repeated and painstaking search. Such spectacular "closed" cases are of no potential danger to the community. In lepromatous leprosy, on the other hand, which may be difficult to diagnose until the disease is well advanced, the diffuse or nodular lesions on skin and mucous membrane harbour many bacilli. These are "open" cases and the patients are therefore potentially infective to others. In the endemic areas such lepromatous cases constitute but a small minority of the total; but it is their close association with susceptible persons, particularly with children, under squalid conditions, which is largely responsible for the maintenance of the disease in a community. In this country simple regulation of the domestic life of patients with this form of leprosy should be all that is necessary to remove the slight risk of their transmitting the infection to others. Experience has shown that sufferers from leprosy in this country are eager to coöperate fully in their treatment and in measures to prevent the spread of the disease. In rare instances where this is not the case some compulsion might be necessary, but there is no justification for indiscriminate compulsory segregation of all leprosy patients.

While leprosy is insignificant as a social problem in the British Isles, it remains an acute medical one. Treatment is not yet satisfactory, but the prospect of more specific chemotherapeutic remedies is growing brighter. Under the existing medieval attitude to the disease it is virtually impossible to admit a known or suspected case of leprosy to any British hospital or other institution except the one small voluntarily maintained leprosy colony in the south of England. Even a brief stay in hospital for the treatment of some incidental medical or surgical ailment cannot be arranged; and this, together with the needless stigma traditionally attaching to the disease, renders the patient's plight indeed pitiful. Refused employment, ostracised by society, and debarred from hospital facilities, he loses the faith and hope which are essential for his recovery. All he asks is for a more enlightened understanding.

Lymphocytic Meningitis

THE clinical picture of meningitis with an excess of lymphocytes in the cerebrospinal fluid may result from infection by yeasts (torulosis), trypanosomes, spirochætes (syphilis, relapsing fever,[1] and Weil's disease), the tubercle bacillus, and viruses. The viruses which more commonly affect other systems predominantly, the most important being those of mumps, glandular fever,[2 3] infective hepatitis,[4] atypical pneumonia,[5] and psittacosis, may at times cause a meningeal reaction so that the case presents as one of lymphocytic meningitis. The essentially neurotropic viruses of anterior poliomyelitis and herpes zoster cause lymphocytosis in the cerebrospinal fluid and often produce clinical signs of meningitis; in some epidemics of poliomyelitis cases occur where the whole course of the disease is that of a lymphocytic meningitis without clinical evidence of involvement of anterior horn cells, and these are usually considered to be abortive cases of poliomyelitis.

In 1924 WALLGREN[6] described six examples of lymphocytic meningitis in children which he considered to be a separate disease entity and called acute aseptic meningitis; the main characteristics were a fairly sudden fever with symptoms and signs of meningitis, a sterile cerebrospinal fluid containing an excess of lymphocytes, a good prognosis, and absence of complications. The ætiology was obscure until ARMSTRONG and LILLIE,[7] investigating the cause of the St. Louis encephalitis epidemic of 1933, discovered a previously unknown neurotropic virus which could be transmitted to mice and monkeys and was quite distinct from the virus which caused the outbreak of encephalitis. Little was known of the clinical history of the case from which the virus was

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1. Scott, R. B. *Lancet*, 1944, ii, 436.
2. Tidy, H. *Ibid*, 1946, ii, 819.
3. Schneider, T., Michelson, D. A. *S. Afr. med. J.* 1947, 21, 67.
4. Waring, J. *Brit. med. J.* 1943, ii, 228.
5. Holmes, J. M. *Ibid*, Feb. 8, p. 218.
6. Wallgren, A. *Acta pædiatr., Stockh.* 1924–25, 4, 158.
7. Armstrong, C., Lillie, R. D. *Publ. Hlth Rep., Wash.* 1934, 49, 1019.

first isolated; but subsequent work[8] showed that the clinical picture in man was that of a lymphocytic meningitis similar to that described by WALLGREN, and in view of the intense congestion of the choroid plexus seen in infected animals the disease was named benign lymphocytic choriomeningitis. The virus was subsequently isolated from cases in England[9] and elsewhere, and it was found that a few patients showed clinical evidence of involvement of the brain, spinal cord, and cranial nerves besides the meningitis. It seemed probable, however, that other neurotropic viruses might cause a similar clinical picture, and accounts of two recent small outbreaks bear this out. In this issue Dr. JENNINGS describes 22 cases with clear clinical evidence of meningitis or encephalitis, admitted to one hospital in north-west Middlesex between March and November, 1946. In these there was a lymphocytosis in the cerebrospinal fluid and recovery was the rule, while in several there was involvement of cranial nerves, especially the facial, and three showed signs suggestive of involvement of the spinal cord and one of the cerebellum. In some cases a Paul-Bunnell test was done and it was always negative, which is important in view of TIDY's[2] recent suggestion that glandular fever may be the cause of many cases of lymphocytic meningitis. Attempts were made to isolate the causative virus from the blood and cerebrospinal fluid in some of the cases by inoculation into various animals, without success. KIBBE and BEADENKOPF[10] have described 23 similar cases admitted to an American army hospital near Myitkyina in Burma during June, 1945; there was no evidence of involvement of the cranial nerves, brain, or spinal cord in this group, and all recovered. Extensive virus studies were carried out in these Burmese cases: virus neutralisation tests for the Armstrong virus were negative in the 19 samples tested, and the complement-fixation test was negative in 18 and anticomplementary in 2 samples; similar tests from random cases were also done for the viruses of mumps, St. Louis encephalitis, Japanese (type B) encephalitis, W. Nile type encephalitis, and dengue, and these were all negative.

It appears that benign lymphocytic meningitis can be caused by many different viruses, some known and others not yet isolated. Further elucidation of the problem will require close collaboration between clinicians and workers on viruses, so that blood and cerebrospinal-fluid samples can be obtained at the right stage of the disease for animal inoculation and virus neutralisation and complement-fixation tests. Judging from the clinical picture, the disease process is not necessarily confined to the meninges, and the brain, spinal cord, and cranial nerves may at times be involved; but pathological studies in man are largely lacking, owing to the benign course of the disease. The mode of transmission is still uncertain and may perhaps differ with different viruses. ARMSTRONG suspected that mice act as a reservoir of infection, and his extensive virus neutralisation tests in Washington showed that in 45% of houses infested with mice the animals had been infected with the virus of lymphocytic choriomeningitis. He suggested that the virus is conveyed from mice to man by insect bites, but this has not yet been proved. It may be significant that six of the Middlesex cases came from houses in which there were mice The domestic cat might also repay investigation. But the widespread presence of antibodies to the choriomeningitis virus in the sera of normal people in the U.S.A. suggests that human carriers are at least one source of infection

Treatment of Early Syphilis

THE assessment of new treatments for a chronic disease like syphilis must await the passage of time and the careful compilation of statistics. During the late war the prevalence of this disease in the Allied Forces, and the difficulties of ensuring continued attendance, led to the adoption of shorter and more concentrated schemes of treatment, at first with frequent injections of arsphenoxide, and later, as it became plentiful, with penicillin. Since then some valuable information has been gained, but the place of penicillin in treatment and the best methods of using it are still undefined. Doubts raised by early failures have led British clinicians to supplement penicillin therapy with injections of neoarsphenamine and bismuth, though this cautious procedure will inevitably complicate and delay the final assessment

Syphilis in the rabbit, though very different from that in the human, may give valuable clues to the reaction of *Spirochæta pallida* to remedial drugs EAGLE et al.[1] found that the effectiveness of sodium penicillin against syphilis in the rabbit varied greatly with the method of administration. They used different batches of commercial penicillin, without regard to possible differences in their spirochæticidal activity due to varying proportions of the several types of penicillin. When injections were given four-hourly an increase in the number of injections, and thus in the duration of treatment, greatly reduced the total dose of penicillin required for cure. With eight injections the necessary dose was 80,000 units per kg. body-weight; but this fell to 1600 units/kg. with twenty injections, and to 360 units/kg. with fifty injections. When injections were given twice daily for four days the curative dose was 30,000 units/kg.; but it fell to 1770 units/kg. if the treatment was extended to eight days By giving a fixed number of injections and varying the interval between them it was found that much the same dose was required whether injections were given four-hourly, twice daily, or once daily. Injections given so often as to produce a cumulative effect on the blood-level of penicillin were therapeutically less efficient, suggesting that much of the penicillin was being wasted If the duration of treatment was fixed, effectiveness increased in direct ratio to the number of injections Thus in a four-day period, with injections once daily, twice daily, and four-hourly, the curative doses per kg were 50,000, 20,000, and 1600 units. The conclusion reached was that the effectiveness of penicillin depends on both the tissue concentrations and the time during which these are maintained, but that the time factor is much the more important. Many small injections over a long period were more effective than a few large injections over a short period. Injections once daily seemed as effective as those given four-hourly, but there was some evidence that the optimum interval between injections might be eight to twelve hours. If these results are applicable to the treatment of human syphilis, it seems that sodium penicillin may be injected once or twice daily without loss of efficiency. The factors concerned are the length of treatment, the number and frequency of injections, and the total dose of penicillin, *in that order of importance.* Methods of injection which delay the absorption of penicillin will presumably have the same effect as an increase in the number and frequency of injections.

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[8] Armstrong, C. *Bull. N.Y. Acad. Med.* 1941, 17, 295.
[9] Findlay, G. M., Alcock, N. S., Stern, R. O. *Lancet*, 1936, i, 650.
[10] Kibbe, F. W., Beadenkopf, W. G. *Bull. Johns Hopk. Hosp.* 1946, 79, 365.

[1] Eagle, H., Magnuson, H. J., Fleischman, R. *Bull. Johns Hopk. Hosp.* 1946, 79, 168.

HELLER [2] has tried to assess the results in early human syphilis of fourteen different methods of rapid treatment, including penicillin alone in varying dosage; penicillin and arsphenoxide, with and without bismuth; and arsphenoxide by intravenous drip or by multiple injections, with and without bismuth. The results were observed after twelve to fifteen months, and in spite of varying standards of observation and tests some important findings emerged. The stage in the disease at which treatment was begun was of great importance, the results for primary syphilis being considerably better than those for secondary syphilis and for cases which had already relapsed. Six schemes of treatment employed penicillin alone, the dosage being 600,000 units in eight days (10,000 units three-hourly), 1,200,000 units in four days (40,000 units three-hourly), 1,200,000 units in eight days (20,000 units three-hourly or 40,000 units six-hourly), and 2,400,000 units in eight or four days (40,000 or 80,000 units three-hourly); and there was little difference in the results obtained. When smaller doses of penicillin were combined with varying amounts of arsphenoxide the effects were much the same; but the addition of bismuth improved the results; and HELLER concludes that any method of penicillin treatment will probably benefit from the addition of bismuth. The proportion of failures in primary syphilis seems to have varied from 15% to 25% with most methods of treatment, but the best results were obtained when treatment was begun while the serum reaction was still negative. For secondary syphilis the results were even less satisfactory. With methods employing penicillin alone or in combination failures varied from 41% to 51%. Much the most effective treatment for this stage was arsphenoxide given by intravenous drip for five days; but this was dangerous treatment, giving a death-rate of 1 in 140 cases, compared with 1 in 1873 with multiple injections of arsphenoxide, 1 in 4312 with penicillin combined with small amounts of arsphenoxide and bismuth, and no deaths with penicillin alone. STERNBERG and LEIFER [3] have studied the case-records of 1400 soldiers of the United States Army treated for early syphilis between June, 1944, and February, 1945. All received 2,400,000 units of sodium penicillin in aqueous solution, sixty injections of 40,000 units each being given three-hourly for seven and a half days, without additional therapy. Of these patients, 84% remained under observation for over nine months after treatment, and the proportion of successes at this stage, as estimated by absence of clinical signs and negative blood-serum reactions, was 98·3% of 517 cases of seronegative primary syphilis, 96·5% of 462 cases of seropositive primary syphilis, and 89·9% of 199 cases of secondary syphilis. An interesting point was the very low incidence of asymptomatic neurosyphilis in patients treated by this method: the cerebrospinal fluid was examined after treatment in 719 patients, in only 5 of whom was it abnormal.

Some of this evidence is conflicting, and taken as a whole it sheds little light on this difficult problem. Doubt as to the precise content of the penicillin used in these studies, in terms of the four crystalline penicillins which it is now known to contain, adds to the general confusion. It is clear that judgment must be reserved; rapid methods of treatment are still in the experimental stage and must be used with the utmost caution. Much could be learnt from a systematic follow-up of the many patients treated in the Services with penicillin alone; their records are available, and most of the men could be traced. Such an investigation would be worth the expenditure in time and money.

Annotations

MENTAL HEALTH AND CRIME

MUCH has been said and written during the last two decades about the increase of crime and delinquency. The gravity of the problem is admitted to be increasing; the attempts to deal with it constructively seem quite inadequate. Dr. J. R. Rees, in his Clarke Hall lecture delivered at Lincoln's Inn on March 26, contributed several sound ideas from his recent experience as chief psychiatric adviser to the Army. He was impressed by the great decrease in sickness and crime which followed the systematic drafting of dull men (of whom the Army received more than its fair share) into manual-labour units. When they were given work entirely within their competence, and friends of their own intellectual level, they became happy and healthy, and contributed much to the Army's effort. Nearly 30% of the whole population, Dr. Rees estimates, are mentally backward, chronically neurotic, or emotionally handicapped. If, he suggests, these "weaker brethren," who commit an unduly high proportion of all the crime, could be put to work and properly led, much adult crime would be prevented.

As a starting-point for the attack on the basic social problem of selfishness, marriage guidance is probably, Dr. Rees thinks, about as good as any other; for clearly if couples married more wisely, they would be better adjusted parents, they would want and love their children, and they would provide happier homes. More and better youth clubs, training for and within industry, vocational guidance, and (on the penological side) better trained and younger magistrates familiar with an enlightened prison system—these are some of the reforms from which he would hope to see a solution grow. There is, in his opinion, plenty of knowledge on which to work, but he emphasises the need for research and for much better coördination of the existing knowledge. Whether his suggestion of a Royal Commission is a good one is, however, open to question. A well-chosen Royal Commission would certainly carry weight, but by the time it published its results the situation might have changed out of recognition. There would, moreover, be no certainty or even probability that the Government of the day would act on its findings. The Criminal Justice Bill of 1938, which everyone admitted went a substantial way in Dr. Rees's direction, is still on its shelf. There is no ready-made answer to the problem.

Dr. Rees said, quite rightly, that all crime is a sign of some personality and character disorder, whether it consists of murder and robbery, or of more respectable offences like income-tax evasion, use of electric current during prohibited hours, or driving too fast in built-up areas. What he did not mention at all was the contribution of society itself to crime. Crime is correctly defined as an infraction of law ; we are only just beginning to realise that both the law and the infraction may be symptoms of a collective character disorder for which we are collectively responsible. Our collective shortcomings are partly responsible for the present tangle of restrictive regulations with their infinite number of new offences ; they have also, by binding upon the weaker brethren burdens they are unable to bear, made inevitable much of the crime which is now beginning to cause us discomfort and anxiety. The problem of crime, while it certainly calls for examination of the offender and his circumstances, calls even more loudly for an examination of the social order against which he offends.

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[2] Heller, J. R. jun. *J. Amer med. Ass.* 1946, 132, 258.
[3] Sternberg, T. H., Leifer, W. *Ibid.* 1946, 133, 1.

THE MULTIPLICATION OF COAGULATION FACTORS

THE orthodox faith of blood coagulation, based on the four agents, thromboplastin, prothrombin, calcium, and fibrinogen, has been able to survive repeated and determined heretical attacks because it offers the simplest explanation of those facts with which the average physiologist is familiar. It is now becoming clear, however, that only as a framework can it continue to exist. Despite the notorious difficulty of obtaining reproducible results in this field of research it is apparent to even the most conservative that modern findings require a considerable elaboration of the old theory, or a new theory altogether. So far the tendency is to try to fit new facts into the old framework, though to some it may seem that the resulting structure is becoming a little unstable. The additions are in the form of "new factors." Some of these are thought to oppose the action of the accepted clotting mechanism, as, for instance, the antithromboplastin described by Tocantins,[1] which he considers to be present in excess in hæmophilia, and a similar, possibly identical, inhibitor studied by Feissly.[2] On the other side of the balance a number of agents have been added by the recognition of the complex nature of factors previously stated to be simple. Thromboplastin is thought to consist of an enzyme (kinase) and a co-factor of lipoidal nature related to cephalin or lecithin.[3] Kinase itself is probably derived from an inactive precursor in the plasma, studied under the name of "plasmakinen" by Laki.[4] Several workers have come to the conclusion that prothrombin is a complex of at least two components,[5] and even fibrinogen has not preserved its undivided identity.

Now, distinct from these fission products of the old clotting factors, come the new "factors V and VI" described by Owren in our columns last week. The evidence that he puts forward must be accepted as being strongly in favour of the existence in normal plasma of an accessory to thromboplastin and calcium essential to their proper action on prothrombin. In his present communication the evidence for "factor VI" is less convincing, but will no doubt be presented in full later.

The existence of an additional factor of the type postulated by Owren had already been suggested by the work of Fantl and Nance[6] in which they found that, while highly purified preparations of prothrombin could be only slowly converted to thrombin by thromboplastin and calcium, the addition of prothrombin-free plasma resulted in a great acceleration of the reaction. Whether, as seems likely, these findings can be explained on the same basis as those of Owren only future work can determine. In any event a fresh impetus to research on blood coagulation has been given by Owren's observations, and, as always, a new discovery may have unexpectedly wide and exciting results. The case of factor V deficiency he describes is obviously an example of an extremely rare condition, but its intelligent investigation has shown once again how important human material can be to the experimentalist, a fact often ignored in academic circles. It provides, too, still another example of how increasing knowledge appears to reveal an almost infinite complexity underlying even the simplest biological process.

And yet, in this particular instance of blood coagulation, the intricacy seems almost too lavish. Do all these factors, whose number now runs into double figures, really exist in the blood for the express purpose of controlling the occasional conversion of fibrinogen to fibrin, or do they, under other names, take part in other and more continuous metabolic processes ? Or is it, perhaps, that one's dissection of the dynamic whole creates a series of static artefacts ?

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1. Tocantins, L. M. *Amer. J. Physiol.* 1943, 139, 265.
2. Feissly, R. *Helv. med. Acta*, 1944, 11, 177.
3. Leathes, J. B., Mellanby, J. *J. Physiol.* 1939, 96, 38P ; Macfarlane, R. G., Trevan, J. W., Attwood, A. M. P. *Ibid*, 1941, 99, 7P.
4. Laki, K. Studies from the Institute of Medical Chemistry, University Szeged, 1943, vol. III, p. 5.
5. Quick, A. J. *Amer. J. Physiol.* 1943, 140, 212 ; Nolf, P. *Arch. int. Pharmacodyn.* 1945, 70, 5 ; Feissly, R. *Schweiz. med. Wschr.* 1945, 75, 696.
6. Fantl, P., Nance, M. *Nature, Lond.* 1946, 158, 708.

DOCTOR DEMAND IN A HEALTH SERVICE

WHEN everyone can get medical advice without paying directly for it, what increase may we expect in the demand for doctors' aid ? Sound planning for a new health service requires some estimate of the amount of professional attention people will want ; and this problem has been studied in Canada, now also engaged on tentative plans for universal State-aided medical care.

Although it would be unwise to apply generally to this country the experience of a particular town in Eastern Canada, yet the results of a morbidity survey made some time ago by Richter[1] in two Nova Scotian communities are certainly relevant. This survey covered a year's record of the services given by the local doctors in Glace Bay, a typical mining town, and Yarmouth, a non-industrial town in the same area. There were differences in the age-sex composition, and the economic and industrial background of the populations, but the most important difference was in the method of providing for medical care. In the mining town a contributory insurance scheme assures treatment by general practitioners, hospital care, operations, drugs, and dressings for each worker and his dependants. In the rather more affluent Yarmouth the fee-per-service system operates, the usual charges being $2 (10s.) for a surgery consultation and $3 (15s.) for a visit. The contributory scheme had been in operation in Glace Bay for about 80 years, and the level of demand had become stabilised. Records were kept of the number of professional services rendered by the practitioners in each town to all members of the communities during the 12 months of the survey, and comparisons between the incidence-rates of *treated* illnesses were then made. Clearly such comparisons were complicated by the occupational, economic, and demographic differences of the two populations, but some of the results which were relatively unaffected by these difficulties are significant.

In both communities two-thirds of the services were given to the workers' dependants, but an important difference was revealed : under the insurance scheme the larger families—with eight or more members—had twice as much medical care as families of the same size had under the *fee-for-service régime*. It appears then that, when assured provision is absent, the larger

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1. Richter, L. The Effect of Health Insurance on the Demand for Health Services. *Canad. J. Econ. polit. Sci.* May, 1944, p. 179.

families get less than their share of medical service. Further results also indicate that where economies have to be made the children suffer most because of the financial loss entailed by continued sickness in bread-winner or mother. Generally, the "treated illness" rates at all ages were appreciably higher among the insured population; presumably this does not necessarily reflect any real difference in the incidence of disease but rather an increased readiness to seek a doctor's advice. A cynic might attribute this alacrity to a very human desire to get one's money's worth for one's contribution, but there may be a widespread belief that prompt attention to minor ailments is a preventive of serious disability. Under the insurance scheme common colds, tonsillitis, minor injuries, and digestive upsets are much more often treated by doctors than under the other system. There are differences, too, in the character of the services provided; for the insured patients their doctors made more home visits and dispensed twice as many drugs and four times the number of dressings prescribed by their counterparts in the other town. Home visits, which are more expensive under a fee-for-service system, were much more frequently made to sick children in the mining town.

From all this, those charged with the provision of medical man-power and supplies for our new health service may reasonably infer that the removal of economic restraint may entail a rise of perhaps 50% in the demand for professional attention. For the general practitioners, whose numbers cannot increase in step with this demand, this will mean even heavier calls upon their time and patience—a consideration which might be taken into account in the forthcoming negotiations. Against this, of course, must be set the possibility that readier access to the doctor's care for apparently trivial illness may give fresh scope for the prevention of more serious developments. The balance between sound preventive medicine and merely harassed overwork is very finely set, and much will depend both on the technical and clinical assistance made available and on the good sense of the public.

CONTINUOUS PENICILLIN APPARATUS

THE discomfort of repeated intramuscular injections in the administration of penicillin has stimulated many ingenious minds to contrive apparatus which will maintain a continuous and accurate dosage in small bulk. Most of these depended on hydrostatic principles and were constructed essentially of a calibrated glass tube connected to the injection needle by a necessarily long length of rubber tubing. Unfortunately, however, penicillin may deteriorate on protracted contact with rubber, and such bedside apparatus is in any case easily overset and very temperamental. Attention has therefore turned towards mechanical devices. Professor Fleming's team adapted a clock, deprived of its hands, to drive down the plunger of a syringe, but rubber tubing was still used to connect the syringe to the patient. In this issue Major Bowie and Captain Borcar describe the Secunderabad apparatus, which has the precision workshop of R.E.M.E. behind it. Rubber tubing is eliminated by strapping the syringe to the patient's thigh at the site of injection, using a flexible speedometer-cable to connect the piston mechanism with an electric motor. A rather similar apparatus, designed by Dich and Jensen, was described [1] by P. J. Dragsted, of Copenhagen, to the Danish Society of Internal Medicine in April, 1946. The Danish apparatus is self-contained and driven by clockwork, so that the patient can move about freely without disconnecting the apparatus; the clockwork is silent and runs without attention for 24 hours. The same technical difficulties have occurred to both inventors. However well the syringe plunger seems to fit the barrel there is a tendency for it to leak under continuous pressure. Dragsted advises lubrication with liquid paraffin, while the Secunderabad apparatus is fitted with a plunger of "resilient material" which can be expanded by a tightening device. Another common problem has been to allow for some movement of the intramuscular needle on the fixed syringe. Although this is not shown in their diagram, the Danes say that a short rubber connexion may if necessary be inserted between the nozzle and the needle. In the Secunderabad apparatus an ingenious spring-coiled needle solves this problem but raises others of cleaning and replacement. The syringe appears to be easily removed for recharging in the Danish model, so avoiding the complexity of a three-way tap and recharging syringe.

While clinicians continue to think it important to keep blood-penicillin levels constant there is likely to be a demand for apparatus such as these. If accuracy, ease of maintenance, and simplicity in operation are the criteria, the published descriptions suggest that the Dich-Jensen has some slight advantages over the Secunderabad.

INDUCED VITAMIN DEFICIENCIES

THE investigator who wants to study specific vitamin deficiencies in human subjects finds his material hard to come by. Natural deficiencies are almost always multiple, and the grosser ones usually arise in remote places, such as prisoner-of-war camps, enemy-occupied countries, or the less-frequented parts of the tropics. When his work seems of national importance he may be allotted volunteers—Servicemen or conscientious objectors, perhaps—but otherwise he must rely on himself, his colleagues, or his students, none of whom will relish deprivations extending over years. The late war was remarkable for the painstaking studies made among (and by) prisoners-of-war in the Far East; but there again the deficiencies were multiple and uncontrolled by the investigators.

In the United States Horwitt and colleagues,[1] working for the National Research Council, have studied induced vitamin deficiencies in the inmates of a mental hospital over 2½ years. One group of patients were subjected to a mild chronic thiamine plus riboflavine deficiency over the whole period, and in a second group a more acute deficiency was induced. An obvious drawback to the experiment was that these patients could not be guaranteed to have a normal vitamin metabolism—presumably many of them were schizophrenics, whose metabolism in many fields is grossly deranged. The 36 male patients studied fell into two age-groups of 58–78 and 24–42 years. Each age-group was divided into three classes, A, B, and C, so that each class consisted of 7 old and 5 younger patients. Class A received a daily diet containing 2200 calories and sufficient vitamins except thiamine (400 µg.) and riboflavine (900 µg.). Class B had the same diet with 6 mg. of thiamine and 1·3 mg. of riboflavine added. Class C were the controls, on the usual hospital diet. The clinical effect of the diet in class A was at no time more than minimal. There was some dulling of interest and restriction of activity, but psychological tests were satisfactorily performed. The skin of some of the younger subjects became thinner, making them look older than they were, and some drying, thinning, and wrinkling of the lips was noted. Within nine months from the beginning of the deficient diet, an abnormally high level of lactic and pyruvic acid was found in the blood in response to a standard exercise after ingestion of a standard amount of glucose. This abnormality persisted throughout the experiment.

At the beginning of the third year of the experiment class B were given a daily diet containing only 200 µg. of thiamine and 800 µg. of riboflavine. Within three months their levels of blood lactic and pyruvic acids after the consists of murder and robbery, or of more respectable offences like income-tax evasion, use of electric current during prohibited hours, or driving too fast in built-up areas. What he did not mention at all was the contribution of society itself to crime. Crime is correctly defined as an infraction of law; we are only just beginning to realise that both the law and the infraction may be symptoms of a collective character disorder for which we are collectively responsible. Our collective shortcomings are partly responsible for the present tangle of restrictive regulations with their infinite number of new offences; they have also, by binding upon the weaker brethren burdens they are unable to bear, made inevitable much of the crime which is now beginning to cause us discomfort and anxiety. The problem of crime, while it certainly calls for examination of the offender and his circumstances, calls even more loudly for an examination of the social order against which he offends.

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[1] *Nord. Med.* Jan. 31, p. 288.

[1] Horwitt, M. K., Liebert, E., Kreisler, O., Wittman, P. *Science*, 1946, 104, 407.

THE MULTIPLICATION OF COAGULATION FACTORS

THE orthodox faith of blood coagulation, based on the four agents, thromboplastin, prothrombin, calcium, and fibrinogen, has been able to survive repeated and determined heretical attacks because it offers the simplest explanation of those facts with which the average physiologist is familiar. It is now becoming clear, however, that only as a framework can it continue to exist. Despite the notorious difficulty of obtaining reproducible results in this field of research it is apparent to even the most conservative that modern findings require a considerable elaboration of the old theory, or a new theory altogether. So far the tendency is to try to fit new facts into the old framework, though to some it may seem that the resulting structure is becoming a little unstable. The additions are in the form of "new factors." Some of these are thought to oppose the action of the accepted clotting mechanism, as, for instance, the antithromboplastin described by Tocantins,[1] which he considers to be present in excess in hæmophilia, and a similar, possibly identical, inhibitor studied by Feissly.[2] On the other side of the balance a number of agents have been added by the recognition of the complex nature of factors previously stated to be simple. Thromboplastin is thought to consist of an enzyme (kinase) and a co-factor of lipoidal nature related to cephalin or lecithin.[3] Kinase itself is probably derived from an inactive precursor in the plasma, studied under the name of "plasmakinen" by Laki.[4] Several workers have come to the conclusion that prothrombin is a complex of at least two components,[5] and even fibrinogen has not preserved its undivided identity.

Now, distinct from these fission products of the old clotting factors, come the new "factors V and VI" described by Owren in our columns last week. The evidence that he puts forward must be accepted as being strongly in favour of the existence in normal plasma of an accessory to thromboplastin and calcium essential to their proper action on prothrombin. In his present communication the evidence for "factor VI" is less convincing, but will no doubt be presented in full later.

The existence of an additional factor of the type postulated by Owren had already been suggested by the work of Fantl and Nance[6] in which they found that, while highly purified preparations of prothrombin could be only slowly converted to thrombin by thromboplastin and calcium, the addition of prothrombin-free plasma resulted in a great acceleration of the reaction. Whether, as seems likely, these findings can be explained on the same basis as those of Owren only future work can determine. In any event a fresh impetus to research on blood coagulation has been given by Owren's observations, and, as always, a new discovery may have unexpectedly wide and exciting results. The case of factor V deficiency he describes is obviously an example of an extremely rare condition, but its intelligent investigation has shown once again how important human material can be to the experimentalist, a fact often ignored in academic circles. It provides, too, still another example of how increasing knowledge appears to reveal an almost infinite complexity underlying even the simplest biological process.

And yet, in this particular instance of blood coagulation, the intricacy seems almost too lavish. Do all these factors, whose number now runs into double figures, really exist in the blood for the express purpose of controlling the occasional conversion of fibrinogen to fibrin, or do they, under other names, take part in other and more continuous metabolic processes? Or is it, perhaps, that one's dissection of the dynamic whole creates a series of static artefacts?

DOCTOR DEMAND IN A HEALTH SERVICE

WHEN everyone can get medical advice without paying directly for it, what increase may we expect in the demand for doctors' aid? Sound planning for a new health service requires some estimate of the amount of professional attention people will want; and this problem has been studied in Canada, now also engaged on tentative plans for universal State-aided medical care.

Although it would be unwise to apply generally to this country the experience of a particular town in Eastern Canada, yet the results of a morbidity survey made some time ago by Richter[1] in two Nova Scotian communities are certainly relevant. This survey covered a year's record of the services given by the local doctors in Glace Bay, a typical mining town, and Yarmouth, a non-industrial town in the same area. There were differences in the age-sex composition, and the economic and industrial background of the populations, but the most important difference was in the method of providing for medical care. In the mining town a contributory insurance scheme assures treatment by general practitioners, hospital care, operations, drugs, and dressings for each worker and his dependants. In the rather more affluent Yarmouth the fee-per-service system operates, the usual charges being $2 (10s.) for a surgery consultation and $3 (15s.) for a visit. The contributory scheme had been in operation in Glace Bay for about 30 years, and the level of demand had become stabilised. Records were kept of the number of professional services rendered by the practitioners in each town to all members of the communities during the 12 months of the survey, and comparisons between the incidence-rates of *treated* illnesses were then made. Clearly such comparisons were complicated by the occupational, economic, and demographic differences of the two populations, but some of the results which were relatively unaffected by these difficulties are significant.

In both communities two-thirds of the services were given to the workers' dependants, but an important difference was revealed: under the insurance scheme the larger families—with eight or more members—had twice as much medical care as families of the same size had under the fee-for-service régime. It appears then that, when assured provision is absent, the larger

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1. Tocantins, L. M. *Amer. J. Physiol.* 1943, 139, 205.
2. Feissly, R. *Helv. med. Acta*, 1944, 11, 177.
3. Leathes, J. B., Mellanby, J. *J. Physiol.* 1939, 96, 38P; Macfarlane, R. G., Trevan, J. W., Attwood, A. M. P. *Ibid*, 1941, 99, 7P.
4. Laki, K. Studies from the Institute of Medical Chemistry, University Szeged, 1943, vol. III, p. 6.
5. Quick, A. J. *Amer. J. Physiol.* 1943, 140, 212; Nolf, P. *Arch. int. Pharmacodyn.* 1946, 70, 5; Feissly, R. *Schweiz. med. Wschr.* 1945, 75, 606.
6. Fantl, P., Nance, M. *Nature, Lond.* 1946, 158, 708.

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1. Richter, L. The Effect of Health Insurance on the Demand for Health Services. *Canad. J. Econ. polit. Sci.* May, 1944, p. 179.

having been caused by horses and horse-drawn vehicles in 1870, against 1087 fatal accidents caused by motors in 1942. On the other hand, better legislation for the care of children is reflected in the fall of deaths in mines: 124 boys aged 10–15 and 10 younger boys died in the mines in 1870, whereas in 1942 only 4 children in all died in "mines and quarries," one of them being a girl under 5. Probably those 4 children were all playing near quarries or old shafts, and were killed accidentally by falls. Gale's tables, indeed, show a sudden decline in deaths from violence in children aged 10–15 from the decade 1851–60, when it was 93 per 100,000 (77 boys, 16 girls) to the decade 1861–70 when it fell to 45—less than half. Below the age of 10 the fall was less dramatic, and it seems certain that legislation to ease the lot of children in industry must be the explanation. Gladstone was forcing his reform Bills on a reluctant Parliament, and public opinion was being influenced by such widely differing books as *Oliver Twist* (1838) Engels's *Conditions of the Working Class in England in* 1844, Mrs. Gaskell's *Mary Barton* (1846), and Kingsley's *Water Babies* (1862).

Deaths from suffocation of children under 5 are still high, having fallen from 947 in 1870 to only 539 in 1942, when there were, in addition, 176 deaths of newborn children from lack of care. Birth injuries cannot be compared in the two groups, since the term evidently had a different meaning in 1870. Deaths on railways fell from 125 to 38, and deaths from drowning (apart from bathing accidents) from 875 to 447. Burns and scalds compete most nearly with traffic accidents as a cause of death, for though they have fallen from 1739 to 513 the number of such preventable accidents is still much too high. Dr. Leonard Colebrook, F.R.S., reminded us not long ago that in the five years 1935–39 6516 people in England and Wales died from burning accidents, and 2825 of these were children; more than 90% of these deaths were due to burning and scalding in the home.[6] Bad housing and overcrowding, old-fashioned grates around which children play for lack of space elsewhere, ill-designed fireplaces, inadequate fireguards, and inflammable clothes combine to produce this terrible waste of life. When non-fatal accidents, many of which lead to loss of function or at best severe scarring, are also taken into account the price of our general carelessness is seen to be appallingly high. In a recent letter[7] Colebrook advocated a simple guard for electric fires which, if widely used, could remove or make negligible at least one important cause of fatal accidents.

LOCAL APPLICATIONS TO PREVENT DENTAL CARIES

ATTENTION has lately been focused on the organic portion of the enamel as the primary site of attack in dental caries. It has been suggested that organisms travel along this organic material until the dentine is reached, and that blockage of the organic paths should check the carious process. In the United States B. Gottlieb has claimed good results from a technique based on this hypothesis. He first applies a 1% solution of 'Naccanol,' which seems to be a wetting agent intended to decrease the surface tension and facilitate better penetration; then a 5% solution of silver nitrate is painted on and left for a minute before precipitation is produced with a saturated solution of calcium chloride. This precipitation is intended to prevent the black stain otherwise found where silver nitrate is applied. A British United Press report says that fairly frequent applications of the solutions are necessary. Now that the formulæ of the solutions have been divulged it will be interesting to see whether further experiments bear out the early somewhat startling claims.

BONES IN THE BANK

A "bone bank," perhaps the first of its kind, has been set up at the Geisenger Memorial Hospital, Pennsylvania.[1] Dr. Leonard Bush, head of the orthopædic department, has explained that surplus bone from such operations as osteotomies can be preserved indefinitely at a temperature of 10° F, and it will provide material for chip grafts, so eliminating one stage of the grafting operation. The value of a bone bank must depend on the kind of material available for storage, and this is likely to be limited to fragments which are partly compact and partly spongy. For filling in defects after trauma or the excision of tumours or cysts, these fragments will be quite satisfactory; for, though heterogenous skin grafts[2] or nerve grafts[3] are unsuitable for transplantation after storage, on account of the foreign protein reaction they excite, with chip grafts it is a matter of indifference whether the bone survives or not. On the other hand, the special properties of living cancellous bone and of massive rigid cortical grafts will still make it desirable to obtain these from the patient himself.

THE CALL-UP

IN the spirited debate at the second reading of the National Service Bill the Minister of Labour explained that any young man training for a trade or profession is to have the option of serving either before or after his apprenticeship; doctors and dentists would, he suggested, be called up usually about the age of 25, though study for higher qualifications would be accepted as grounds for deferment up to the age of 29. He emphasised, however, that no young man who is liable and medically fit will be exempted; the burden is to be the same for all. None will quarrel with this arrangement on grounds of equity. Nevertheless, it may be questioned whether the ruling should be narrowly applied to doctors. The doctor's contribution to the Forces is his trained skill; though there is a particular knack in applying this skill in the Services, it is basically the same skill that he exercises in civilian practice. The trained doctor, like the trained soldier, can be rapidly prepared for war service, and we suggested on March 22 (p. 375) that the whole of his term of national service should not necessarily be spent in the Armed Forces. The Forces may be hard put to it to employ usefully the 2000 or so men who qualify each year; on the other hand, there is great and growing need for medical men in the civilian and other official services, notably in the Colonies.

There is no reason why doctors, more than any other group, should be excused national service. There is, however, every reason, in the present scarcity, for employing them where they are most needed.

CAMBRIDGE APPOINTMENTS

THE appointments to the honorary staff of Addenbrooke's Hospital announced on March 28 mark a further step in the development of the Cambridge postgraduate school of medicine.[4] Prof. R. A. McCance (head of the department of experimental medicine), Prof. J. S. Mitchell (radiotherapeutics), and Prof. H. A. Harris (anatomy) become physicians to the hospital; Prof. H. R. Dean consulting physician; and the readers in the departments of bacteriology, medicine, and morbid histology assistant physicians. As an academic quid pro quo 17 members of the staff of the hospital have been recognised as lecturers of the university.

Lord MORAN has been re-elected president of the Royal College of Physicians of London.

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[6] *Ibid*, October, 1946, p. 214; see *Lancet*, 1946, ii, 833.
[7] *Lancet*, March 22, p. 386.

[1] British United Press report
[2] See *Lancet*, 1943, ii, 449.
[3] *Ibid*, p. 671.
[4] See *Ibid*, 1946, ii, 836.

exercise *test rose higher than those of class A.* Shortly afterwards clinical symptoms developed, either acutely or subacutely. These included a non-pitting œdema of the facial skin, especially of the eyelids, without any œdema of the legs; budding of the blood-vessels into the cornea with plexus formation; decreased vibration sense in the legs; and emotionally some loss of inhibitory control *with an exaggeration of psychotic symptoms.* There were wide individual differences in the time it *took for symptoms to develop and in their intensity.* Those who took a long time to develop symptoms on the whole had mild ones. In general the young withstood the deficiency best. Recovery was immediate when an additional 6 mg. of thiamine a day was given.

CERVICOBRACHIAL SYNDROMES

Prof. René Leriche lately remarked[1] *that there are* still a number of unclassified vasomotor syndromes in the arm. He describes, for instance, one of inadequate vasoconstriction marked by paræsthesiæ, redness, and swelling in the fingers, worse in warm weather, and immediately relieved by lying down. He regards this as similar to the condition sometimes seen in the legs after sympathectomy for hypertension, in which vasoconstrictor tone is lost so that the peripheral circulation *cannot adjust itself to changes of position. If this is* the explanation it is a little odd that stellate block should be the right treatment; but Leriche believes that this corrects any existing sympathetic imbalance and is not to be regarded as merely the antidote to vasoconstriction.

In the causation of the various syndromes of the erect position Leriche attaches some importance to compression of the neurovascular bundle in the gap between scalenus anterior and medius, and he suggests that the *significance of congenital anomalies of the lower cervical* transverse processes is possibly that they allow the insertion of scalenus medius to encroach further forward, thanks to its additional origin, so narrowing the gap still more. In costoclavicular compression Leriche holds the unorthodox view that the subclavius is partly responsible, and he advises section of this muscle, or crushing its nerve, in addition to a routine anterior scalenotomy. He does not mention partial resection of the first rib *for this condition, though others find it essential in severe* cases. His general conclusion, however, will be widely acceptable—one should not diagnose Raynaud's disease or acroparæsthesia until postural causes have been entirely excluded; and here the patient's history of his trouble provides the most valuable guide.

At a discussion on pain in the arm at the Royal Society of Medicine on Feb. 4 there was pretty general agreement that brachial neuritis is usually an ill-founded diagnosis *(though acute infective radiculitis is a genuine and* common entity), and that as a rule a mechanical factor can be found. Telford and Mottershead,[2] who have made a systematic investigation of the costoclavicular syndrome at operation, in the dissecting-room, and experimentally in normal students, do not believe that costoclavicular compression is as ubiquitous in these cases as some writers make out. Their observations have shown that forcible depression of the shoulder widens rather than narrows the costoclavicular interval, and they maintain that the disappearance of the radial pulse which often occurs with this movement has nothing to do with the clavicle but is due to squeezing of the axillary artery between the heads of the median nerve. *All surgeons may not agree with* these conclusions of Telford and Mottershead, but their combination of *anatomical investigation* with the experimental clinical approach is the right way to tackle this problem, which still possesses *undiscovered facets.* Two of their observations are certainly valid. The knifelike anterior edge of the scalenus medius is as capable of damaging the neurovascular bundle as is the anterior scalene. And there are a multiplicity of mechanical and postural factors to be considered, several often operating in the same case.

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1. Leriche, R. *Pr. méd.* 1946, 41, 569.
2. Telford, E. D., Mottershead, S. *Brit. med. J.* March 15, p. 325.

THIOUREA DERIVATIVE AS RAT POISON

SOME of the thiourea derivatives are highly toxic, and one has proved a useful rat poison. Richter[1] fou *that phenyl thiourea was as lethal as strychnine to r* though not very poisonous to man. Owing to its ta however, *it was not very acceptable to the rats as ba* so a search was instituted for a substitute. The fi choice fell on a derivative, alpha-naphthyl-thiourea, blue-grey powder, which clings easily to dry or surfaces, is very stable, and lasts some years witho deteriorating, air and light not affecting it. Its melti point of 184° C allows it to be used in hot places. It *practically insoluble in water. Rats seem unable* distinguish any difference between poisoned bait a that not poisoned, when both are laid together.

To be effective as a poison for rats, alpha-naphth thiourea (ANTU), which is recommended by the Minist of Food,[2] must be consumed in a large enough do (8 mg./kg. of body-weight). Repeated sublethal do *have no cumulative action; on the contrary, they* m produce some tolerance, which may last 30–40 day *The toxicity of* ANTU *is greater to small mamma than to large mammals, and greater to carnivores* th to herbivores. Among rats the toxicity is greatest *Rattus norvegicus* (the brown rat) and least to *R. alexa drinus,* whereas *R. rattus* (the black rat) occupies intermediate position. The toxicity to mice is about t same as to the brown rat. Domestic animals are equall *susceptible, but the effects are minimised* by vomitin (an action which rats are said to be unable to perform[3] *To poison man,* ANTU *would have to be* swallowed a large quantity: no case of poisoning has so far bee reported among makers or users in America, where fift tons have been distributed to 150,000 farms. Neve theless, precautions should be taken, such as colourin *bait containing* ANTU, *laying the bait in sites* inaccessib to children and pets, and washing the hands aft *handling the bait.*

ANTU acts only after ingestion. Contact with the sk is harmless, *but if it is sprinkled on the rats'* runs the can be poisoned by licking it off their paws. The poiso produces an intense pulmonary œdema, due to increase permeability of the capillary walls. McClosky and Smith have reported fatty degeneration of the liver of t "nutmeg" type. A characteristic sign of poisoning a lowered body-temperature. Like the other membe of the thiourea group, ANTU in repeated small dos interferes with the action of the thyroid hormone.

ACCIDENTS TO CHILDREN

VIOLENT deaths of children might be supposed to hav increased with the growth of motor transport; an indeed, from 1911 to 1944 there was a slight but stead rise in deaths from violence among those between t ages of 5 and 15. The overall picture, however, is not dark, for Dr. A. H. Gale[5] has lately published figur showing that the death-rate from all kinds of violenc per 100,000 living, has fallen from 130 in 1851–60 67 in 1940–44 in children under 5, from 54 to 35 in tho aged 5–10, and from 93 to 21 in those aged 10–15. Th numbers at-risk were about the same in the years chose He has analysed child deaths in 1870 under vario headings—such as deaths on railways, in mines, fro burns and scalds, drowning, and suffocation—and h compared them with deaths from similar causes in 194 *The change for the worse in traffic accidents is* ou standing, only 443 fatal accidents in children under

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1. Richter, C. P. *J. Amer. med. Ass.* 1945, 129, 937.
2. See *Lancet,* 1946, ii. 950.
3. Bayley Bustamente, G. *Prensa méd. argent.* 1946, 33, 2550.
4. McClosky, W. T., Smith, M. I. *Publ Hlth Rep., Wash.* 1945, 60, 110
5. *Mon. Bull. Min. Hlth, P.H.L.S.* Fe

These times are now past, and life is getting less difficult every day, and so is our work. Today nearly every hospital in Holland makes use of the blood-transfusion equipment of the Netherlands Red Cross. Each hospital is visited once a month by the vans of the Red Cross blood-transfusion service to supply them with sterile blood-transfusion sets and dried plasma.

It is very important always to use one standard apparatus, prepared under rigorous control in one and the same laboratory. This makes it possible to prevent nearly all pyrexial reactions after transfusion, which were formerly so common, and it enables us to collect all the transfusion records from the whole country for statistical analysis, a procedure of great value.

In spite of five years' isolation we can now claim that the blood-transfusion service in Holland is not inferior to those in other countries.

SERVICE PSYCHIATRY

In 1942 an expert committee was appointed by the Government to investigate and appraise the work of psychiatrists and psychologists in the Services, and to consider its application to other purposes. This committee was composed as follows:

Sir Wilson Jameson, chairman: Surgeon Vice-Admiral Sir Sheldon Dudley; Air Marshal Sir Harold Whittingham; Lieut.-General Sir Alexander Hood; Lord Moran; Prof. F. C. Bartlett; Prof. D. K. Henderson; Prof. Aubrey Lewis; Prof. A. W. Wolters.

In March, 1943, Sir Wilson Jameson resigned owing to pressure of other duties, and was succeeded in the chair by Sir Francis Fraser.

Their report,[1] dated Jan. 31, 1945, has now been published, and their main findings are summarised below.

WORK OF PSYCHOLOGISTS

The systematic study of the thought and behaviour of humans, the committee consider, can be applied practically to the handling of personnel in all phases of their Service careers, from recruitment through training to readiness for active operations: and this is increasingly recognised at all levels of Service organisation. Experience and tradition accumulated during the war should be preserved and applied in the Services during peace-time.

Psychologists have been mainly engaged in developing methods of personnel selection, so that officers and men could be put to appropriate tasks: in improving methods of training and of assessing proficiency: in assisting in design of weapons and equipment: in studying the psychological aspect of operational problems; and in developing statistical methods for dealing with their material. Much of this work has grown directly from studies made in the 1914–18 war, and from the work of the Industrial Health Research Board, which was first set up in 1918 under the Medical Research Council. Service psychologists have also joined with psychiatrists and experts in other fields to advise on interviewing technique and the use of questionaries, on the use of drugs and vitamins, on job analysis and conditions of work, and on fitness of personality in candidates for various Service duties.

In the Navy psychologists are assisted by technical and clerical staff. The technical staff, mostly W.R.N.S. of high capacity with previous experience as teachers or welfare officers, are trained for a fortnight in the giving of tests. A few male officers are also used, being trained specially in the technique of interviewing, and in the use of oral trade-tests. In the Army the auxiliary staff consists of personnel selection officers and sergeant testers. The officers have a month's training in job analysis, vocational selection, assessment of educational level and occupational experience, and in interviewing technique. Sergeant testers get two or three weeks' training in the nature and use of tests, and must be able to test and score. In the R.A.F. the auxiliary staff are W.A.A.F. clerks who have had four weeks' training and passed an examination.

Differences in the three Services make it impossible to develop the same type of psychological arrangements in each; the pattern must develop to suit the Service; but shortage of trained psychologists in all the Services prevented expansion at the time when the report was written. The committee feel that the universities might be used more fully for laboratory research into Service problems.

They note that, since on demobilisation Service men and women recover their civil rights, the disclosure of Service data about them must be very carefully considered, especially since findings applying to Service situations do not apply directly to employment in civil life.

They recommend that all officers during training should be instructed in the psychological aspects of their work; that psychologists should be represented on scientific and advisory committees and other bodies concerned with personnel; that the senior psychologists should form an inter-Service committee, to discuss developments and research; and that psychologists should be observers at operations or battle exercises. They also suggest directions in which psychological work might be extended, including selection of officers for special duties, design of syllabuses, assessment of proficiency in Service occupations, design of reports on training progress and operational efficiency, opinion surveys, and publicity in the fields of recruitment and hygiene.

WORK OF PSYCHIATRISTS

Service psychiatrists have worked mainly on prevention. They have helped to devise measures to avoid waste of time on the training of people likely to break down, and have studied ways of preventing breakdown and improving morale by placing people in appropriate jobs, with responsibility suited to their intelligence and temperament. Early recognition of symptoms and early treatment have made recovery possible for many patients, who were then allocated to suitable work in the Services or in civil life.

Service psychiatry is naturally based on civil psychiatry. Conscription brought into the Forces many unsuitable people: between a third and a half of all medical invalids, men and women alike, are discharged from the Services on psychiatric grounds—an incidence of 4–10 per 1000 of the average strength per annum. Between a quarter and a third of these have served less than a year. Those who break down in this way show a much higher concentration of ominous signs—such as poor occupational record—than those who do not break down.

In the Navy most psychiatrists now have experience of conditions at sea, and after several months of training begin serving as juniors under a senior Naval psychiatrist. Army psychiatrists, after four weeks' initial training during the war, were posted for four weeks to a field force unit. They were then apprenticed to an area psychiatrist, and their suitability for various types of military psychiatric work assessed. They have no responsibility for treatment or disposal until they have had at least three months' training in the special conditions obtaining in Army psychiatry. In the R.A.F. neuropsychiatric specialists are attached, on entry, to the Central Medical Establishment, for training, and are subsequently sent to a neuropsychiatric centre where they get practical experience under a Service specialist. While in training they spend a period of two or more weeks attached to a station from which squadrons are operating.

Since the aim of Service psychiatry is to make full use of human resources, it gives first place to preventive measures. The psychologist applies selection tests, designed to assess general ability and special skills and aptitudes; the psychiatrist assesses fitness of personality for Service duties; and experience has shown that the methods used give reliable results.

The committee recommends that psychiatrists and psychologists should continue their work of selection, classification, training, and maintenance of mental hygiene and morals; and that better methods should be developed for keeping out of the Forces those who are unsuitable. Better training of those responsible for referring candidates to psychiatrists is needed, while medical officers of units should have more instruction in the handling of psychiatric problems, and officers of units in the maintenance of morale. More psychiatrists than are at present available are needed in the Services, and arrangements should be made, the committee consider, to train suitable medical officers for the purpose. Senior psychiatrists, like senior psychologists, should have some common meeting-ground where they can discuss the procedures developed in each Service.

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[1] The Work of Psychologists and Psychiatrists in the Services. London: H. M. Stationery Office. Pp. 94. 2s.

Special Articles

DUTCH BLOOD-TRANSFUSION SERVICE DURING THE GERMAN OCCUPATION

J. SPAANDER
M.D. Amsterdam
From the Central Laboratories, Netherlands Red Cross, Amsterdam

IN 1939 the imminence of a European war made it necessary to extend the blood-transfusion donor panel in Holland and to prepare for an emergency transfusion service. During the Spanish civil war the treatment of severe casualties with stored blood had proved very promising, and experiments on the storage of blood were started with great enthusiasm in Holland.

In the university clinics of internal medicine at Amsterdam (director, Prof. J. G. G. Borst) an apparatus for blood-transfusion was devised which could be used for taking, storing, transporting, and giving blood aseptically. To gain experience, transfusions with stored blood were performed in five leading hospitals in Amsterdam. Many difficulties, especially in discovering the right kind of glass for the bottles, had to be overcome. However, when on May 10, 1940, the Germans launched their surprise attack and the Dutch Army went into action, 60,000 voluntary donors were ready, and stored whole blood could be sent to the field ambulances and surgical centres immediately.

It was obvious that under German occupation the military blood-transfusion service could not carry on. Yet it was clear to every true patriot in Holland that the forced surrender to the German Army was not the end of the fight. So we had to switch over to a civil transfusion service to prepare secretly for a possible fight for liberation later. The complete equipment of the blood-transfusion service was handed over to the Dutch hospitals through the Netherlands Red Cross. The bottles were prepared in the central laboratories of the Red Cross blood-transfusion service in Amsterdam and delivered to the hospitals. After use the apparatus had to be collected and brought back to the laboratories for sterilisation and refills. Thus many Dutch surgeons and physicians became familiar with blood-transfusion and aware of its advantages in the treatment of shock.

One of our major difficulties was the complete lack of foreign scientific papers, especially English and American. Sometimes, however, we got information, unnoticed by the German censor, through Switzerland and Sweden, and B.B.C. broadcasts told us of the splendid results achieved with dried plasma in the North African and Sicilian campaigns.

UNDERGROUND ACTIVITIES

In spite of strict German control we managed to build a hidden plasma-drying plant in the autumn of 1943. The difficulties in getting machines and materials were manifold. The separator for producing the plasma came from Sweden, together with some " confidential remarks." Several Dutch factories helped us by making the required equipment from raw materials intended by the Germans for their own use.

Thus we managed to prepare 6000 complete sets of dried plasma in 1944. They were divided among several hospitals in Holland, especially in centres where we expected bombing or fighting. In the battles of Nijmegen and Arnhem some hundreds of sets of dried plasma were at hand for resuscitation. The special ambulances of the blood-transfusion service drove as near to the front as possible to provide Dutch civilians and underground forces with plasma and blood-transfusion equipment. Only the day before the liberation of Breda and Hertogenbosch our cars arrived there with plasma and apparatus. During their trips our vans were exposed to machine-gun fire from fighters patrolling over the main roads, but the protection of the Dutch tricolour and the red-cross sign on top of the cars enabled us to continue our duties.

When in September, 1944, many men of the British airborne division from Arnhem were conveyed to Apeldoorn, we succeeded in passing the German sentries and gave the British soldiers the blood-transfusions they urgently needed. Yet some days afterwards the Gestapo intervened and swept aside our humanitarian work.

The Germans continually tried to involve us in their war effort. We became suspicious, with good reason, when they appealed to our generosity. Only when the donor was sure that his blood could not be given to a German was he willing to help. When it became known that blood was being sent to the British soldiers in Apeldoorn, in no time people queued outside the hospital ready to give their blood.

DURING THE LIBERATION

With the approach of the Allied Armies the difficulty in maintaining our services became more acute. In September, 1944, the northern part of our country became isolated from the southern part, and the hospitals in Brabant and Limburg had to rely on their own stock of blood-transfusion equipment.

The Germans stopped all traffic to break the railway strike, so it became extremely difficult to get our cars to the hospitals. In March and April, 1945, only the hospitals in the neighbourhood of Amsterdam could be provided with blood-transfusion sets, which were delivered by bicycle, the cars being requisitioned by the Germans.

Gas works and electricity works were obliged to close down because of shortage of coal. Again we appealed successfully to our friends the Dutch manufacturers. From their hidden stocks we fetched an electricity generator with a Diesel engine, while the German demolition squads were blowing up the cranes of the Amsterdam docks. From the same source we got oil and petrol, hidden in municipal dust-carts. In a German gas-filling station our cylinders were filled with coal gas by a reliable Dutch workman, the empty ones being added to the German cylinders. In this way we had enough gas at our disposal for the laboratory. We hastily erected a small boiler, which was run on coal from German war stores. Many difficulties, many risks had to be faced, but we managed to carry on.

Meanwhile starvation became more and more intense, and everyone tried to find a little more food than the 400 g. of bread and 1000 g. of potatoes allowed per week. Even in this respect we were able to help our employees, owing to the support of many friends of our service When in May, 1945, the first food-flying squadrons arrived at Schiphol and dropped their parcels the men of our laboratory helped to gather the food. They were allowed to eat from tins that had fallen to pieces. I shall always remember the look of satisfaction on their faces when they came back after a day's work !

AFTER THE LIBERATION

Very soon after the liberation we resumed our work on an almost normal scale. The cars, requisitioned by the Germans, were still in Amsterdam, and immediately after the German surrender we gathered the remnants together. After some weeks the cars were ready for use again, and on July 17, 1945, we were able as before to visit every hospital in Holland once a month.

In the meantime people in the southern part of the Netherlands had prepared themselves to give their blood for the starving population of western Holland. Every week hundreds of bottles of blood were prepared in the hospitals of Brabant and Limburg and sent to the central Red Cross laboratories in Amsterdam. From here the blood was distributed to the hospitals in Haarlem, the Hague, Rotterdam, &c.

In England Now

A Running Commentary by Peripatetic Correspondents

I ALWAYS admired men like Owen who from a chip of bone deduced the mighty moa; so when this "thank you" letter from the best-loved Englishman of all time fell into my hands I tried to reconstruct the mood in which he wrote it.

> Victory Dec. 28th 1803.
>
> MY DEAR MACAULY
>
> I have to return you many thanks for all your kindness for sending me milch goats or milch sheep but as they lose all their milk before they get to the Victory I beg that you will not give yourself the trouble and expence of sending me any more. *After the Battle* I may have an opportunity of thanking you in person for all your kindness and attention. My dear Macay Your much obliged
>
> NELSON AND BRONTE
>
> Alex. Macaulay Esq.

The three words in italics show the thought that was to remain aggressive and dominant in his mind for a score of months yet; but underneath this, underneath his habitual courtesy, I think I detect a certain irritability not to be wondered at in a man who left his ship only three times in 27 months and then on the King's business and for less than an hour each time.

The ship was watering off Maddalena and a light wind blew off sea, when suddenly the Admiral smelt a smell—a lusty, loathly smell. "Dammit, what's that?" Sniffing like a hound, he prowls round the busy ship and finds in the bowels thereof a miserable cluster of goats or sheep or both. "Who's supposed to be looking after these?" The wind increases and there is a threat of thunder in the voice. There is much running and scurrying and finally the amateur goatherds are fetched from their watering duties. "Are you supposed to be looking after these *animals*? Then why *don't you*? They stink." Quite a breeze is blowing now. "In any case what are they here for?" One of the chorus of sailors murmurs the word "milk." "Milk? Milk! I haven't seen any milk for six months. What d'you do with it? D'you drink it?" The chorus say the animals are dry when they come aboard. "Then what to purple Providence are we enduring this insanitary . . ."

Half a gale is blowing when an officer comes up. "Mr. Blank. Who is responsible for sending these fetid . . . ?" "A Mr. Macaulay, Sir, sent them as a gift to you, Sir." "O, that fellow! What's he think we are—a purple pound!" Breeze subsides as Admiral retires muttering, but springs up again for a moment when he turns back. "Mr. Blank. Did anyone write and thank Mr. Macaulay?" "No, I don't think so, Sir." "Good Heavens, the manners of the rising generation . . ." Cabin door slams, pen swivels into action. "Turn the ship into a purple pound—poor brutes—how the devil d'you spell Macaulay?"

But perhaps other Lancelots will construe differently.

* * *

"Would THE LANCET like to hear what goes on in your waiting-room?" asked M, an ex-Serviceman home from a sanatorium. "They might," I said, "Jot it down and we'll try it on them."

I always feel embarrassed when I open the surgery door, he wrote, because one momentarily takes the stage. The eyes seem to penetrate through one, and their owners seem to be asking, "What's wrong with him? Doesn't seem much." I must confess that, when I am one of the audience, I in turn become a scrutineer. I find the other occupants more interesting than the weeklies that lie on the table. Some sniff, some cough, some look at the floor deep in thought, others look straight ahead; some just sit and twiddle their thumbs; very few bring a book or even a paper to read. Some look very ill, others the picture of health. But you cannot judge a book by its cover, and the same may apply to patients. You can travel by train from one end of England to the other and never hear a word from your fellow passengers; not so in the waiting-room. Perhaps illness makes the whole world kin, but here we all seem anxious to explain our aches and pains to one another—maybe just as a preliminary canter before we appear before the doctor. Anyway a great deal of sympathy is expressed; whether genuine or not it is hard to say.

Last evening I sat between two middle-aged ladies, one of whom had a small boy with her. When the doctor called out "Come in" a comfortable shuffle went round the waiting-room, which seemed to say, "Now we won't be long." The first patient to go in was a girl. As soon as she had disappeared the lady on my right leaned across me and whispered to the lady on my left that the girl was going to have her first baby. How she had found this out I do not know. Lady no. 2 replied in a voice for all to hear, "Blimey! Wait till she is like me and 'ad nine of 'em, and reared the lot, four in the Army now." And her whole body shook with merriment. She looked round the waiting-room as if for approval. None was forthcoming, so she turned to her neighbour again, asking, "What's wrong with you, dear?" Some lip talk followed that I sensed rather than heard. I felt my face getting redder, but luckily the doctor called for the next patient. Two people got up at once, an old man and a young woman. "It's my turn next," said the old man. "It certainly isn't!" exclaimed the young woman. All eyes were on the actors. How was it going to end? The old man, though keeping up the argument, was craftily advancing bit by bit nearer the doctor's open door. A sharp "Come in" from the doctor gave the old man his chance. He was through the door like a two-year-old, leaving the young lady standing.

My two companions were soon at it again. Now it was number one's turn to ask "What's wrong with you, dearie?" "Nothing wrong with me," said no. 2, "I've brought Alfie along. He was climbing over some railings and slipped and cut 'is arm. As if I 'adn't enough trouble. Take yer coat off Alfie, and let the lady look at yer arm." Alfie proceeded to do so. He had a couple of pieces of sheet tied round the wound, and his mother began to unwrap them, but no. 1 stopped her. She didn't want to see any gory sights: she would faint if she looked at it. So Alfie was told to put his coat on again and not make such a noise, or how could the doctor listen to people's chests?

"'e's a proper little devil." (Alfie's mother again.) "I blame the pictures and wireless for a lot of it. The other day a letter come for my eldest girl from 'er sweetheart. (She's getting married shortly.) I put it on the mantelshelf until she got 'ome from work. After 'is nibs here had gone to school I 'appens to glance up at the mantelshelf and to me 'orror the letter'd *disappeared*. I was in a rare old stew, thinking at that very moment he'd be showing the letter to 'is mates. You know how courting couples write to one another? When 'e *come* back from school I 'ad 'im by the ear before he got in the gate. 'Did you take your sister's letter off the mantelshelf?' I asks 'im. 'Let go me ear an' I'll tell yer,' he says. I lets go and he tells me he'd put it under the staircarpet for a bit of fun. Said William on the wireless does them sort of tricks, and never gets biffed. The little monkey. I don't let 'im listen in to 'Just William' any more."

"Next please," called out the doctor, and Alfie and his mother departed. They were so long that some of the patients began to mutter "How much longer is he going to be?" "I've been here half an hour already." (We are all a bit impatient these days.) At last they came out, Alfie looking every bit the hero. "'ad his arm dressed without a tear," his mother was quick to tell us, and with a cheery "Good night all" she passed out into the night.

* * *

Is it true that dogs can't distinguish one colour from another, and therefore live in a neutral-tinted world? And how would you prove it?

At a recent meeting of our family, Colin (8) proposed that the dog should be asked to gaze into a small box where coloured counters could be suddenly substituted for one another. (Me: And how would you know whether the dog noticed the change? Colin: You'd see whether its eyes moved.) Margaret and I, following Pavlov, thought the dog might be trained to distinguish between (*a*) pieces of meat, and (*b*) pieces of 'Plasticine' looking like meat but of a different colour. (Colin: The dog would smell the meat. Me: We'd wait till the dog had a cold.) But the winning answer came from Robin (7)—"Get inside the dog and look out."

Reconstruction

PILLARS OF HEALTH

FROM A CORRESPONDENT

THE Government promise an indefinite period of hardship before our standard of living can be secured. During this period we must distinguish between luxuries and necessities.

Under the National Insurance Act the State has provided comprehensive protection against many of the economic hazards of life—sickness, unemployment, and the infirmity of age. It has taken an important step towards removing the reproach that children are the principal cause of poverty. These are measures of the utmost value in preventive medicine, and it would be tragic if any campaign for retrenchment were to whittle down any of the benefits of this class.

PROMOTION OF HEALTH

By providing security, National Insurance indirectly befriends health. It provides conditions favourable for healthy living even in adversity. Housing, too, is a long-term insurance policy for health, and in the present shortage we cannot afford to forgo one item in its programme. Comfort in the home has a higher health value than tobacco, alcohol, and gambling, although tobacco and alcohol might possibly stake a claim as adjuncts to preventive medicine in an anxious and disordered world. The key to comfort is warmth and the means to warmth is fuel. Children derive no benefit from tobacco, alcohol, and gambling, but warmth is for them a necessity.

There is no absolute shortage of fuel; we can get it if we are prepared to sacrifice other things that we need less. The tragedy of the situation lies in the fact that we waste most of the fuel we have, by inefficient heating appliances and our failure to conserve heat by proper insulation of our dwellings and our heating systems. Comfort should be placed in the forefront of our struggle for health, and the Government ought to take steps before next winter to insist on good insulation and efficient heating appliances, and to give a high priority to domestic fuel at the expense of non-essential industry. Home keeping is an essential national industry, and hot water and space-heating are vital to the health of the family, especially at the extremes of life.

The first condition of health is security, and the second is warmth. We have been cold too long.

The next essential for health is food in sufficient quantity and of good quality. In this respect we have been fortunate during the war years. Paradoxically enough, we shall be faced with a greater risk of subnutrition when food becomes more plentiful, because the unwise and the ignorant will be free to reject nutritious foods and to fill their bellies with windy substitutes. Here the Education Act of 1944 may be our safeguard. The Provision of Milk and Meals Regulations, 1945, establish a school meals service in which "every dinner shall be adequate in quantity and quality so as to be suitable as the main meal of the day for the pupil, shall be well prepared and cooked, and shall be served decently and in good condition."

For the crown of these legislative achievements one naturally turns to the National Health Service Act, to find what it does for the promotion of health. The result is disappointing. The word *health* is used many times, but in most places it seems to be thought synonymous with the prevention or treatment of sickness. A special feature of the plan is the establishment of "health centres"; but if the Government intends that these shall do no more than offer space and facilities for general practice, health promotion will be neglected and we shall have a sickness service. Comfortable words in statutes and statements about the family doctor being "health adviser to the families under his care" do not make a health service. A doctor does not become a teacher by light of nature; he has to learn teaching method.

Nevertheless a well-conceived nation-wide plan for healing the sick can do much to prevent illness and to restore the sick to working capacity. A programme of immunisation against certain common infections will no doubt become part of the service; the study and practice of physical medicine must surely lead to more effective treatment of the chronic rheumatic conditions which make so many lives a misery; and the adoption of mental illness, tuberculosis of the lung, and other deprived children of medicine into the family of general clinical practice should go far to heal the breach between prevention and treatment. If the axe falls, these services ought to be shielded from the blow, and the livelihood of those who take part in them must be secured.

WHAT IS NEEDED

The four pillars of a health service—towards which the Government and people should bend all their efforts in the interests of economy in man-power and money—are:

1. Family security, as provided in our schemes for National Insurance.
2. Housing, to provide space, warmth, and comfort for family life.
3. Food, adequate in quantity and quality.
4. The establishment of real health centres offering scope for promoting the health of families through educational and social activities.

Medicine and the Law

An Admission of Negligence

THE case of Baldwin *v.* Lord and others, decided at Manchester assizes last month, is a happily unusual example of the sort of accidents which can occur in hospitals and elsewhere and which afterwards seem inexplicable. A patient was admitted to the Oldham Royal Infirmary in 1945 in order that a piece of bone from his leg might be grafted into his right wrist. The operation was duly performed, but somehow it happened that the tourniquet, which should have been removed from the leg before the patient left the operating-theatre, was allowed to remain for eleven hours. Blood-transfusion was tried, but the plaintiff collapsed and died. His widow gave evidence at the trial that the deceased had complained of great pain and had tried to get up in order to take the bandage off his leg. A nurse, it was suggested, had omitted to take notice of the complaint.

The widow sued the managers of the infirmary and the two surgeons concerned in the operation. The defendants admitted liability; it was indeed a perfect instance of such a prima-facie case of negligence as would put upon the defendants the onus of proving that they were not at fault. The claim came into court, therefore, merely as a dispute on the amount of damages. Mr. Justice Singleton awarded £4000 with costs to the widow. The deceased had two daughters, aged 14 and 8; out of the total sum awarded, the judge allocated £450 to the former and £600 to the latter.

"... The need for education in nutrition has been steadily gaining recognition. The popular education of war-time has but made more obvious the general lack. Now the demand is for education in schools, in youth welfare centres and in adult education classes, but the question is not always asked: Who is to teach? ... It might be expected that the nursing and medical professions would be able to help, but the teaching of nurses depends on the education of the medical profession and, of medical schools, only a few provide systematic instruction in nutrition."—*Nutr. Abstr. Rev.* Jan. 1947, p. 497.

case in which there might be indications for ligation is much better treated with heparin, which acts just as quickly and effectively but does not involve destruction of a large and valuable blood-vessel.

Prophylactic heparin treatment is employed only in very exceptional cases. The present trend is all towards very early diagnosis followed by intensive heparinisation.

General Hospital, Mariestad, Sweden. GUNNAR BAUER.

STEVENS-JOHNSON SYNDROME

SIR,—We were interested in the articles of Dr. Nellen and of Dr. Murray in your issue of March 15, and in your annotation of March 22, for we have had under our care a female patient suffering from this syndrome.

A woman, aged 30, was admitted to this hospital as an emergency on Jan. 3, 1946. For some days she had felt rather ill, having some vulval irritation, and 3 days before admission a rash had appeared on both hands and feet; on admission this rash was papular on the dorsal aspects of the extremities, the eyelids were inflamed, and there was some vaginal discharge. She had anorexia, a sore throat, and scalding on micturition, but no other symptoms, and no enlargement of lymphatic glands or other abnormal physical signs.

During the next few days the rash spread over the whole body, becoming vesicular, with some bullæ several inches in diameter. The rash involved the eyelids, mouth, gums, and vulva, and there was well-marked œdema of these parts; severe conjunctivitis also developed.

Temperature fluctuated between 99° F and 102° F, settling around 99° F on Jan. 8 and becoming normal 3 days later. The pulse fluctuated between 90 and 120 per min., becoming normal on Jan. 14.

Blister fluid was sterile, and throat swabs negative for Vincent's organisms, diphtheria bacilli, and hæmolytic streptococci; the only other significant finding was a mild polymorphonuclear leucocytosis (86% of 10,800 white cells per c.mm.). Treatment with sulphamezathine, and systemic and local penicillin did not seem to affect the condition materially.

The lesions crusted and disappeared by Jan. 17, leaving no mark; and there was no residual corneal involvement.

A diagnosis of erythema multiforme bullosum was reached on Jan. 7; but it is of interest that the house-physician sent for one of us saying he had admitted a case of smallpox.

The special interest in this case lies in the fact that the patient was female and was 5½ months pregnant on admission. The disease did not influence her pregnancy, for she gave birth to a healthy daughter on April 13, 1946, and both are very well at the time of writing.

The David Lewis Northern Hospital, Liverpool.

R. D. HOTSTON
H. S. PEMBERTON.

ANKYLOSING SPONDYLITIS AND FLUOROSIS

SIR,—Dr. A. M. G. Campbell, in his interesting review of 25 cases of ankylosing spondylitis (March 29), makes no mention of fluorosis, though your own pages have contained at least three articles on the subject in the last thirteen months.

I was entirely ignorant of the condition until I met Dr. T. Ockerse in Pretoria early last year and heard of his original work[1] in associating stippled teeth and ankylosing spondylitis with the water-supply in 805 endemic areas in the Union of South Africa. Your leading article last year (1946, ii, 835) said that "in at least one or two areas in England where dental fluorosis occurs, osteochondral changes in the vertebræ have been discovered" and Lyth's paper (1946, i. 233) showed clearly how this happens in certain parts of China. Ockerse states that chronic endemic dental fluorosis occurs in "practically every country in the world" and illustrates its association with "bamboo spine" by clinical photographs.

Ankylosing spondylitis is so disabling and distressing a condition that it would be a great step forward if something better than mere symptomatic treatment could be found. Its possible association with fluorosis in this country does suggest an opportunity for useful research, and perhaps the young orthopædic surgeon is the man likely to see most examples of the disease. The general aspect of the subject was surveyed by Murray and Wilson in your issue of Dec. 7, 1946, and they gave a bibliography which should be a useful starting-point for any orthopædic investigator.

London, W.1. ERIC I. LLOYD.

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[1] Ockerse, T. D.M.D. Thesis, Government Printer, Pretoria, 1944.

MARRIAGE GUIDANCE

SIR,—Dr. E. F. Griffith's interesting article of Feb. 1 shows that getting married is a serious undertaking concerning which a large number of considerations ought to be taken into account, eugenic, physical, and psychological.

One question of much social significance arises from his article. I would like Dr. Griffith to tell us whether he believes that love, as ordinarily understood, is a proper basis for successful marriage. A great deal, of course, has been written on the theme, much of it, however, in my opinion, vitiated by sentimentality.

Wilde makes a character in one of his plays remark that being in love is really no excuse for getting married. Freud, in the course of his researches, many years ago described love as an abnormal state of mind—an excellent starting point for a serious discussion of the subject.

London, W.1. FREDERICK DILLON.

COMPRESSION OF MEDIAN NERVE IN CARPAL TUNNEL

SIR,—I fear Dr. Russell Brain (March 29) has misread my letter (March 22): I advocated immobilisation primarily as a diagnostic measure. In ulnar neuritis due to friction at the elbow the diagnosis is usually relatively certain, and I quite agree that early operation is indicated.

In conditions such as the costoclavicular syndrome and compression of the median nerve at the wrist the diagnosis is often much less certain. Under these circumstances improvement following immobilisation provides valuable confirmatory evidence of local pressure on the nerve.

In some cases immobilisation appears to give permanent relief; if symptoms recur, then the nerve should be explored and, with the reasonable certainty that there is local pressure, exploration should be thorough.

Liverpool. R. ROAF.

DOCTORS' SALARIES

SIR,—The Misses Gorst and Corbishley (March 29) find that £2 10s. a week is sufficient on which to feed two persons. In so far as the necessities of life are concerned they are extravagant. Common hospitality, however, has to be taken into consideration; and if the doctor of the future is going to take no part in intelligent discussion and social intercourse during his leisure hours, then the standard of British medical practice, which is already in jeopardy, is doomed to fall.

I should also like to point out that an assessment of the doctor's salary at ten times that of the average worker reflects a sad lack of arithmetical ability.

ANOTHER CHIEF ASSISTANT'S WIFE.

SIR,—How curious the confusion of faith revealed by your young lady communicants beneath this heading! Working-class solidarity prompts them not only to degrade their professional aspiration to that of the artisan but to shake their minatory fingers at me because I do not choose to do likewise. "How *dare* he spend so much!"

I have no doubt that it is possible to live, after a fashion, and in canteens, upon the sum with which one of them nourishes her husband and herself; I merely do not regard it either as praiseworthy or desirable. And the strange thing is that if they were the wives of miners or of lorry-drivers neither would they. They would be screaming and fighting for higher wages, less work, more privileges, nylon stockings, and turkey.

The fact is of course they are attuned to their age as I am not; and, when and if these young persons qualify to practise our profession, the Government they doubtless helped to elect will be gladdened, perhaps, by two new embryo Summerskills shrilly denouncing, *ex capella*, the

Letters to the Editor

SOCIAL PATHOLOGY

SIR,—The excellence of the first two-thirds of your leader of March 29 made the defects of the last paragraph conspicuous. Such an admirable appreciation of the theory of social pathology deserved a better discussion of its practice.

Apparently there is still lacking a proper understanding of the individual's relationship to society. If he were in society in the sense in which he may be in the bus or the train which carries him to his daily work, the reasoning of your last paragraph might be sounder. But in addition to being in society he is *of* society, and it is a dangerous fallacy to assume that we need merely study the health of the individual "against a wider background." What society does to the individual and what the individual does and is in society are inseparable, so that social medicine requires not only social pathology but social physiology, social diagnostics, and social therapeutics, each of which will deal not only with the health and sickness of the individual as a member of society but with the health and sickness of society itself. It seems clear that the physician whose starting-point is the old conception of disease as a clinical entity in a biological individual has a long road to travel and much to unlearn before he is a true practitioner of social medicine. Professor Crew, who suggests the inclusion of the anatomy, physiology, and pathology of society in the very beginning of the medical curriculum, offers not only a realistic method but a shrewd commentary on medicine in the past.

There are, of course, "elder statesmen" of public health who see social medicine as something bounded by the limits of the routine which they have long practised. But there are clinicians who decry social medicine as a dangerous new fad and others who see it as a "racket" which it may be expedient to capture. If your feeling that social medicine cannot grow out of "traditional public health" is based upon knowledge of the former, I would but suggest that there are panes of glass in both rows of houses! The importance of the public-health service in the establishment of social medicine lies in the fact that it is already a part of social physiology and social therapeutics; it may not be the whole of social medicine, but it has a larger social-medicine content than any other branch of medical activity.

Most disturbing of all the implications of your last paragraph is the suggestion that public-health officers would turn social medicine into "a science of herd management," a suggestion which must be based upon ignorance of present tendencies in public health. I have had exceptional opportunities of contact with, at any rate, the middle and younger generations of my public-health colleagues, and I have been forcibly impressed by the extent to which "human medicine" guides and is practised in public-health work. It is quite true that we make use of group techniques, for social groups are society's organs; but we are fully aware of the individual in the group, just as we are aware of the group which contains the individual.

I have suggested elsewhere that the essential feature of social medicine is that it contains a philosophy of health—a "social discipline" complementary to the "academic discipline" which Professor Ryle has found in it. Let us select our social physicians in accordance not with whence they come but with where they are going. The acceptance of the right philosophy of health is, clearly, the fundamental qualification. If that is present, the reformed clinician and the enlightened public-health officer can be coequal partners in social medicine—so long as they have the integrity to realise and admit that neither of them holds the whole in his own two hands.

JOHN D. KERSHAW.

Public Health Department, Colchester.

SIR,—In King's College Medical School, Newcastle-upon-Tyne, the Nuffield department of industrial health is already attempting to practise many of the precepts so ably preached in your leading article of March 29. Its laboratories are within the medical school, and its beds, through the generosity of the two physicians concerned, are contained within the clinics of the professor of medicine and the senior honorary physician. It is to be hoped, however, that the interest of social pathology will not turn away too quickly from what you describe as "the old concern . . . with the mechanical environment of man." There is still a great field for study here along the lines of war-time personnel research, for much of preventive industrial medicine, especially the study of fatigue and accidents, is a mixture of applied physiology and engineering; and nowhere, indeed, is this more obvious than in the medieval conditions found in coal-mining.

This department itself studies individual patients, and moreover has sat down not only alongside physicians but (almost literally) alongside those much tougher nuts—surgeons. For in Newcastle the doors of the rooms of the professors of surgery and industrial health face each other across a narrow passage, and a plan has already been drawn up for the joint study of a condition usually considered to be purely surgical.

On the staff of the department is a lady almoner who brings to the bedside information both about the domestic lives the patients lead and the places where they lead them; and at the bedside, too, this is welded on to the equivalent knowledge of where the patient works, which is gathered if necessary by a factory visit. This material is set out in one specially designed note folder, thus enabling the department to abide by the terms of reference which it has set itself—namely, to study and to teach the triple and reciprocal relation between health, job, and social state. Moreover, the close connexion between these three is maintained in the ward, in the outpatient department, and in teaching, which takes the form of an informal discussion, usually of a single case, between a clinical member of the department, the lady almoner, and not more than eight students. Here the whole emphasis is placed upon the patient's history, and the ætiology and management of his or her condition. As part of the course in general medicine, every Newcastle medical student attends eight of these discussions and a few—but very few—lectures.

Field studies and statistical techniques are important research procedures, but they have little place either at the bedside or in the alteration of the emphasis in the future doctor's training. This very necessary reorientation will surely come about much more commonly, in the future as in the past, by a new inspiration which will arise from within hospital practice. This will then help social and industrial medicine to serve both the individual patient and student in some way like the experimental method outlined above.

Our department, begotten by war-time experience out of hospital medicine, and staffed by a team whose ages range from 35 to 21 years, has indeed followed Professor Ryle's lead; but at the same time it is attempting to develop an approach to medicine which will fit the needs of an industrial society such as that of the North East of England.

R. C. BROWNE.

Medical School, King's College,
Newcastle-upon-Tyne.

POSTOPERATIVE PULMONARY EMBOLISM

SIR,—While agreeing in general with your leading article of March 22, I should like to refer to one problem, the solution of which does not seem to you to be satisfactorily settled. What should be done when very early thrombosis has been revealed by pain on palpation of calf muscles or hyperextension of the foot?

My own experience, gained by observation of 300 cases of proven thrombosis and backed by exactly similar results from several other Swedish clinics, tends to show that these cases are very effectively treated with heparin in rather large doses for 4–5 days. After that time all symptoms of thrombosis have usually subsided and the patient may be allowed out of bed. In no single case have we seen an extension of the thrombotic process after heparinisation was started. Even in more advanced cases in which, in addition to the process in the calf veins, there was a long and freely waving thrombus in the femoral vein, no harm arose from the use of heparin. We have never seen such a clot break off and form an embolus once proper heparin therapy was instituted.

Accordingly, the American practice of vein ligation is not at all favoured in Sweden. In fact it is felt that every work for local health authorities—i.e., immunisation and vaccination—the proceeds will not count towards pension, nor will they earn him an independent pension from the local authority. This refusal to reckon in *all* remuneration from every branch of the national service suggests a complete misunderstanding of the general practitioner's worth and work, and is apparently decided upon only to facilitate the work of accountants along familiar lines.

The fact that the Ministry refuses to recognise that there is any shadow of impropriety in treating general practitioners in this manner is of particularly ill omen and assuredly threatens the smooth operation of the new service. The Medical Practitioners Union is not represented upon the Negotiating Committee, nor does it usually see eye to eye with the British Medical Association, but it certainly looks as if it may be forced to urge upon its members an attitude not very different from that of the latter body, although for different reasons. No-one wants to see doctors on strike; but if we general practitioners are to be deliberately treated as of less account than administrative officials in Whitehall and elsewhere, and if even reasonable representations are to be turned down as those above mentioned have been, then the strike is bound to come and the very best that can be hoped for is an unhappy and therefore inefficient service.

GORDON WARD

Sevenoaks. Vice-President, Medical Practitioners Union.

OVERSEAS APPLICATIONS FOR APPOINTMENTS

SIR,—My *Lancet* comes direct, without forwarding either in the United Kingdom or in India. The issue of Jan. 18 arrived on March 1. In the advertisement columns of that issue are listed 172 appointments for which a last date of application is stated. The distribution of these dates is interesting:

"Immediately," "at once," "forthwith" or "as soon as possible"	45
Between Jan. 20 and Jan. 31	61
" Feb. 1 and Feb. 10	39
" Feb. 11 and Feb. 20	12
" Feb. 21 and Feb. 28	6
" March 1 and March 10	5
" March 11 and March 20	2
" March 21 and March 31	2
	172

Thus only 4 of these 172 advertisements could have been answered in time by doctors serving in India.

I did not wish to apply for any of these posts, and can therefore write without personal bitterness. But so long as these remain typical figures I hope you will not allow it to be suggested in your pages that doctors serving in the Forces overseas are given a fair opportunity to apply for jobs.

India. MAJOR, R.A.M.C.

ASCORBIC-ACID METABOLISM OF BANTU SOLDIERS

SIR,—I have read the paper by Professor Kekwick, Dr. Wright, and Dr. Raper (March 29) with some interest since just ten years ago R. E. Bernstein and I produced "a study of the vitamin-C nutrition of healthy Europeans, Bantu mine recruits, and subscorbutic Bantu subjects" in the *South African Journal of Medical Science* (1937, 2, 37). Our conclusions were substantially the same, as the following summary indicates.

1. On a vitamin-C-restricted diet the hourly and daily excretion of vitamin C by Europeans, who ordinarily took large amounts of the vitamin, was much higher than that of healthy Bantu mine recruits.
2. On giving test doses of ascorbic acid the Europeans studied showed an immediately accelerated excretion, and within the following 24 hours eliminated the greater proportion of the added vitamin; the Bantus gave no such response as their tissues retained the added vitamin. This indicated that the Bantu was far less saturated than the European.
3. The highest degree of unsaturation was found in subscorbutic subjects, judging both from their daily excretion and from their response to added vitamin C.
4. The bodily store could be saturated in the healthy Bantu by addition of vitamin C in large amounts to his diet.
5. It was concluded that the difference between the bodily saturation of European and Bantu and the greater liability of the latter to scorbutic conditions depends on difference in dietary intake of vitamin C and not to any physiological peculiarity in the Bantu.

Our investigation was less extensive than that of Professor Kekwick and his colleagues, for in those days it was difficult and expensive to get ascorbic acid in South Africa. We noted, however, in general conformity with their results, that one apparently healthy Bantu mineworker required nearly 3 g. of ascorbic acid to increase his excretion to a level comparable to that of Europeans.

Department of Human Anatomy, Oxford. J. S. WEINER.

SERVICE MEDICINE

SIR,—In his letter of April 5 "R.A.F. Medical Officer" states that a Service medical officer should be an officer first and a doctor second. Fortunately, he implies that this is necessary only in preventive medicine. I repeat, fortunately, for if this dogma is adhered to in treatment the result is deplorable. It leads to such abuses as the patient having to "parade" sick irrespective of his condition; the patient lying "to attention" in bed whilst the C.O. of the hospital does his round; and to attempts to over-rule clinical decisions by superior rank. Such things happened but very rarely in the war-time medical service of the R.A.F., but they are the results of medical officers being officers first and doctors second. If he is not to betray the Hippocratic oath a medical officer must always be a doctor first and an officer second; and in my experience the personnel were best handled by those who followed this principle.

EX-R.A.F.V.R. MEDICAL OFFICER.

THE CURRICULUM

SIR,—I hasten to congratulate Professor Zuckerman and his colleagues in the University of Birmingham for having adopted so boldly a scheme for the reintegration of anatomy and physiology (March 29, p. 395). It is a policy which we in this university favour strongly, though for the time being we are testing it, not in the whole preclinical curriculum, but in one or two of its sections—i.e., special senses and neurology. We shall watch with interest the Birmingham scheme in the hope that we also shall be able to adopt one on similar lines.

It is perhaps worth recalling that the principle involved finds favour with the General Medical Council and is expressed in the latest recommendations as to professional education by the phrase ". . . throughout the period of preclinical studies every effort should be made to secure close correlation between Anatomy and Physiology."

Two points of criticism of the Birmingham scheme come to my mind; and doubtless these will be met if, in the light of experience, they prove to be well founded. The load of dissection allotted to the first term appears to be very heavy, coming as it does at a time when students are introduced to a new subject involving a complicated and difficult terminology; and one would have thought in general that they are more fitted to undertake a more intensive burden of dissection at a somewhat later stage of the curriculum, possibly in the second or third terms. This excessive load probably arises from what would be my second criticism, that to a course of the type envisaged six terms rather than five should have been allotted. The additional term would permit a more leisured approach to the highly important subjects of anatomy and physiology, and would provide more time for greater development of lectures and lecture demonstrations in the coördinating series.

Apart from these minor criticisms I feel sure that medical educationists throughout the country will await with interest further news of the results of the Birmingham scheme.

Medical School, King's College,
Newcastle-upon-Tyne. R. B. GREEN.

During March the Voluntary Hospitals Emergency Bed Service, which is run by a joint committee of the King Edward's Hospital Fund and the Voluntary Hospitals Committee, dealt with 1541 cases on behalf of doctors and hospitals. This is an increase of 90% over March, 1946, and decadent frivolity of Camembert before the proletarian virtues of rat-trap.

When the Spanish Republicans seized the pretty ladies on the beach at St. Sebastian, and forced them, clad in dungarees, to clean out the military stables, they admirably symbolised their ugly and envious pretensions. And your correspondents, formidable in their voluntary dungarees, may expect to find me, a little hungry (but that, at all events, *malgré moi*), warmed in the last rays of the long Edwardian afternoon, firmly upon the opposite side of the barricades.

CHIEF ASSISTANT.

TOXICITY OF THIAMINE

SIR,—In your annotation of Feb. 8 (p. 223), you have misquoted our findings regarding the anaphylactic nature of thiamine toxicity in rabbits. We have definitely stated[1] that anaphylaxis played no part in the toxicity of intravenous thiamine in rabbits. However, the rest of your discussion should be widely circulated among the medical profession to call their attention to the fact that thiamine can cause fatalities in high doses (50–100 mg.). Further, these toxic manifestations of the drug can occur regardless of the site of injection but are more often seen after rapid intravenous injections. *The physician should remember that doses of 50–100 mg.* of thiamine by injection are not utilised to any great extent and are rapidly excreted by the body. Also such injections call into play the pharmacological properties of the drug and not its vitamin properties.

T. J. HALEY.

E. S. Miller Laboratories Inc., Los Angeles, U.S.A.

SOURCE OF THE RED CELLS

SIR,—In connexion with your leading article of March 29, which mentioned my preliminary note,[2] I should like to emphasise again that, although the changes described are very conspicuous in a traumatised muscle they may also be readily demonstrated in *normal* (uninjured) active muscles.

The controversy whether erythropoiesis is intravascular or extravascular is by no means settled, as can be seen from even the brief discussion of the question in Whitby and Britton's textbook,[3] where, by the way, the conclusion is just opposite to that in your article. Besides, the "erythrogenic" capillaries of Doan are regarded by a number of workers[4, 5] as tissue spaces between the fat cells of the marrow. Quite recently Schleicher[6] found that "the prevalent view that erythrogenic capillaries exist in the bone-marrow of man . . . could not be verified."

Sterile morphological controversy still flourishes, as far as the problem of the normoblast nucleus is concerned. You express agreement with Fieschi and Astaldi,[7] whose findings in bone-marrow cultures did not contribute anything basically new to this particular problem. On the other hand Leitner[8] advocates karyolysis, although the work of Fieschi and Astaldi (at least its greater part) is known to him. La Cour[9] suggests that the nucleus disappears owing to loss of its staining properties. Another group of workers[10, 11] describe erythrocytes budding off from "mitroid erythroblasts." It is remarkable that only the last group are able to substantiate their views with photomicrographs, although the process is admittedly observed in certain conditions only, and seems to represent a rather vestigial phenomenon.

In his comprehensive review of the subject of bone-marrow cultures Bloom[12] tersely observes: "Tissue cultures of this tissue have been very disappointing from the hæmatological point of view, for the cells of the marrow do not continue to form granulocytes and red blood cells."

Department of Anatomy,
University of Birmingham.

S. H. WAJDA.

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ESTIMATION OF PENICILLIN IN SERUM

SIR,—I was interested to read the paper by Sir Alexander Fleming and Dr. Smith (March 29, p. 401) in which they describe their micro-method of estimating penicillin in blood-serum, based on the one published by J. Fielding in the *British Medical Journal* of Jan. 25. Since Fielding's paper appeared we have been using as our culture medium 1% glucose in peptone water with Andrade's indicator; serum was omitted. For simplicity and consistent results in penicillin assays and sensitivity tests this appears to be the best thing we have come across yet.

We use a simple modification of the micro-technique for assays. The doubling dilutions of the serum, starting at 1 : 2, are prepared as usual on paraffin slides and inoculated with the Oxford staphylococcus. These are introduced into sterile Dreyer's tubes with a Pasteur pipette. A total of four drops for each dilution is used—two drops of serum and two drops of glucose peptone water and the indicator. Each tube is sealed with a pellet of 'Plasticine,' placed in a Dreyer's rack, and incubated overnight. The results compare favourably with the macro-technique and the end-point is much more easily read than with the capillary-tube technique

Birmingham United Hospital.

M. J. PIVAWER.

THE G.P.'s PENSION

SIR,—Since no word comes out of the secret conclaves of the Negotiating Committee, and none is to be expected until some cry of triumph or excuse for defeat announces the shape of things to come, it seems well that doctors should be enlightened as to one at least of the rods in pickle for them. I refer to the question of pensions for general practitioners. It has long been a claim of the Medical Practitioners Union that pensions should be given, but we certainly did not expect that they would be so arranged as to give the administrative branches *better chances and higher pensions* than general practitioners. It is not surprising that draft regulations should contain clauses which threaten to produce unforeseen hardships, but I will deal now with something much worse—i.e., with regulations which responsible officials of the Ministry refuse to modify in spite of obvious hardships, *with regulations whose ill results must therefore be deemed to have the Minister's approval.*

The general intention of the draft regulations on superannuation is to impose upon the new service those Civil Service rules which have been in operation for many years and, on the whole, satisfactorily. One of these rules ordains that the "remuneration" upon which pensions are to be based shall be average remuneration over the last three years of service. These years are, of course, in the case of an administrative officer, the three years in which his earnings have been highest. This rule would not be fair in the case of general practitioners because their later years are often less prosperous than those of middle life, and it is right that it should be varied. The variation proposed (and, indeed, insisted upon) is that the remuneration of general practitioners shall be based upon the average of all their years of service, and this is obviously unfair to them. The suggestion that they *also should be entitled* to take the average of their three best consecutive years has been utterly rejected.

Again, it is to be noted that the administrative officer, entering the service at the age of 18, and beginning to contribute towards his pension at once, can get in 47 years before the retiring age of 65. His pension is thus potentially larger than any the general practitioner can hope for—i.e., the average of his best three years multiplied by 47, *in place of the average* of all years (good and bad alike) multiplied by 40 or less. Yet the administrative officer brings nothing to the service except his *schooling, no special* degree or qualification; he works much shorter hours; and he takes virtually no responsibility—certainly not the responsibility for life or death, happiness or misery, which is the daily burden of the general practitioner.

Finally, it is to be noted *that, for pension purposes,* the general practitioner may reckon only the receipts from State general practice—i.e., from his *capitation fees,* less a deduction for expenses. Although the Act provides that he must have opportunity for doing certain first six months every medical conscript should serve the rest of his time under conditions that would provide the necessary experience to enable him to fill a civilian post in his profession efficiently on his release.—Mr. NOEL-BAKER replied: I understand that doctors have at least six months' work in hospital after they are qualified and before they are called up for the R.A.F. Many of them are then posted to stations, some of which, no doubt, are isolated; but it is in the stations that most of the medical work of the R.A.F. is done. All general hospitals in the R.A.F., however, organise regular clinical meetings, to which medical officers of surrounding stations are invited. In this way most of our doctors can improve their knowledge if they feel that their ordinary work does not give them experience enough.

Mrs. GOULD: Is the Minister aware that a number of these medical officers have been posted to isolated stations for over a year, where they have not yet had half an hour's work a day to do, and in some cases have never had the opportunity of performing any sort of clinical work which could not have been done by a child of ten?—Mr. NOEL-BAKER: If my hon. friend will give me particulars of special cases I will see if there is anything I can do.

Incidence of Venereal Disease Among Troops

Replying to a question, Mr. F. J. BELLENGER stated that the number of cases of venereal disease reported and treated amongst British troops in the United Kingdom during 1946 was 3·3%.

Public Health

Rising Birth-rate in England and Wales

IN the last three months of 1946 the birth-rate in England and Wales, 20·5 per 1000, was the highest of any December quarter since 1921; the rate for the same quarter in 1945 was 15·3. The Registrar-General, who gives these figures,[1] also reports a death-rate in the quarter of 11·3 per 1000, compared with 11·4 for the same quarter of 1945. The infant-mortality rate was 44 per 1000 related live births—7 below the average rate for the fourth quarter of the ten preceding years.

For the whole year the birth-rate was 19·1 per 1000, the highest since 1923. The approximate reproduction-rate for the year—1·102—exceeds by 10% that required to maintain the population; this is the first time since 1922 that the rate has reached replacement level. Infant mortality, 43 per 1000, was the lowest ever recorded in this country, being 2 per 1000 below that in 1944, the previous lowest.

Smallpox

During the week ended April 5 smallpox has been diagnosed at Scunthorpe, Lincs, and Doncaster, Yorks, in circumstances suggesting association with the recent outbreak at Grimsby. At Bilston, Staffs, the importation of smallpox from India is suspected. At Stepney one secondary case infected in Mile End Hospital was sent to hospital on March 21, since which there have been no further notifications.

At Scunthorpe an unvaccinated platelayer, aged 35 years, living in a common lodging-house, developed a rash on March 22 and was removed to an infectious diseases hospital on the 25th diagnosed as chickenpox. On April 1 laboratory examination suggested smallpox which was confirmed clinically next day, when the man was removed to Laceby Smallpox Hospital. Contacts not recently vaccinated are numerous, and secondary cases are already due to appear; one has been removed on suspicion. Two men who absconded from Grimsby while under surveillance as contacts stayed at the lodging-house at Scunthorpe at a material time. A few crusts were found on one and have been sent for laboratory examination. It is not improbable that other unidentified and itinerant contacts have moved on to other common lodging-houses, so special vigilance should be exercised.

At Doncaster an assistant master at a preparatory school, vaccinated 13 years previously, developed a rash on March 27 and was removed to Doncaster Smallpox Hospital on the 31st. Modified smallpox has been confirmed. Fortunately this patient is believed to have been confined to his residence from the date of appearance of rash and is unlikely to have infected his pupils, who must, nevertheless, be under surveillance. The source of infection is unknown; but a link with Grimsby, through another absconding contact there, is suspected.

At Bilston the infection seems to have been imported by a soldier. This man, vaccinated in infancy, in 1944, and in 1946, left Agra on Feb. 17 for Karachi by train and thence travelled by air via Cairo and Marseilles to Heath Row, where he arrived on the 22nd. He reached Bilston on the 23rd. He developed fever on March 2 and a few spots on March 5. Subsequently, his mother, vaccinated in infancy, became ill on March 19 and developed a rash on the 23rd. Another unvaccinated contact sickened on March 23 and developed a rash on the 25th. Initially chickenpox was diagnosed, but variola virus has been cultured and there is now strong suspicion of smallpox. The rashes, reported to be superficial and centripetal, have given rise to considerable difficulty in diagnosis.

Infectious Disease in England and Wales

WEEK ENDED MARCH 29

Notifications.—Smallpox, 1; scarlet fever, 1317; whooping-cough, 2263; diphtheria, 254; paratyphoid, 3; typhoid, 5; measles (excluding rubella), 10,780; pneumonia (primary or influenzal), 1025; cerebrospinal fever, 115; poliomyelitis, 7; polioencephalitis, 0; encephalitis lethargica, 1; dysentery, 85; puerperal pyrexia, 141; ophthalmia neonatorum, 83. No case of cholera, plague, or typhus was notified during the week.

Deaths.—In 126 great towns there were no deaths from enteric fever, 1 (0) from scarlet fever, 3 (1) from diphtheria, 21 (1) from measles, 25 (2) from whooping-cough, 74 (10) from diarrhœa and enteritis under two years, and 38 (3) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 286 (corresponding to a rate of 26 per thousand total births), including 38 in London.

Obituary

ROBERT GEORGE BANNERMAN

M.D. EDIN.

DR. R. G. Bannerman, who died on March 26, was born in Edinburgh in 1891 and educated at George Watson's College and the University of Edinburgh. He graduated in arts in 1910 and in medicine with first-class honours four years later. As a student he had a distinguished career, winning Vans Dunlop scholarships in 1911 and 1912 and serving as president of the Royal Medical Society of Edinburgh. For a time he was assistant to the professor of pathology in Edinburgh and during the 1914–18 war he served as a captain in the R.A.M.C. On demobilisation he was appointed assistant pathologist to the Royal Sussex County Hospital at Brighton. Later, while holding a grant from the Medical Research Council, as assistant M.O. at the English Sanatorium at Montaña and at the Children's Hospital, Alton, he studied the biological action of light. He also held appointments as pathologist at the Royal Northern Infirmary, Inverness, the Miller General Hospital, Greenwich, and the Paddington Green Children's Hospital. His published work included papers on the fate of tubercle bacilli in human plasma and on the clinical significance of blood platelets. In 1939 he rejoined the R.A.M.C. and was for a time attached to an anti-aircraft brigade near Bristol. In 1940 he returned to his laboratory, and a colleague with whom he worked in the early years of the war writes: "R. G. B. was a shy man who eschewed publicity and ambition—yet he could look back on a busy life in which he had made a substantial contribution to the science of pathology, notably in hæmatology. With those who were afflicted he had a gentle touch and warm sympathy. A cultured man with an appreciation and understanding of literature and music, he was also an effective teller of stories of his student days in Edinburgh."

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[1] Registrar-General's Return of Births, Deaths, and Marriages for the December Quarter, 1946. H.M. Stationery Office. 6d

Parliament

ON THE FLOOR OF THE HOUSE

THE House adjourned on April 3 for the Easter recess, which will give Ministers and M.P.'s a chance of sitting back and taking stock of *the shape of things to come*—and things already past.

During the spring and summer the country must build up a reserve of 10 million tons of coal, to add to the existing reserve of 5 million, for the essential margin of safety is 15 million tons. It is going to be a tight squeeze, and the domestic consumer will be asked to make a substantial contribution by voluntary saving. But the Government, despite some opposition, have announced that they are ready to buy coal from abroad if it can be provided from some source that will not upset our friends in Europe.

Shortages are general in Europe, and indeed in most parts of the world which have been in the war. Our own, although it is unpleasant *to face the facts*, have been smaller than those of many countries both among victors and vanquished. Food continues to be short in many countries, but still no major world epidemic has shown itself, *though tuberculosis in* some countries has reached high figures. Does the absence of a world epidemic indicate a higher general level of food-supply than in the period 1918–21, or is it due to better distribution of food, or to more efficient medical services in the world as a whole? The answer is important in view of the Budget, for on taxation depend prices and subsidies and hence to some extent the general level of nutrition.

The Budget will be opened on April 15, the day the House meets after the recess. Will the Chancellor be able to reduce the general level of income-tax, or to raise the limit of exempt income, or to exempt any part of overtime earnings from tax? And shall we be able to maintain food subsidies at the rate of £400 million a year?

Another way to economise would be by reducing the strength of the Armed Forces. The Government have fixed a figure for the run-down to March, 1948. The T.U.C. ask that this level shall be reached by Dec. 31, 1947. *And it is probable that this is the kind of limit in which economies may be possible.* Otherwise, in this period of change from war to peace organisation, while we are trying to make the United Nations the foundation of a long and perhaps permanent peace, drastic cuts in military expenditure will not be possible. And so long as this period of uncertainty lasts so long will our military commitments and all our shortages and those of other nations continue.

The shortages do not, however, extend to plans for world rehabilitation. The F.A.O. mission for Greece have published a report which, if applied, would put Greece on her feet and make her self-supporting. Yet the plan would cost only 100 million dollars, or about a quarter of the proposed American loan to Greece, which would be largely spent on military expenses. And if Greece with its unsteady economy can be put on its own feet so can any part of Europe. More will be heard of the F.A.O. proposals, but they were published in Washington and are not yet available here. A speed-up in this respect would be of great advantage.

MEDICUS, M.P.

FROM THE PRESS GALLERY

The Age of the Call-up

In moving the second reading of the National Service Bill in the Commons on March 31 Mr. G. A. Isaacs, Minister of Labour and National Service, *said that the age* of calling-up was to be between 18 and 26. The usual call-up age would be 18, but the extra age-limit had been put in to allow the Ministry to make deferments. There was a provision *to allow young men who applied to be* called up from the age of 17½. This provision had been made to enable young men going up to a university, or to some other training course, to come out of the Forces a little earlier to start their university or other scholastic careers. There was also a variation for doctors and dentists. In normal circumstances doctors and dentists would be called up round about the age of 25; but there would be many who were taking specialist courses; and when a man asked for an extension his call-up might *be postponed up to the age of 29.* That had been done to meet the needs of the professions, so that men would get their additional training. The arrangement was also of advantage to the Services, because they would have within their ranks men with higher qualifications to assist in the professional work of the doctors and dentists in the Forces.

After two days debate an amendment for rejection, moved by Mr. RHYS DAVIES from the Labour benches, was negatived by 386 votes to 85, and the Bill was then read a second time. The Government are now considering reduction *of the period of service from 18 months to 12*

QUESTION TIME

Regional Hospital Boards

Mr. W. M. F. VANE asked the Minister of Health whether he was satisfied that the five days given for the consideration, in his department, of the representations which he had invited to his draft proposals for regional hospital boards in December, 1946, was sufficient; whether he was aware that no acknowledgment was received by Westmorland county council to their criticisms of his proposals until five weeks after the publication of S.R. and O. no. 2168; and whether he would ensure that such treatment of responsible local authorities by his department was not repeated in future.—Mr. JOHN EDWARDS replied: The Minister reviewed personally all comments received. The resulting order was published, with notices in the press, on the day it was laid. This seemed a reasonable way of indicating the decision to all who had commented. No discourtesy was intended by the absence of separate replies to all by letter.

Care of the Aged

Mr. GEORGE THOMAS asked the Minister whether provision would be made under his new health scheme for special hostels to cater for old-age pensioners who were bedridden.—Mr. EDWARDS replied: The care of all the aged who are sick will be a matter for the new health service. The care of those who need care but are not sick will be dealt with in further legislation.

Recruitment of Nurses

Mr. PETER FREEMAN asked the Minister how many extra nurses had been obtained this year as a result of his recent appeal; whether the present position was satisfactory; and what further steps were contemplated.—Mr. EDWARDS replied: Over 1000 persons, including 600 qualified nurses, assistant nurses, and midwives, have taken up employment in hospitals as a result of the recent appeal for part-time staff in London. Many more are needed, and recruitment measures are being continued and extended.

Doctors in the R.A.F.

Mr. SOMERVILLE HASTINGS asked the Secretary of State for Air what peace-time conditions in the R.A.F. made necessary a 30% increase in the medical personnel over war-time strength.—Mr. PHILIP NOEL-BAKER replied: Since the end of the war the R.A.F. has taken over some hospital work from the Army; it now depends largely on short-term medical officers, who must start by sharing their work with *an experienced man; the numbers on each station* have decreased, but medical officers are still required. Nevertheless, as I said last week, I share the anxieties expressed, and I propose to consider the matter again. Mr. HASTINGS: Is the Minister convinced that the conditions which he has described warrant such a heavy increase as 30% over war-time strength?—Mr. NOEL-BAKER: I think that they more than explain the increase. Whether we ought to have made a greater effort to reduce below the level which we have now reached is exactly the question which I am going to reconsider with other Service Ministers. Mr. L. D. GAMMANS: Is it true that there is a 30% increase as compared with war-time?—Mr. NOEL-BAKER: Yes, sir. The rate was 2·29 per 1000 in May, 1945, and it is now 3·03. The Army have gone down a little and the Navy have gone up a little. All are substantially above the agreed rate.

"Medical Conscripts"

Mrs. AYRTON GOULD asked the Minister if he was aware that young medical officers, who were called up as soon as they were qualified, were *posted to isolated camps* where they could get practically no clinical experience and there was little work of any kind for them to do; that often they remained in these posts for a year or more; and if he would see that after the

Notes and News

BUREAU OF INTERNATIONAL MEDICAL CONGRESSES

At a preparatory conference, held in Paris in March under the auspices of Unesco, 13 representatives of international congresses and associations in medical science, together with a representative of the interim commission of the World Health Organisation and a representative of the World Medical Association, arranged for the summoning of a conference in October to create the permanent Bureau of International Medical Congresses. The bureau is to coördinate the international congresses of medical science, and to serve as a channel for material aid from Unesco to them. It is also hoped to establish an International Council of Medical Science to advise Unesco on questions referred to it by the Economic and Social Council.

The following directives laid down by the general conference of Unesco on scientific activities may be taken as basis for the work of the bureau:

To assist scientific work of international significance by grants-in-aid and the sending of scientific and technical assistance by means of personnel on missions to national institutions. Amongst the kinds of assistance given would be support of type-culture collections (bacteria, algæ, fungi, genetic mutants) with a view to the preparation of a world catalogue of the strains maintained.

To investigate the improvement of the circulation of scientific literature.

To facilitate the travel of scientists across national boundaries.

To keep the people of all countries informed as to the bearing of scientific discoveries on international problems.

To investigate the possibilities of setting up new international scientific laboratories and observatories.

To investigate the feasibility of smaller projects, such as the creation of international stockrooms for pure substances not commercially available—e.g., radioactive isotopes and pure-line strains of laboratory animals.

The following delegates to the preparatory conference will serve on the committee organising the conference: Dr. Cavaillon, Professor Maisin, Dr. Martínez Báez, Prof. E. Bezançon, Prof. A. Gigon, and Dr. Léopold Mayer. Dr. Kenneth Soddy (National Council for Mental Hygiene) will also serve on the committee.

A JOURNAL ON CARE OF CHILDREN

The Council of Associated Children's Homes have published a new quarterly review, *Child Care*, which promises to be useful to those interested in the welfare of homeless children. The council represent Dr. Barnado's Homes, the Catholic Child Welfare Council, the Church of England Children's Society, the National Children's Home, the Jewish Board of Guardians, and other similar societies. One of the council's chief aims is to foster training schemes for child-care workers, and they have, since the publication of the interim report of the Curtis Committee (on the subject of such training), founded a new training college at Sutton Coldfield. The new journal, under the editorship of the Rev. John W. Waterhouse, vice-principal of the National Children's Home, contains an article by Miss Myra Curtis setting out the main aspects of home life which are important to the child—personal affection, stability, opportunity, and the sense of belonging to a small friendly group of people—and which those given the task of caring for homeless children must seek to replace. The journal, which is well arranged and produced, should make it easy for the great and small voluntary agencies engaged in this important work to share ideas and study old and new aspects of their task in the light of both inside and outside opinion.

GIFTS TO HOSPITALS

As a result of the amendments made in the House of Lords the provisions in the National Health Service Act governing hospital endowments differ considerably from those set out in the Bill. The Hospitals Association has now published a memorandum[1] explaining how donors can ensure that the hospital of their choice may retain their gifts under the new service. In the will or deed of gift, the memorandum points out, it must be made clear that the gift is to be treated as a capital fund separate from the general funds of the hospital. But should a donor wish to help a hospital with its maintenance charges during the interim period the income of such a gift may be used for this purpose until the appointed day. After that date the hospital management committee would be free to use the whole fund, both capital and income, for purposes other than general maintenance connected with their group of hospitals, including the hospital indicated by the donor. Suggested forms of words for use in making gifts, which have been prepared by Chancery counsel, are included in the memorandum.

HOSPITAL LIBRARIANS

The Library Association have introduced a specialist certificate for hospital librarians in their final examination. The syllabus for the certificate is divided into two parts—the first dealing with the patients and the hospital and the second with the librarian and his equipment for the work.

At a course of lectures given to prepare candidates for this new qualification the lecturers included Dr. O. W. Roberts, medical superintendent of Dulwich Hospital, Mrs. Mackenzie, lecturer to the Royal College of Nursing, Mrs. Paget Cooke, who is in charge of the library at St. Bartholomew's Hospital, Captain J. E. Stone, consultant on finance to King Edward's Hospital Fund, and Mrs. Askwith, who is in charge of the patients' library at the Middlesex Hospital. Members of the course also visited Guy's Hospital and the Middlesex Hospital to see the conditions of the work.

PNEUMATIC BONE-SAW

The new pneumatic bone-saw produced by Desoutter Bros. Ltd. is not a reversion to the rather cumbersome pneumatic tools of the twenties but a product of the factory bench. It is very light and easy to handle; it has a pistol grip, and the speed is controllable from zero to 2500 r.p.m. by a trigger control resembling the throttle of a motor-car. The cost, £15 10*s*., is low for such an instrument, and the construction is simple. The saw has to be sterilised by hot air, and it works from compressed-air cylinders with a reducing valve. Trials in all kinds of bone surgery confirm that it is a very good tool indeed.

University of Oxford

An election of two members of the board of the faculty of medicine will be held on June 3.

The electorate consists of all Oxford graduates in medicine who are members of convocation. Nominations will be received up to 10 A.M. on Wednesday, May 14, by the secretary of faculties, University Registry, Oxford, from whom further particulars may be had.

University of London

Dr. Alfred Schweitzer has been appointed reader in experimental physiology at University College, and Dr. J. R. Gilmour reader in morbid anatomy at the London Hospital medical college. Both will take up their appointments on Oct. 1.

Dr. Schweitzer graduated in medicine at Cologne in 1932 and took his PH.D. Lond. in 1940. Since 1943 he has been lecturer in physiology at the University of Leeds. While working in the department of physiology at the Middlesex Hospital in 1941 he published, jointly with Buttle and Kekwick, an experimental evaluation of blood substitutes in the treatment of hæmorrhage. He obtained his D.SC. Lond. last week.

Dr. Gilmour, who qualified in 1931 from the London Hospital, took his M.R.C.P. in 1933 and two years later was awarded a scholarship of the Grocers' Company. In 1936 he was appointed junior assistant director of the Bernhard Baron Institute at the London Hospital. His published work includes papers on the anatomy of the parathyroid gland, intranuclear inclusion in the genital tract, and erythroblastosis fœtalis.

University of Manchester

Dr. C. S. D. Don has been appointed lecturer in medicine and Mr. D. S. Poole Wilson lecturer in urological surgery. The department of industrial health will in future be described as the Nuffield department of occupational health, and the following have been appointed lecturers in the subject: Mr. Thomas Bedford, D.SC., Dr. S. B. Davis, and Dr. Alice Peters.

Royal College of Physicians of London

On Tuesday and Thursday, April 15 and 17, at 5 P.M., Dr. J. Purdon Martin will deliver the Lumleian lectures at the college, Pall Mall East, S.W.1. He is to speak on Consciousness and its Disturbances considered from the Neurological Aspect.

Royal College of Surgeons of England

On Wednesday, April 16, at 3.30 P.M., Dr. James Craigie, F.R.S., will deliver an Imperial Cancer Research Fund lecture at the college. He will speak on Relationships of Virus and Host Cell with reference to Latent and Cryptic Infections.

Applications are invited for election to the office of Hunterian professor, Arris and Gale lecturer, Arnott demonstrator, and Erasmus Wilson demonstrator for the ensuing year. Applications must be made in proper form by April 28, and particulars may be had from the assistant secretary.

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[1] Obtainable from the British Hospitals Association, 52, Green Street, London, W.1., price 3*d*.

HAROLD MUIR EVANS

M.D. LOND., F.R.C.S.

Dr. H. M. Evans, who died at his home at Beccles in Suffolk on March 28, was a doctor whom practice among the fishermen of Lowestoft had led to the study of marine biology, and his work on the physiology of venomous fish won him recognition within and without medicine. He read papers before the Royal Society; University College elected him to their fellowship; and the Royal College of Surgeons under a special by-law to theirs.

Born at Richmond, Surrey, in 1866, he was educated at Bute House, University College Hospital, London, and the University of Berlin. In 1889 he took the Conjoint qualification and the following year his M.B. After serving for two years as medical officer for the Cape Government Railways on the Bloemfontein Vaal River extension he returned to London to become registrar at the Central London Throat and Ear Hospital, and in 1893 he took his M.D. He then settled in practice at Lowestoft, and joined the staff of the Lowestoft and East Suffolk Hospital as surgeon; during the 1914–18 war he served as surgeon specialist in casualty-clearing stations with the rank of major. His pleasantly written books, which even at their most technical retained a tang of the sea, included a *Short History of the Thames Estuary*, *Brain and Body of Fish*, and in 1943 *Sling-fish and Seafarer*.

Dr. Evans married in 1896 Miss Violet Reid, of Hanworth, and they had two sons and a daughter.

Mr. ARTHUR W. DOWN, founder of Down Bros. Ltd., the surgical instrument makers, died at Croydon on April 2, in his 95th year. He entered the surgical instrument industry in 1866, and was actively interested in the control of his firm from its foundation in 1879 until the last few days of his life.

Births, Marriages, and Deaths

BIRTHS

ALEXANDER.—On March 27, in London, the wife of Dr. Alfred B. Alexander—a son.

BROWNE.—On April 5, in London, the wife of Mr. Denis Browne, F.R.C.S.—a son.

CLYDE.—On April 1, at Surbiton, the wife of Dr. J. O. Clyde—a son.

DALE-BUSSELL.—On March 27, at Newmarket, the wife of Dr. A. P. Dale-Bussell—a son.

FOSTER-SMITH.—On April 6, at Westcliff-on-Sea, the wife of Dr. G. C. Foster-Smith—a son.

HALL.—On March 27, at Eastbourne, the wife of Surgeon Lieutenant Derek Hall, R.N.V.R.—a son.

MCSWEENEY.—On March 30, at Hove, the wife of Dr. M. P. McSweeney—a son.

MARSHALL.—On March 29, at Sutton, the wife of Dr. J. K. Marshall—a daughter.

MORRISON.—On March 27, at Isle of Sheppey, the wife of Dr. J. Neill Morrison—a son.

PATON.—On March 26, in London, the wife of Dr. Ian Paton—a son.

RICHARDS.—On April 4, at Cardiff, the wife of Mr. R. D. Richards, F.R.C.S.—a son.

STEVENS.—On March 26, at Maidenhead, the wife of Lieut.-Colonel C. P. Stevens, M.B.E., R.A.M.C.—a daughter.

SWEET.—On March 5, at Glasgow, the wife of Dr. H. S. Sweet—a son.

TAYLOR.—On April 3, the wife of Dr. A. W. O. Taylor, of Edinburgh—a daughter.

THURSTON.—On April 2, at Oxford, the wife of Dr. J. G. Thurston—a son.

WALTER.—On March 29, at Windsor, the wife of Dr. K. H. Walter—a daughter.

MARRIAGES

EDWARDS—WILLIAMS.—On March 27, at Sutton, Surrey, Errol M. Edwards, M.R.C.S., captain R.A.M.C., to Hetty Williams.

DEATHS

BANNERMAN.—On March 26, in London, Robert George Bannerman, M.D. Edin.

CUMMING.—On April 3, in Malta, Charles Chevin Cumming, C.B., M.B. Glasg., colonel, late R.A.M.C., aged 72.

EVANS.—On March 28, at Beccles, Suffolk, Harold Muir Evans, M.D. Lond., F.R.C.S., aged 80.

FLOYER.—On April 4, at Eastbourne, William Wadham Floyer, M.B. Lond., aged 86

GOURLAY.—On April 5, at Carrbridge, Inverness-shire, Charles Aikman Gourlay, D.S.O., M.D. Glasg., F.R.F.P.S., D.P.H., D.T.M. & H., I.M.S., retd.

NEWLAND.—On March 28, at Cheltenham, Broderick Edward Middleton Newland, L.R.C.P.E., lieut.-colonel I.M.S., retd.

PARSONS.—On March 29, Allan Chilcott Parsons, M.R.C.S., D.P.H., aged 74.

REILLY.—On March 27, Percy George Reilly, M.R.C.S.

Diary of the Week

APRIL 13 TO 19

Monday, 14th

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
5 P.M. Mr. L. R. Broster: Surgery of the Suprarenal Gland.
6.15 P.M. Dr. W. W. Mushin: Signs of Anæsthesia.
ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5 P.M. *Odontology.* Dr. P. O. Pederson: Dental Investigation of the Greenland Eskimos.
MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1
8.30 P.M. Mr. Douglas MacLeod: Endometriosis.
WESTMINSTER HOSPITAL, Horseferry Road, S.W.1
5 P.M. (Meyerstein lecture theatre.) Clinico-pathological demonstration of two cases of hypertension: (1) periarteritis nodosa; (2) tumour of adrenal.

Tuesday, 15th

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.1
5 P.M. Dr. J. Purdon Martin: Consciousness and its Disturbances. (First Lumleian lecture.)
ROYAL COLLEGE OF SURGEONS
6.15 P.M. Dr. C. Langton Hewer: Physiology of Anæsthesia.
ROYAL SOCIETY OF MEDICINE
9.30 A.M. *Neurology with the Société de Neurologie de Paris.* Sir Hugh Cairns, Dr. Honor Smith, Dr. C. Worster-Drought, Dr. W. D. Nicol: Penicillin in Neurology.
5.30 P.M. General meeting of fellows.
8.5 P.M. *Pathology.* Dr. J. E. McCartney: Impressions of American Laboratories.
CHELSEA CLINICAL SOCIETY
7 P.M. (South Kensington Hotel, 41, Queen's Gate Terrace, S.W.7.) Mr. Duncan Fitzwilliams: Sir Thomas More and Utopia.
SOCIETY FOR THE STUDY OF ADDICTION
4 P.M. (11, Chandos Street, W.1.) Dr. W. R. Bett, Dr. H. Crichton-Miller, Dr. Denis Hill, Dr. H. Pullar-Strecker, Dr. H. J. Shorvon, Dr. J. Yerbury Dent, Prof. R. C. Browne, Dr. G. R. A. de M. Rudolf: The Uses of Amphetamine.
EUGENICS SOCIETY
5.30 P.M. (Burlington House, Piccadilly, W.1.) Dr. Linford Rees: The Physical Constitution in Mental Illness.
INSTITUTION OF MINING AND METALLURGY
5 P.M. (Royal Institution, Albemarle Street, W.1.) Major-General A. J. Orenstein: History and Prevention of Tuberculosis. (Julius Wernher lecture.)

Wednesday, 16th

ROYAL COLLEGE OF SURGEONS
3.30 P.M. Dr. James Craigie, F.R.S.: Relationships of Virus and Host-cell.
5 P.M. Prof. R. V. Bradlaw: Tumours of the Jaws.
6.15 P.M. Dr. E. A. Pask: Anoxia.
CONFERENCE ON SILICOSIS
10.30 A.M. (at the Royal Institution). Silicosis, Pneumoconiosis and Dust Suppression in Mines. (Opening session.)

Thursday, 17th

ROYAL COLLEGE OF PHYSICIANS
5 P.M. Dr. J. Purdon Martin: Consciousness and its Disturbances. (Last Lumleian lecture.)
ROYAL COLLEGE OF SURGEONS
5 P.M. Prof. B. W. Windeyer: Radiotherapy in the Treatment of Cancer.
6.15 P.M. Dr. T. C. Gray: Curare.
ROYAL SOCIETY OF MEDICINE
9.30 A.M. *Neurology with the Société de Neurologie de Paris.* Prof. T. Alajouanine, Dr. Clovis Vincent: Cerebral Œdema.
BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck Street, W.1
8 P.M. Prof. R. Sievert: Dangers and Protection in Radiological Work. (Silvanus Thompson lecture.)
UNIVERSITY OF EDINBURGH
5 P.M. (Physiology classroom.) Dr. Douglas Guthrie: The Historical Foundation of Medicine.

Friday, 18th

ROYAL COLLEGE OF SURGEONS
6.15 P.M. Dr. John Gillies: Anæsthesia in Neurosurgery.
WEST LONDON MEDICO-CHIRURGICAL SOCIETY
7.15 P.M. (South Kensington Hotel, 41, Queen's Gate Terrace, S.W.7.) Dr. William Sargant, Mr. Harvey Jackson, Dr. Spencer Paterson: Physical Treatment in Psychiatry.
FACULTY OF RADIOLOGISTS
2.30 P.M. *Therapy.* (Royal College of Surgeons.) Dr. L. M. Shorvon, Dr. W. M. Court Brown, Dr. Frank Ellis: Constitutional Effects of Radiation.
HEBERDEN SOCIETY
5 P.M. (11, Chandos Street, W.1.) Dr. Graham Weddell: The Structure of Striate Muscle in Relation to its Function.

Saturday, 19th

TUBERCULOSIS ASSOCIATION
11 A.M. (King George V Sanatorium, Godalming.) Demonstrations.
2 P.M. Dr. James Watt, Mr. J. E. H. Roberts, Dr. W. E. D. Moore: Complications following Adhesion Section.
3.45 P.M. Miss M. Sheehan: Employment of Tuberculous Staff.

Dr. H. A. Krebs, whose name appeared in the list of new fellows of the Royal Society (*Lancet*, March 29, p. 410), is professor of biochemistry in the University of Sheffield (not Leeds) and honorary biochemist to the Royal Sheffield Infirmary and Hospital.

RECOVERY FROM STARVATION

R. O. MURRAY
M.B.E., M.B. Camb.
LATE LIEUT.-COLONEL R.A.M.C.

DURING the final stages of the war in Europe Allied troops overran many concentration camps and liberated a vast number of prisoners suffering from starvation, which had caused the death of many others before relief arrived. Among the survivors disease was rampant, typhus and tuberculosis being extremely common, and famine diarrhœa almost universal.

Sandbostel concentration camp, which was captured on April 29, 1945, contained over 8000 male political prisoners, mostly Russians and Poles, but representing also many other nationalities and almost every occupation. While most had been of the unskilled labouring type, there were several of high intelligence and great experience. Nearly all were young to middle-aged adults, but a few adolescent boys and elderly men were included. They had been in captivity from six months to six years.

The camp was appallingly overcrowded, about 850 men occupying huts intended for 120. There was virtually no sanitation, and the universal diarrhœa soon caused fouling of the entire area. The daily rations were reported to have consisted of 140 g. of bread, extremely coarse and of poor quality, two half-litre bowls of soup, and a small amount of margarine. The value of this diet is estimated at not more than 500 calories. There was no fair system of distribution, and the greatest share was often obtained by those with the greatest strength.

After liberation about 2000 were considered to be fit to proceed directly to a displaced persons' camp after cleansing and without admission to a medical unit. The remainder were placed under medical care as rapidly as possible. The receiving medical units, expanded to the utmost and provided with all available assistance, soon became grossly overcrowded. To relieve them a convalescent camp was opened on May 12. It is on observations carried out at this camp that this paper is based.

In the circumstances only the barest medical investigations could be carried out, but records were kept of the body-weight of each patient on admission and on discharge, and of the amount of food consumed, with a view to their subsequent correlation. It was hoped that these would provide some information about the speed of recovery and the optimum constitution and amount of the diet to be given to patients recovering from advanced starvation.

Starvation has been investigated in the past both experimentally and in famines, but very few inquiries have been made into the process of recovery in the human adult, and those that have been made deal with individual cases in professional fasters or laboratory workers.

Lipscomb (1945), working at Belsen, used for this purpose three graduated diets for different stages during the process of recovery from starvation. The first had a low value of 800 calories, with a large milk content; the second 1700 calories; and the third 3000 calories.

Leyton (1946), who investigated the effects of slow starvation while himself a prisoner-of-war, considers that the prognosis for recovery from starvation is excellent, provided that no concomitant organic disease is present, and notes that Russians under his care ate everything available without any ill effects.

ADMINISTRATION OF THE CONVALESCENT CAMP

From the first it was appreciated that the patients would require both physical and psychological care. However, such large numbers were involved, because the order to accommodate up to 1000 had been received, that individual care, except in the case of the sick, had to give way to the production of the best possible conditions for the majority. It was made clear to the patients that the camp was under military discipline, even though this was reduced to a minimum. Since all patients were typhus contacts, it was decided to confine them to camp during the period of convalescence.

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On arrival the patients were dusted with D.D.T., informed of the method by which the camp was operated, and allotted, by nationalities, to huts, where each man was provided with stretcher, pillow, and blankets and issued with toilet essentials. Next day they were medically examined and weighed. This was periodically repeated until they were finally weighed and re-examined on the day before discharge.

It was arranged with the dispatching medical units that all patients should be ambulant and free from diarrhœa before admission for convalescence. As a result nearly all patients had received from two to three weeks' treatment between liberation and convalescence.

Meals were served at 8 A.M., 12 NOON, 3.30 P.M., and 7 P.M. Eating-utensils and tables were kept scrupulously clean. The dining-rooms were light, airy, and cheerful. Though mess tins only were at first available, these were superseded as soon as possible by crockery. All this was done as part of a general plan to introduce into the surroundings an atmosphere of civilisation.

CONDITION ON ADMISSION

General Condition.—Despite the treatment they had received before admission nearly all the patients presented the same picture both mentally and physically. Apart from the universal desire for food, and the truly voracious appetite they displayed, they were utterly apathetic, dull, and submissive. They conversed hardly at all between themselves, did not express any emotion, and appeared to have little interest in life. Very few wanted to write letters or communicate in any way with the outside world. A cheerful remark would often be met by a completely vacant stare, and carelessness of dress and habit was the rule. At this stage they were all amenable to the very moderate discipline imposed, and almost no initiative whatsoever was shown. This total lack of interest was particularly noted among those who had been only a short time under medical care.

Great changes, however, were observed after a few days. Meal-times became noisy, often with complaints of insufficient food or of petty thieving. Vast quantities of food were consumed, and, if a meal could not be finished, an attempt would be made to smuggle out the remainder. Initiative returned and was particularly directed to methods of obtaining more food, despite the very large diet. Many showed a highly developed form of cunning in this respect, the most notable effort being the theft of a calf from a neighbouring field. This animal was introduced into the camp and slaughtered, and the patients began to eat the meat raw. When this was stopped, and some scraps of meat were buried, the patients waited until they were free from supervision and then recovered and ate the meat. In the early stages these people could not believe that any meal in the future could be anticipated with confidence. Meanwhile all amenities, such as pianos, indoor games, and literature, were eagerly asked for, a small orchestra was formed, and later on games of football were played.

Physical Condition.—Gross emaciation was usually seen, due both to loss of virtually all subcutaneous fat and to extreme wasting of muscle. The absorption of subcutaneous fat made the skin hang in loose folds, particularly on the buttocks, which came to be recognised as the first site in which generalised wasting of tissue became apparent. In advanced cases the anus became clearly visible between the tubera ischii, and owing to the

University of Birmingham

Mr. Lancelot Hogben, D.SC., F.R.S., Mason professor of zoology at Birmingham, has been appointed to the chair of medical statistics in the university.

McGill University

On March 11 the honorary degree of D.SC. of McGill University, Montreal, was conferred on Prof. John Ryle, of Oxford.

Royal College of Obstetricians and Gynæcologists

On Wednesday, May 14, at 5 P.M., Dr. Linton Snaith will deliver the Blair-Bell lecture at the college, 58, Queen Anne Street, London, W.1. He is to speak on Tubal Occlusion.

British Association for the Advancement of Science

Sir Howard Florey, F.R.S., will deliver the Radford Mather lecture at the Regent House, Cambridge, on Friday, May 2, at 5 P.M. His subject is to be Penicillin and other Antibiotics.

Royal Sanitary Institute

At a meeting, to be held at the institute, 90, Buckingham Palace Road, London, S.W.1, on Wednesday, May 14, at 3 P.M., Dr. W. H. Bradley, a senior medical officer of the Ministry of Health, is to open a discussion on the Control of Smallpox.

Faculty of Radiologists

Dr. Gordon E. Richards, of Toronto, will deliver the Skinner lecture before the faculty on Friday afternoon, May 16. His subject is to be the Place of Surgery and of Radiotherapy in the Management of Mammary Cancer. The annual meeting of the faculty will be held at Birmingham on June 27 and 28.

London Jewish Hospital Medical Society

On Thursday, April 17, at 8 P.M., at the West London Synagogue, Seymour Place, W.1, Lord Rothschild, PH.D., will deliver the annual oration. He is to speak on the Problem of Fertilisation. Admission is limited to members and those eligible for membership.

British Association of Urological Surgeons

The annual general meeting of the association will be held in Glasgow on Friday and Saturday, June 13 and 14. The provisional programme includes a discussion on the Treatment of Serious Tumours of the Bladder, to be opened by Mr. Clifford Morson, the president. Further information may be had from the secretary, 45 Lincoln's Inn Fields, London, W.C.2.

Harveian Society of London

The council of the society has selected as the subject for the Buckston Browne essay for 1948 the Mental and Physical Effects of Pain. The prize is open to all doctors registered in the British Isles or Dominions who are under 45 years of age. Essays must be submitted by Oct. 1, 1948. Further particulars may be had from Sir Cecil Wakeley, 14, Devonshire Street, London, W.1.

Watts Eden Fellowships

Dr. T. Watts Eden, who died on Sept. 22, has left two sums, each of £10,000 free of duty, to found, after the death of his widow, two travelling fellowships. The first fellowship, which will be administered by the Royal College of Obstetricians and Gynæcologists, is to encourage the study of obstetrics and gynæcology, and the second, to be administered by the Royal College of Physicians, the study of infancy and early childhood in health and disease.

Australia Wants More British Nurses

British nurses wishing to emigrate to New South Wales are to be given priority in the allocation of passages. The New South Wales minister for immigration is reported by B.U.P. as saying that of the 900 berths available for migrants in 1947, 350 will be allotted to women coming out to work in mental and other hospitals.

Morgan E. Williams Bequest

Grants from this fund will be available to doctors and others engaged in medical work resident in the county of Glamorgan who wish to travel abroad on short visits of medical interest. Applications should be made to the secretary of the Welsh National School of Medicine, 10, The Parade, Cardiff.

Naval Medical Compassionate Fund

A meeting will be held at 3 P.M. on Friday, April 25, at the Medical Department of the Navy, 64, St. James's Street, London, S.W.1, to elect six directors of the fund.

Course on Reablement

The British Council for Rehabilitation is holding a course at Nottingham on April 29, 30, and May 1. The speakers will include Mr. S. A. S. Malkin, Mr. J. P. Campbell, Dr. G. F. Keatinge, Mr. E. A. Nicoll, and Dr. T. A. Lloyd-Davies. The council's address is 32, Shaftesbury Avenue, London, W.1.

Institute of Hospital Administrators

The annual conference will be held at the Royal Pavilion, Brighton, next week-end, April 18–20. On the 19th, at 10 A.M., Sir Arthur Rucker, deputy secretary to the Ministry of Health, will speak on Hospital Administration in the New Health Service, and at 2.30 P.M. Mr. B. Lees Read on Financial Implications of the Act. The offices are at Tavistock House North, Tavistock Square, London, W.C.1.

Education of Blind Children

At a meeting of the school medical service group of the Society of Medical Officers of Health, to be held at the Civic Hall, Leeds, on Wednesday, April 30, at 2.20 P.M., Mr. D. D. Stenhouse Stewart, F.R.C.S., and Mr. J. Lumsden, of the Ministry of Education, will open a discussion on the Education of Blind and Partially Sighted Children. The meeting has been arranged at the request of the Minister of Education's advisory committee on handicapped children.

Foreign Awards

The following awards have been made to R.A.M.C. officers:

UNITED STATES

Legion of Merit.—Major-General Sir HENRY TIDY (commander), K.B.E., D.M. Oxfd; Colonel D. C. CHEYNE, O.B.E., M.C., M.D. Aberd.

Bronze Star Medal.—Colonel H. H. KENSHOLE, D.S.O., M.R.C.S., L.D.S.; Major W. G. H. ALLEN, M.D. Durh.; Major A. D. ROBERTSON, M.B. Glasg.

Medal of Freedom with Bronze Palm.—Major G. A. G. PETERKIN, M.B.E., M.B. Edin.

NETHERLANDS

Bronze Lion.—Captain J. W. LOGAN, D.S.O., M.B. Glasg.

Bronze Cross.—Lieut.-Colonel T. D. V. SWINSCOW, M.R.C.S.; Major C. J. LONGLAND, F.R.C.S.; Captain DAVID WRIGHT, M.C., M.B. Glasg.

Return to Practice

The Central Medical War Committee announces that Mr. Charles Gray, F.R.C.S., has resumed civilian practice at 19, Harley Street, London, W.1 (Langham 2579).

Appointments

ALLEN, E. H., M.R.C.S., D.M.R.E.: asst. radiologist, Royal National Orthopædic Hospital, London.

BRADMORE, ROSEMARY, M.B. Edin.: temporary asst. M.O., Kensington.

DAVIES, I. G., M.D. Lond., M.R.C.P., D.P.H.: M.O.H. and schools M.O., Leeds.

DORNHORST, A. C., M.D. Lond., M.R.C.P.: senior asst. to medical unit, St. Thomas's Hospital, London.

GREENE, RAYMOND, D.M. Oxfd, M.R.C.P.: physician, Royal Northern Hospital, London.

HARMAN, J. B., M.D. Camb., F.R.C.P., F.R.C.S.: asst. physician, Royal Cancer Hospital (Free), London.

O'DONNELL, R. F., B.SC., M.B. N.U.I.: pathologist, East Ham Memorial Hospital, London.

St. Mary's Hospital for Women and Children, London:

CULLOTY, TIMOTHY, M.R.C.S., D.M.R.E.: radiologist.
DIMSON, S. B., M.D. Lond., M.R.C.P., D.T.M. & H.: asst. physician.
GORDON, ISAAC, M.D. Lond., M.R.C.P.: asst. physician.
LEWIS, BEATRICE, M.D. Lond.: skin physician.
LUMB, J. R., M.B. Durh., B.HY., D.P.H., D.M.R.E.: radiologist.

Medical Board (Silicosis and Asbestos Scheme, 1931):

Medical officers:
BREBNER, ALLAN, M.B. Aberd.
BULLEID, J. H., M.R.C.S.
CAMPBELL, A. M., D.S.O., O.B.E., M.B. Glasg.
MCGOWAN, R. M., M.B. Glasg.
MACNAIR, R. A. C., M.B. Edin.
ROWLAND, E. M., M.R.C.S.

Colonial Service:

BURNS, J. C., M.B. Belf.: M.O., Malaya.
CANNON, D. A., B.SC., M.B. Glasg., D.T.M. & H.: senior pathologist, Nigeria.
EVANS, W. J. M., M.B. Lond.: M.O., Tanganyika.
HARVERSON, E. S., M.B. Lond.: M.O., Nigeria.
HOAR, C. E. W., M.B. Lond., D.C.P.: pathologist, grade B, Trinidad.
MCLINTOCK, J. S., M.B. Glasg.: M.O., Malaya.
SNODGRASS, R. J., F.R.F.P.S.: deputy director of medical services, Fiji.
WILLIAMS, W., B.SC., M.B.: M.O., Uganda.

RECOVERY FROM STARVATION

R. O. MURRAY
M.B.E., M.B. Camb.
LATE LIEUT.-COLONEL R.A.M.C.

DURING the final stages of the war in Europe Allied troops overran many concentration camps and liberated a vast number of prisoners suffering from starvation, which had caused the death of many others before relief arrived. Among the survivors disease was rampant, typhus and tuberculosis being extremely common, and famine diarrhœa almost universal.

Sandbostel concentration camp, which was captured on April 29, 1945, contained over 8000 male political prisoners, mostly Russians and Poles, but representing also many other nationalities and almost every occupation. While most had been of the unskilled labouring type, there were several of high intelligence and great experience. Nearly all were young to middle-aged adults, but a few adolescent boys and elderly men were included. They had been in captivity from six months to six years.

The camp was appallingly overcrowded, about 850 men occupying huts intended for 120. There was virtually no sanitation, and the universal diarrhœa soon caused fouling of the entire area. The daily rations were reported to have consisted of 140 g. of bread, extremely coarse and of poor quality, two half-litre bowls of soup, and a small amount of margarine. The value of this diet is estimated at not more than 500 calories. There was no fair system of distribution, and the greatest share was often obtained by those with the greatest strength.

After liberation about 2000 were considered to be fit to proceed directly to a displaced persons' camp after cleansing and without admission to a medical unit. The remainder were placed under medical care as rapidly as possible. The receiving medical units, expanded to the utmost and provided with all available assistance, soon became grossly overcrowded. To relieve them a convalescent camp was opened on May 12. It is on observations carried out at this camp that this paper is based.

In the circumstances only the barest medical investigations could be carried out, but records were kept of the body-weight of each patient on admission and on discharge, and of the amount of food consumed, with a view to their subsequent correlation. It was hoped that these would provide some information about the speed of recovery and the optimum constitution and amount of the diet to be given to patients recovering from advanced starvation.

Starvation has been investigated in the past both experimentally and in famines, but very few inquiries have been made into the process of recovery in the human adult, and those that have been made deal with individual cases in professional fasters or laboratory workers.

Lipscomb (1945), working at Belsen, used for this purpose three graduated diets for different stages during the process of recovery from starvation. The first had a low value of 800 calories, with a large milk content; the second 1700 calories; and the third 3000 calories.

Leyton (1946), who investigated the effects of slow starvation while himself a prisoner-of-war, considers that the prognosis for recovery from starvation is excellent, provided that no concomitant organic disease is present, and notes that Russians under his care ate everything available without any ill effects.

ADMINISTRATION OF THE CONVALESCENT CAMP

From the first it was appreciated that the patients would require both physical and psychological care. However, such large numbers were involved, because the order to accommodate up to 1000 had been received, that individual care, except in the case of the sick, had to give way to the production of the best possible conditions for the majority. It was made clear to the patients that the camp was under military discipline, even though this was reduced to a minimum. Since all patients were typhus contacts, it was decided to confine them to camp during the period of convalescence.

On arrival the patients were dusted with D.D.T., informed of the method by which the camp was operated, and allotted, by nationalities, to huts, where each man was provided with stretcher, pillow, and blankets and issued with toilet essentials. Next day they were medically examined and weighed. This was periodically repeated until they were finally weighed and re-examined on the day before discharge.

It was arranged with the dispatching medical units that all patients should be ambulant and free from diarrhœa before admission for convalescence. As a result nearly all patients had received from two to three weeks' treatment between liberation and convalescence.

Meals were served at 8 A.M., 12 NOON, 3.30 P.M., and 7 P.M. Eating-utensils and tables were kept scrupulously clean. The dining-rooms were light, airy, and cheerful. Though mess tins only were at first available, these were superseded as soon as possible by crockery. All this was done as part of a general plan to introduce into the surroundings an atmosphere of civilisation.

CONDITION ON ADMISSION

General Condition.—Despite the treatment they had received before admission nearly all the patients presented the same picture both mentally and physically. Apart from the universal desire for food, and the truly voracious appetite they displayed, they were utterly apathetic, dull, and submissive. They conversed hardly at all between themselves, did not express any emotion, and appeared to have little interest in life. Very few wanted to write letters or communicate in any way with the outside world. A cheerful remark would often be met by a completely vacant stare, and carelessness of dress and habit was the rule. At this stage they were all amenable to the very moderate discipline imposed, and almost no initiative whatsoever was shown. This total lack of interest was particularly noted among those who had been only a short time under medical care.

Great changes, however, were observed after a few days. Meal-times became noisy, often with complaints of insufficient food or of petty thieving. Vast quantities of food were consumed, and, if a meal could not be finished, an attempt would be made to smuggle out the remainder. Initiative returned and was particularly directed to methods of obtaining more food, despite the very large diet. Many showed a highly developed form of cunning in this respect, the most notable effort being the theft of a calf from a neighbouring field. This animal was introduced into the camp and slaughtered, and the patients began to eat the meat raw. When this was stopped, and some scraps of meat were buried, the patients waited until they were free from supervision and then recovered and ate the meat. In the early stages these people could not believe that any meal in the future could be anticipated with confidence. Meanwhile all amenities, such as pianos, indoor games, and literature, were eagerly asked for, a small orchestra was formed, and later on games of football were played.

Physical Condition.—Gross emaciation was usually seen, due both to loss of virtually all subcutaneous fat and to extreme wasting of muscle. The absorption of subcutaneous fat made the skin hang in loose folds, particularly on the buttocks, which came to be recognised as the first site in which generalised wasting of tissue became apparent. In advanced cases the anus became clearly visible between the tubera ischii, and owing to the absorption of the circumanal fat some degree of rectal prolapse was common.

Wasting of muscle was shown in its most striking form in the glutei and in the muscles of the limbs. Usually the loss of tissue was most pronounced in the lower limbs, in the gluteal area, and over the vastus medialis on the inner side of the thighs; in the upper limbs the wasting was seen mainly in the deltoid muscle, the biceps, and the flexors of the forearm. In advanced cases, however, the loss was so great that no real selective action could be observed. Wasting was less well marked in the muscles of the abdominal wall, and the fat over the upper part of the rectus sheath was often retained. In the back the thoracic spinous processes and the scapulæ became unduly prominent. The degree of facial emaciation was not necessarily related to the wasting in other parts.

TABLE I—ANALYSIS OF DIETS

No. of days	Type of diet	Protein (g.)	Fat (g.)	Carbo-hydrate (g.)	Total calories
9	High-fat	330	356	853	8255
3	Additional carbohydrate	263	217	943	6964
12	Relative high-fat (average of foregoing)	313	329	877	7938
10	High-carbohydrate	278	224	1048	7518
22	Over-all average	297	281	956	7747

The skin was often dry, scaly, and covered with sores, many of which had originated from scabies. All hair had been shaved from the patients' bodies.

No gross vitamin deficiencies were observed, and no famine œdema was seen; hence the weights on discharge are not influenced by a pathological increase in fluid.

THE DIET

The extraordinary appetite displayed was first appreciated when bitter complaints about the inadequacy of the diet were made during the first days. At this time the Army 'Compo' ration was in use, having an average value of 3600 calories. It was then resolved that every effort must be made to satisfy the patients' appetites so long as no harmful effects developed. "The danger of stuffing a starving man is notorious" say Hutchison and Mottram (1936), and this principle was kept strongly in mind.

The increase in diet began on May 17 and was continued until June 7, a period of twenty-two days. In addition to food supplied by the Army, further supplies of potatoes were obtained, and dairy produce was requisitioned from local farms. The last source of supply ceased on May 26, when all such produce was ordered by Military Government to be supplied to the medical units handling cases directly out of the concentration camp.

As a result of this order the fat content of the diet was considerably reduced, but this reduction was to some extent compensated by an increase in carbohydrates. There were thus two periods in the investigation in which the average constitution of the diet shows considerable variation. These will be arbitrarily referred to as the high-fat period, from May 17 to May 26, and the high-carbohydrate period, from May 27 to June 7.

Despite the considerable increase in the diet that resulted from these measures, the cry for more food continued almost to the end; but during the latter part of the high-fat period the demand, especially from Russians and Poles, was for more carbohydrate, particularly in the form of bread and potatoes. The average consumption of fat per head of population in normal times by the Russians and Poles is about half that of Germany or Great Britain. The same is true of the Japanese and Italians, for the general level of poverty was such that cereals were a compulsory replacement for fat, which is the most compact form of fuel we possess. Morgulis (1923) remarks that Irish and Bavarian peasants, accustomed to a bulky diet of bread and potatoes, suffer greatly when put on a small quantity of highly nourishing food. Though this agrees with the present findings, he says in the same paragraph that the habitually underfed are much discomforted when given a sufficient diet, and concludes that appetite and subjective feeling are unreliable guides in the matter of nutrition. Experience in the present case did not coincide with these views. Patients certainly appear to have regarded the highest hospital diet, of 3000 calories, as inadequate, since great objection was raised by those readmitted to hospital at the prospect of returning to this scale of diet.

Table I shows the diets and their calorie values. The average value of the diet during the high-fat period was 8255 calories, and during the high-carbohydrate period 7518 calories, whereas the average for the w period was 7747 calories. Though both diets are extre large, they proved to be adequately balanced. fat content in the first period, however, judged by the subjective reaction, was almost certainly higher than necessary. Every effort was made to check the amounts of food used, and every meal was carefully supervised. Measurements of the swill showed that, when about 800 patients were being fed, only about a bucketful a day was going to waste from the meal-tables.

Fig. 1 shows the calorie value of the daily diet and of the protein, fat, and carbohydrate constituents. This cannot be absolutely accurate, because some food was inevitably carried over from day to day in the kitchens. The figures were obtained by making an accurate daily check of all food provided and dividing the total by the number of patients being fed. Allowance was made for the peeling of potatoes.

Typical diets from each of the two periods were as follows:

Items	High fat (oz.)	High carbo-hydrate (oz.)	Items	High fat (oz.)	High carbo-hydrate (oz.)
Fresh meat (with bone)	14	—	Sugar	2 1/2	3
Preserved meat	—	13	Potatoes	42	48
Brown bread	28	36	Tinned vegetables	1 1/4	7
White bread	—	6	Flour	1 3/4	1 1/4
Eggs (8=1 lb.)	4	4	Oatmeal	2	—
Cooking-fat	1/2	1/2	Dried egg	1/2	—
Cheese	3/4	1 3/4	Dehydrated soup	1 1/4	—
Cream cheese	16	—	Cereals (dried)	—	1 3/4
Butter	2 1/2	1 3/4	Bacon	—	1 3/4
Margarine	1 1/2	—	Fresh milk (pints)	1 3/4	1 3/4
Jam	1	1 3/4	Coffee	4/5	—
			Tea	—	1/8

Analysis g.

	High fat	High carbohydrate
Protein	319	295
Fat	400	226
Carbohydrate	763 } 836	984 } 1070
Sugar	73	86
Calories	8442	7669

The daily diet also included salt 1/2 oz., pepper 1/100 oz., mustard 1/100 oz., and two compound vitamin tablets. Seven cigarettes were allowed daily.

An explanation is necessary for the large quantity of cream cheese shown in the high-fat period. This local dairy product was plentiful, and was served on the bread at each of the four meals. Though little was left,

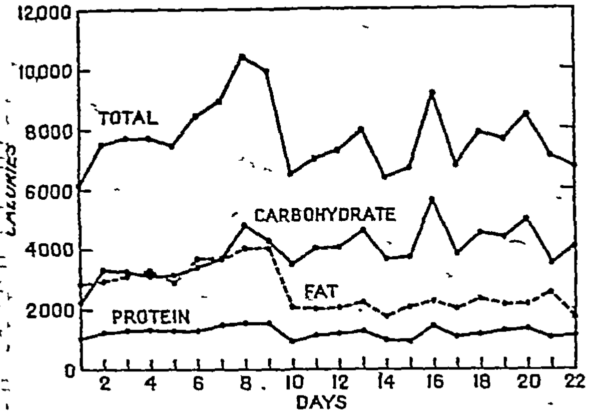

Fig. 1—Calorie values of daily diets and constituents thereof.

omplaints were frequent. The analysis of this item, alculated from standard tables, may be a source of error, ince the fat content of the milk used in its manu-acture was variable. This cheese sours very rapidly, but the free fatty acid, to which the rancid taste is due, s a powerful agent in the promotion of hydrolysis and absorption of fat. This effect, together with the possibly beneficial action of rancid cheese on the intestinal flora, may have caused a disproportionate rise in weight among those patients who consumed their full ration.

The very high calorie value of the diet finds its nearest comparison in a report of Woods and Mansfield (1904) where lumbermen consumed a diet of an average value of 8083 calories daily, containing 164·1 g. of protein, 387·8 g. of fat, and 982·0 g. of carbohydrate. The lumbermen, however, in contrast to our patients, were taking extremely active exercise.

The large diet was very well tolerated. No vomiting and very few cases of lienteric diarrhœa were reported. Certainly at this stage in treatment it seemed perfectly safe to satisfy the subjective desire for food to the utmost. The question arises whether too great precautions were taken in the early stages of treatment when considerably smaller diets were used. Though an initial period of invalid feeding is desirable, particularly to allow the gastro-intestinal tract to recover its function, it appears that this should not be continued, unless there are definite contra-indications to a more substantial diet, for more than a few days at the most. After this the subjective desire for food should be regarded as the safest guide. Though this is contrary to general opinion, Leyton (1946), investigating a very similar field, came to the same conclusion. The great and rapid improvement in both physical well-being and mental health in the vast majority of cases was due largely to the adoption of this principle.

VARIATION IN BODY-WEIGHT

The convalescent camp accommodated patients from May 12 to June 9, during which period 1393 patients were admitted. Of these, 98 were returned to hospital, many going reluctantly. Weight records were kept in 930 of the remaining cases during the diet-observation period (May 17 to June 7) and on June 8, when no record was made of the diet. Thus weight records were made on twenty-three successive days.

In 45 cases weight was either stationary or lost. Of these, 9 were Frenchmen, who were evacuated to a hospital in France by air while still very weak. The weight of the remaining 36 averaged 55·7 kg. Many of these were sent for radiological examination of the chest as possible cases of pulmonary tuberculosis. The congested conditions in the hospitals were such that those who were not definitely shown to be suffering from a demonstrable lesion were returned to the camp. Possibly, however, the lack of gain in weight may have been due to occult tuberculosis.

The weight records of the 885 who did gain weight, however small the gain, were used to ascertain the average weight on admission and the rate of recovery of body-weight.

Average Body-weight.—On admission, the body-weight averaged 54·2 kg. Starling (1930) gives 70·3 kg. as the average weight of an Englishman. If this is taken as a criterion, the average degree of wasting was 23% of the original body-weight. (It is equally true to say that 30% of the starved body-weight must be gained to allow recovery to the original weight.)

Mollison (1946), at Belsen, found that the average weight of 18 men who were strong enough to stand on the scales was 44·0 kg., and that of 11 women 35·3 kg. Some of these had known their weight previously, and in these cases the average loss of original body-weight was 38·8%. From these figures it is deduced that the average male weight before starvation was 71·9 kg.; hence the adoption of Starling's figure appears reasonable.

Rate of Weight Recovery.—This was investigated by taking groups of patients according to periods of observation from two to twenty-three days. Subjects who could not be observed for two days or more were excluded from the series. The percentage gain in starved body-weight per day of observation was calculated in every case, and the average for each observation period was taken. The results have been plotted in fig. 2. The number of subjects for each period of observation is shown in the background to give an index of reliability. From the plotted figures a smooth curve was drawn to indicate the rate of weight recovery. A decrease in this rate corresponding to increased length of the observation period is demonstrated.

Since each figure represents the average gain over the number of days in question, it is clear that this graph does not indicate the rate of recovery in an individual patient. With the use of the smooth curve in fig. 2 this was calculated for the average patient of 54·2 kg. by the following method. The expected gain over two days was plotted. This was subtracted from the expected gain over three days, the difference giving the gain for the third day, which was then also plotted. This total was then deducted from the total anticipated gain over four days, thus giving the actual gain for the fourth day. This procedure was continued to give the curve shown in fig 3. A reduction in the rate of gain is observed after the first week. Thereafter a fairly

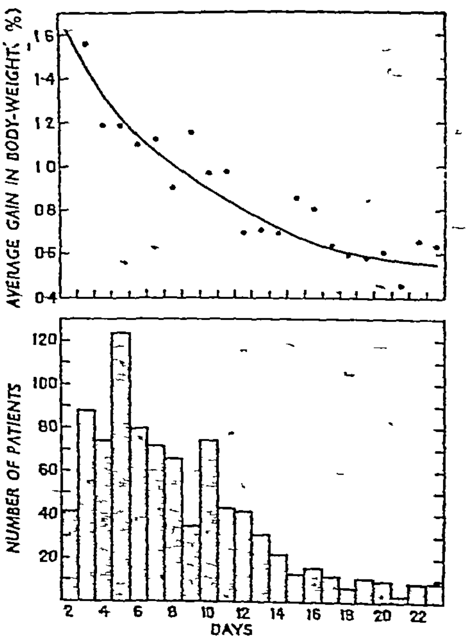

Fig. 2—Speed of weight recovery. Above, average daily gain for each observation period, expressed as percentage of starved body-weight. Below, histograms denoting number of patients in each observation period.

constant, though smaller, rate of gain appears to be maintained.

Examination of this graph of the average patient shows that the weight gained during the first six days is equal to that gained in the following seventeen days, and that 58% of the total gain in weight during the twenty-three days takes place during the first week. If the rate of gain of weight is continued in the way suggested, recovery to the weight of 70·3 kg. might be expected after about seventy-five days.

Effect of Refeeding in Different Weight-groups.—The body-weight records obtained were also used in investigating the effect of refeeding in different weight-groups. The degree of starvation postulated can only be regarded as a mean, since all degrees of starvation were found among the released prisoners. It seemed justifiable to consider the lower weight-groups, despite normal variations, as having been exposed to greater starvation than those in the higher weight-groups. Accordingly the rate of weight recovery among the different categories was investigated. The lightest of these included the few patients whose initial weight was less than 40 kg. and the heaviest those whose weight was more than 70 kg. Between these limits groups were taken at 5 kg. intervals. The results are shown in table II. A striking difference in the rate of weight recovery is observed, the lower weight-groups making a greater rate of gain and over a longer period than the higher groups. It is particularly interesting to compare the average gain per cent. of the original body-weight for each group with the same figure for the whole series for the corresponding time, in each instance, the latter being obtained from the smooth curve in fig. 2.

These results demonstrate clearly that the high diet, demanded by the cry of nature, had definitely beneficial results, rapid response being shown by the gain in weight. This gain is especially pronounced during the first week of high-diet refeeding. Clinical confirmation is found in the absence of ill effects, and in the fact that, at the end of this period of a week, most patients were considered sufficiently well recovered to be discharged.

RELATION OF DIET TO SPEED OF WEIGHT RECOVERY

The size and constitution of the diets and the rate of weight recovery having been examined, an attempt was made to relate the results obtained. It was desirable to ascertain whether greater gains of weight were made during the high-fat period or during the high-carbohydrate period.

TABLE II—WEIGHT GAINS IN DIFFERENT WEIGHT-GROUPS

Weight-group (kg.)	No. of patients	Av. period of observation (days)	Gain in body-weight		Av. daily gain % of body-weight	Av. gain % of body-weight for whole series in same period*
			Actual (kg.)	Percentage of starved body-weight		
Below 40	11	9·5	4·5	12 2	1·28	0·93
40–44·9	52	11·3	6·3	12·4	1·10	0·84
45–49 9	156	8·7	5·0	10·5	1·21	0·97
50–54·9	265	8·7	5·1	9·8	1·13	0·97
55–59 9	217	7·1	4·4	7 7	1·09	1·07
60–64·9	110	7·0	4·3	6 9	0·99	1·08
65–69·9	56	6·9	4·5	6 6	0·96	1·08
Above 70	10	7·3	4·1	5 6	0 77	1·06

* Calculated from fig. 2.

To obtain figures for weight recovery during the high-fat period it was necessary to include patients who had had a further three days on the high-carbohydrate diet.

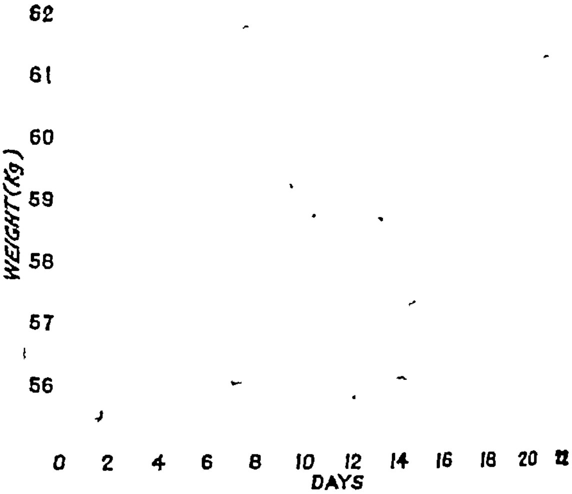

Fig. 3—Average weight of patients during refeeding period.

This was necessary because, when the involuntary ch of type of diet took place, it was impossible to arr accommodation elsewhere for patients who had att the degree of recovery compatible with discharge. The first twelve days of the period, on the first nine of which the high-fat diet had been given, and on the last three of which the high-carbohydrate diet had been given, was therefore taken together as a relative high-fat period.

The diet during this period had an average value of 7938 calories a day; of these, 16·2% were derived from protein, 38·5% from fat, and 45·3% from carbohydrate (table I). Observed for an average of 8·5 days, 18 patients gained at the average rate of 1·07% of body-weight a day. The equivalent for this period in the whole series is 0·98% (fig. 2).

The high-carbohydrate diet had an average value of 7518 calories a day; of these, 15·2% were derived from protein, 27·7% from fat, and 57·1% from carbohydrate. Observed for an average of 5·3 days, 476 patients showed an average gain of 1·19% of body-weight a day. The equivalent for this period in the whole series is 1·20% (fig. 2).

The relative high-fat diet had a calorie value 5·5% greater than the high-carbohydrate diet, and a greater rate of gain with the diet of higher value is observed. This is surprising, because it was not thought possible that these large quantities of food could be fully utilised by the body. It seemed particularly unlikely, even allowing for the abnormal condition of the patients, that the 356 g. of fat fed during the earlier period could be fully absorbed. However, the only real test of fat absorption—analysis of the fæces—could not be carried out under the prevailing conditions.

Almost equally good gains in weight were recorded with a diet poorer in fat and richer in carbohydrate. It is interesting that during the period when more fat was being given in the diet than may have been assimilated the subjective desire was for more carbohydrate.

It is likely that all, or very nearly all, the protein was absorbed to make good the great tissue loss. All the meat in the diet was eaten, like everything else, but this item never became a subject for complaint. Chittende (1907), who advocated a reduction in the protein content of the normal diet, advised a high-protein content in the treatment of malnutrition.

SUMMARY

The convalescent from starvation whose gastro-intestinal tract has begun to recover its function, often shown by the cessation of diarrhœa, and who is not confined to bed, displays a very great desire for food.

The use of a diet of high calorie value to satisfy this appetite seems to be justified.

A study was made of 930 men who had been liberated from German concentration camps and had received initial hospital treatment for two to three weeks. The average degree of wasting at the start of the investigation was estimated to be 23% of the original body-weight.

More than 95% of the patients gained weight quickly, and advanced greatly towards the full recovery of health on rich diets of between 7500 and 8000 calories daily. No untoward effects developed, and it is considered that the optimum constitution of such a diet should be 225 g. of fat, which contributes largely to the recovery of weight; 275 g. of protein, to provide for the regeneration of the wasted tissues; and 1000 g. of carbohydrate.

The results suggest that the greatest benefit from such a diet arose in the first week and was in proportion to the amount of starvation.

Measures to encourage mental rehabilitation are desirable, since, despite the initial complete lack of interest in the surroundings, the mental and moral inertia soon gives way when weight increases. In fact, the patient's interest in his surroundings is a good indication of the degree of recovery.

My thanks are due to all ranks of 3 Field Dressing Station and 49 Field Surgical Unit for their assistance in this investigation; and also to Prof. H. A. Harris and Dr. Ian Murray for their advice and criticism in connexion with the preparation of this paper.

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FOLIC ACID IN THE TREATMENT OF THE SPRUE SYNDROME

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REPORTS by Garcia Lopez et al. (1946) on the treatment of tropical sprue, and by Brody and Gore (1946) and Dalton et al. (1946) on the treatment of cœliac disease, have told of the excellent response that may result from the administration of folic acid. The present report is primarily concerned with the hæmatological changes in 10 cases of the sprue syndrome after treatment with synthetic folic acid. A short account of the effects of treatment on the clinical features and the absorption of fat is also included.

A fat-balance test carried out according to the method of Cooke et al. (1946) was done on all adult patients except cases 2 and 4, where it could not be undertaken for reasons given below. A similar test, in which 50 g. of fat was given daily for 3 days, was done on 17 adult controls and showed a percentage absorption ranging from 91·3% to 98·5%, mean 95·4%. Since no information was available about fat-balance tests in infants, a daily intake of 25 g. of fat was arbitrarily selected. The percentage absorption of fat in normal infants given this amount was found to be the same as in normal adults given 50 g. daily. Before folic acid was tried, all the adult patients had been treated for long periods with a high-protein low-fat diet and parenteral liver without attaining normal blood figures. Special diet and iron had been equally unsuccessful in the hypochromic anæmia of cœliac disease. The hæmatological and clinical findings and the results of the fat-balance tests before and after treatment with synthetic folic acid are given in tables I and II. The hæmoglobinometer used in this investigation gave a reading of 100% at 13·8 g. per 100 ml.

TROPICAL SPRUE

Case 1.—A man, aged 59, first had attacks of diarrhœa while in Sumatra in 1916; sprue was diagnosed in 1932. During the past twelve years he had frequent relapses of diarrhœa with pale frothy stools. In 1933 examination of a stool showed total fæcal fat 52% (split 63%, unsplit 37%), and many fatty crystals. An oral glucose-tolerance test gave an abnormally flattened curve.

The patient developed a psychotic depressive state in 1933 and was admitted to a mental home for treatment. He was discharged in 1934 and was unable to work during the next twelve years.

He was readmitted to a mental hospital in May, 1946, with an exacerbation of depression. Because of the fatty diarrhœa he was transferred to our ward for treatment with folic acid in August, 1946.

On admission he was passing 7 pale frothy loose stools a day. Total fat in dried stool 31·5%; fat-absorption 48·7%. He was extremely depressed, but otherwise his general condition was good. There was histamine-fast achlorhydria. Sternal puncture showed the marrow to be normoblastic, with an increase of early and intermediate normoblasts.

After a control period the patient was given 100 mg. of folic acid intramuscularly, followed by 20 mg. daily intramuscularly from the 2nd to the 21st day of therapy, and then 20 mg. by mouth from the 22nd to 36th day.

The rise in the blood-count was slight and macrocytosis persisted; there was no improvement in fat-absorption; but there was a dramatic and rapid effect on the diarrhœa, a reduction of abdominal distension, and a gain in weight and appetite. The patient's mental state was not improved.

The next case was selected for study for the specific purpose of ascertaining whether folic acid would correct the macrocytic blood picture, which in our experience is not uncommon in the sprue syndrome even when the Hb level is 100% or more, and often does not respond to large amounts of parenteral liver extract.

Case 2.—A man, aged 35, who had been in Egypt in 1935–36, had attacks of diarrhœa, with pale yellow loose stools, from 1943, when he was on service in North Africa. In 1944 he began to feel very weak and developed a sore tongue. He was admitted to a casualty clearing station in Italy in 1945, when his red-cell count was 1,640,000 per c.mm. and Hb 59%: the marrow was megaloblastic. There was no response to injections of liver extract, but the blood-count improved after blood-transfusion and the administration of liquid liver extract by mouth. The patient was evacuated to the United Kingdom still complaining of weakness and flatulence. The stools continued to be pale and loose, and sprue was diagnosed. Injections of liver extract were given during 1945–46.

He was referred to us as an outpatient and not admitted to hospital owing to extreme shortage of beds. At the start of treatment he was having one or two greasy but formed motions daily. His general condition was good. Red-cell count 4,160,000 per c.mm., Hb 100%, colour-index (C.I.) 1·2, mean corpuscular volume (M.C.V.) 103·4 cμ, mean corpuscular hæmoglobin concentration (M.C.H.C.) 32·1%.

Folic acid was given by mouth in a dosage of 20 mg. daily for 30 days. The red cells remained macrocytic despite a slight but definite rise in the blood-count.

Case 3.—A woman, aged 70, developed sprue while in India in 1931. During the past fifteen years she had continuous treatment with special diet, injections of liver extracts, and supplements of vitamins, in different places. During this time she had numerous severe relapses, and her health was never satisfactory.

When she came under our charge she was having 2 or 3 bulky pale motions daily. Total fat in dried stool 37·7%: fat-absorption 71·4%. Her general condition was very poor,

TABLE I—EFFECT OF FOLIC ACID ON CLINICAL STATE AND ON FAT-ABSORPTION

Case no.	Sex and age (yr.)	Before or after folic acid	No. of stools daily	Character of stools	Chronic atrophic glossitis	Weight (lb.)	Sense of well-being	Appetite	Abdominal distension	Fat absorption (%)	Total in (% of weight
1	M 59	B A	7 1	Pale, frothy, loose Formed	+ +	117 128	Poor Impr.	Poor Impr.	++ +	48·7 41·2	31·5 39·7
2	M 35	B A	1–2 1–2	Greasy, formed Greasy, formed	– –	130 130	Norm. Norm.	Good Good	– –	.. ..	.. ..
3	F 70	B A	2–3 1	Pale, bulky, semi-formed Formed	+ +	79 81	Poor Much impr.	Poor Much impr.	++ +	71·4 89·6	37·[illegible] 34·[illegible]
4	F 59	B A	3–5 1	Loose, pale, frothy Formed	+ +	$90\frac{1}{2}$ 92	Poor Much impr.	Poor Much impr.	+ –	.. ..	34·0 ..
5	F 37	B A	3–4 1	Pale, loose Formed	+ +	65 86	Poor Impr.	Poor Impr.	– –	76·0 77·1	25·4 19·1
6	M 50	B A	1–2 1–2	Formed Formed	+ +	92 99	Poor Impr.	Poor Impr.	+ –	75·7 75·8	32·6 30·6
7	M 69	B A	2–3 1	Pale, bulky, loose Formed	+ +	127 127	Poor Impr.	Poor Impr.	+ –	78·3 80·2	34·5 33·9
8	F $3\frac{1}{4}$	B A	2–4 2–4	Pale, bulky Pale, bulky	– –	24 21	Poor Worse	Fair Worse	++ ++	69·6 ..	32·8 ..
9	M $1\frac{10}{12}$	B A	2–4 2–4	Pale, fatty Pale, fatty	– –	$15\frac{1}{2}$ $15\frac{3}{4}$	Poor Impr.	Fair Fair	++ ++	.. ..	.. ..
10	F 17	B A	1 1	Formed Formed	– –	$77\frac{1}{2}$ 79	Fair Fair	Fair Fair	– –	70·0 72·0	.. 27·9

with pellagrinoid skin and a well-marked tendency to bruise and bleed. The marrow was normoblastic.

Folic acid was given by mouth in a dosage of 20 mg. daily for 30 days. The macrocytic anæmia was unchanged, but fat-absorption improved, and there was a rapid and dramatic improvement in the frequency and character of the stools, and in the patient's feeling of well-being. After she left hospital she ceased taking folic acid and had a severe clinical relapse without any change in the blood-count.

Case 4.—A woman, aged 59, lived in India in 1916–20, during which period she had one brief attack of diarrhœa, with pale stools. She had no looseness of the bowels after leaving India until July, 1946, when diarrhœa began again. Thereafter she often had 6 or 7 loose frothy pale stools daily. She also had heartburn, flatulence, and bouts of vomiting, and lost $1\frac{1}{2}$ st. in weight in six months. Sprue was diagnosed, and she was treated with diet and parenteral liver without improvement.

In view of the long time which elapsed between the patient's leaving India and the development of steatorrhœa in Great Britain, it is debatable whether she was a case of tropical sprue or of idiopathic steatorrhœa.

In 1947 she was seen in a private nursing-home, where intensive investigations were impracticable. Free hydrochloric acid was present in her gastric juice, and the fat content of a dried specimen of stool was 34%. Red-cell count 3,480,000 per c.mm., Hb 80%, C.I. 1·1. Folic acid was given by mouth in a dosage of 20 mg. daily for 21 days.

The macrocytic anæmia was not improved, but there was a rapid improvement in the patient's general condition indicated by a better appetite, loss of the abdominal distension, and control of the diarrhœa.

IDIOPATHIC STEATORRHŒA

Case 5.—A woman, aged 37, was admitted to hospital with fatty diarrhœa and megaloblastic anæmia refractory to injections of a potent liver extract.

At the start of folic-acid therapy the total fat in the dried stool was 25·4%, and fat-absorption 76·0%. The patient was having 3 or 4 pale loose stools daily, and her general condition was poor. A test-meal showed free hydrochloric acid. The bone-marrow was megaloblastic. The red-cell count was 1,370,000 per c.mm., Hb 40%, C.I. 1·5, white cells 7800 per c.mm., packed cell volume 19%, M.C.V. 138·7 c.μ., M.C.H.C. 28·9%, reticulocytes 3·5%

Folic acid was given by mouth in a dosage of 20 mg. daily for 10 days, and thereafter 10 mg. daily for 19 days.

The reticulocyte-count began to rise on the 4th day, reaching a peak of 38·6% on the 6th day. On the 29th day the red-cell count was 3,590,000 per c.mm., Hb 72%. This rise was considered highly satisfactory and fully up to the standard obtained in a classical case of pernicious anæmia with an equivalent initial erythrocyte-count treated with parenteral liver extract. Coincidentally with the blood changes her clinical state improved remarkably.

Continuation of folic-acid therapy for another 19 days, however, did not increase the number of red cells. Accordingly it was given for a further 17 days and supplemented by three injections of 4 c.cm. of 'Anahæmin.' This also did not improve the blood findings, the red-cell count on the 65th day of treatment being 3,680,000 per c.mm. while the blood picture remained macrocytic. Treatment with proteolysed liver ('Hepamino') was then begun, and this resulted in a rise of 1,000,000 red cells per c.mm. in 14 days, and the restoration of the M.C.V. to normal.

The hæmatological results of treatment with folic acid in this case must be assessed as unsatisfactory despite the excellent initial response, since the blood picture was not restored qualitatively or quantitatively to normal. There was no improvement in fat-absorption, but a rapid and dramatic improvement in the diarrhœa and the patient's general health.

Case 6.—A man, aged 50, had been under our care with fatty diarrhœa for $4\frac{1}{4}$ years before the present admission to hospital, the number of stools commonly being 8–10 daily, sometimes watery, sometimes pale and bulky.

He had had a severe dermatitis of hands, feet, and face for over two years, and this had resisted all forms of therapy. He had been unable to work for over a year because of general weakness.

On admission he had 1 or 2 formed motions daily; total fat in dried stool 32·6%; fat-absorption 75·7%.

A test-meal showed free hydrochloric acid. On three occasions the marrow was found to be preponderantly normoblastic, though an occasional megaloblast was also present. He had a moderate degree of macrocytic anæmia which was entirely resistant to parenteral liver therapy.

The patient was given folic acid by mouth in a dosage of 20 mg. daily for 28 days.

The red cells increased by 1,080,000 per c.mm. in 28 days, and the M.C.V. was restored to the upper limits of normal. Fat-absorption was unchanged. Clinical improvement was definite, and most remarkable of all was the coincident alleviation of the dermatitis, which had almost completely disappeared at the end of treatment with folic acid.

Case 7.—A man, aged 69, served in the Regular Army from 1896 to 1920, and was in India in 1901–06, where he had an attack of acute bacillary dysentery but no other diarrhœal disease. In 1914, when in this country, he developed diarrhœa with loose pale stools. Since then he had frequent exacerbations of these symptoms, sometimes associated with sore tongue. He was admitted to hospital in 1940 with a megalolastic anæmia, and pernicious anæmia was diagnosed. Treatment with potent preparations of liver extract did not restore the blood to normal. During the next 4 years diarrhœa recurred at intervals. Since his general condition was poor he was readmitted to hospital in 1944 for further investigation. Free hydrochloric acid was found in the gastric juice, and the fat-content of the dried stool was 35%. Steatorrhœa was diagnosed. Whether the case should be classified as tropical sprue or idiopathic steatorrhœa is debatable.

Since 1944 the patient has been under observation and has continued to have loose pale stools, usually 2 a day, but more during exacerbations.

He was again admitted to hospital in January, 1947, when folic-acid therapy was begun. At this time he was having 2 or 3 pale loose very bulky motions daily.

On admission the fat in the dried stool was 34·5%; fat-absorption 78·3%. There was considerable œdema of the ankles, and his general condition was poor. Sternal puncture showed a predominantly normoblastic marrow with many early and intermediate normoblasts.

After a control period the patient was given 20 mg. of folic acid daily by mouth. His general condition improved rapidly, and a free diuresis (6600 c.cm. in 48 hr.), associated with disappearance of œdema and with loss of weight, occurred on the 6th and 7th days of treatment. A gain of about 900,000 red cells per c.mm. and 24% Hb took place in 16 days. Despite continued treatment with folic acid for a further 10 days the blood level remained about stationary and the blood picture macrocytic. There was no change in fat-absorption, but there was a rapid and dramatic improvement in the frequency and character of the stools and in the patient's general feeling of well-being.

CŒLIAC DISEASE

Case 8.—A girl, aged 3 years 3 months. At the age of 2 years steatorrhœa began, followed by progressive loss in weight and deterioration in health. On Oct. 29, 1945, the red-cell count was 4,000,000 per c.mm., Hb 65%, C.I. 0·81. Treatment with diet, liver injections, iron, and vitamins A, C, and D led to a steady improvement. Six months later there was a severe relapse which was attributed to discontinuation of dietetic restrictions. The patient was readmitted to hospital in very poor health with the clinical picture of cœliac disease. A moderate hypochromic anæmia was present (table II). Sternal puncture revealed a normoblastic marrow. At the start of folic-acid therapy the patient was passing 2–4 pale bulky stools daily; total fat in dried fæces 32·8%; fat-absorption 69·6%, compared with 95·2% in a control infant of the same age.

She was given 10 mg. of folic acid by mouth daily for 18 days. The blood-count and clinical condition were unchanged, so the dose of folic acid was increased to 20 mg. daily for the next 14 days, again with no improvement.

In view of the low colour-index a further 21 days' treatment with folic acid was given and supplemented with ferrous sulphate gr. 3 daily. At the end of 53 days' treatment with folic acid, the hæmoglobin level was lower than it had been before treatment. Moreover a clinical relapse started about the 40th day of the treatment which was sufficiently severe to prevent the fat-balance test being repeated.

The hæmatological and clinical results of treatment with folic acid in this case were entirely unsatisfactory (tables I and II).

Case 9.—A boy, aged 1 year 10 months, who first suffered from vomiting, followed by diarrhœa, at the age of 13 months. He was admitted to hospital severely ill, and cœliac disease was diagnosed. Treatment with a low-fat diet, iron, and vitamins led to some improvement. Six months later, however, he was still grossly emaciated, weighing about 15 lb. He vomited often and passed many pale frothy stools daily. It was impossible to carry out a fat-balance test because he could tolerate only traces of fat in the diet.

When folic-acid therapy was started he was passing 2–4 pale fatty stools daily. The anæmia was hypochromic and moderately severe.

Treatment with folic acid began with 10 mg. daily by mouth; but the blood-count was unaltered after 12 days so the dose was increased to 20 mg. daily for 18 days, and was continued for a further 17 days at 10 mg. daily.

After 47 days' treatment with folic acid, supplemented during the last 22 days by ferrous sulphate gr. $1\frac{1}{2}$ daily, the red-cell count was lower than when treatment started. The Hb level remained unchanged. There was no change in the appearance or frequency of the stools and no significant gain in weight or reduction in abdominal distension, but the infant showed some general subjective improvement and began to take an interest in his surroundings.

The hæmatological and clinical response to folic acid was unsatisfactory.

TABLE II—EFFECT OF FOLIC ACID ON ANÆMIA ASSOCIATED WITH THE SPRUE SYNDROME

Case no.	Before or after folic acid	Hæmoglobin (%)	Red cells (millions per c.mm.)	C.I.	P.C.V. (%)	M.C.V. (c.μ)	M.C.H.C. (%)	Folic acid mg. daily and other treatment	Days of treatment
1	B	78	3·3	1·2	34	103	31·3	100 I.M. 20 I.M. 20 oral	1 2–21 22–36
	A	88	3·7	1·2	..	..	..		
2	B	100	4·16	1·2	43	103·4	32·1	20 oral	1–30
	A	118	4·63	1·3	50	108	32·6	..	..
3	B	78	3·22	1·2	34·5	107·1	31·3	20 oral	1–30
	A	78	3·3	1·2	34·5	104·5	31·2	..	..
4	B	80	3·48	1·1	..	..	..	20 oral	1–21
	A	74	2·85	1·2	..	..	..	..	..
5	B	40	1·37	1·5	19	138·7	28·9	20 oral 10 oral 10 oral	1–10 11–20 22–65
	A*	72	3·59	1·0	36·5	101·7	27·2	'Anahæmin' 4 c.cm. I.M.	48, 52, 65
	A†	80	3·68	1·1	36·5	99·2	30·1	Fer. sulph. gr. 6 t.i.d.	38–65
6	B	90	3·42	1·3	41·5	121·3	29·9	20 oral	1–28
	A	96	4·5	1·1	43·5	96·7	30·4	..	..
7	B	72	2·68	1·3	32	121·3	30·9	20 oral	1–26
	A‡	96	3·52	1·4	40	113·6	33·1	..	..
	A§	100	3·75	1·3	43	114·7	32·1	..	..
8	B	68	4·03	0·8	34·5	85·6	33·0	10 oral 20 oral Fer. sulph. gr. 3 daily	1–18 19–53 32–53
	A	62	4·33	0·6	..	..	..		
9	B	56	5·23	0·5	..	..	..	10 oral 20 oral 10 oral Fer. sulph. gr. $1\frac{1}{2}$ daily	1–12 13–30 31–48 26–48
	A	52	4·38	0·6	..	..	..		
10	B	75	4·1	0·9	..	..	..	20 oral	1–20
	A	81	4·4	0·9	..	..	..	..	

* 29th day of folic acid treatment
† 65th ,, ,, ,, ,, ,,
‡ 16th ,, ,, ,, ,, ,,
§ 26th ,, ,, ,, ,, ,,

Case 10.—A girl, aged 17 years, who had had cœliac disease since the age of 2 years. On admission, in May, 1946, she had well-marked rachitic deformities; her height was 62½ in. and her weight 5 st. 7½ lb. Red-cell count 1,800,000 per c.mm., Hb 30%. The bone-marrow was normoblastic. She was treated with blood-transfusion, proteolysed liver, a low-fat diet, and vitamin supplements, and was discharged from hospital with a red-cell count of 3,650,000 per c.mm., Hb 70%. She was readmitted to hospital on July 23, 1946, for the purpose of determining the effect of folic acid on the absorption of fat and on the anæmia. The blood-count had been stationary for several weeks before the start of folic-acid therapy. Folic acid was given for 20 days, the daily dose being 20 mg. by mouth. This treatment was ineffective in improving significantly the blood-count or the capacity to absorb fat.

DISCUSSION

Clinical Effects

Table I clearly indicates that folic acid is a reliable therapeutic agent for the alleviation of certain clinical features of the sprue syndrome in adults. Excluding case 2, who was selected for a particular hæmatological study and whose general condition was satisfactory in other respects, the other adult patients (cases 1, 3, 4, 5, 6, and 7) all showed an excellent clinical response. Diarrhœa was completely controlled within a few days of starting treatment, and the patients all noted a rapid improvement in appetite and sense of well-being.

In contrast to these satisfactory clinical effects in adults are the unsatisfactory results in the patients with cœliac disease (cases 8, 9, and 10). We were particularly disappointed with these findings in view of the excellent results published by Dalton et al. (1946). Their two cases of cœliac disease had a megaloblastic bone-marrow, a finding which is exceptional in cœliac disease and whose significance is discussed below.

Fat-balance Test

Fat-balance tests were carried out before treatment with folic acid in 7 out of the 10 cases recorded in table I. In all cases the test showed a failure of fat-absorption as compared with controls. In 6 cases the test was repeated after treatment with folic acid had been completed. Only in case 3 did treatment improve fat-absorption as assessed by this test. There appeared to be no correlation between improvement or lack of improvement in fat-balance tests and improvement or lack of improvement in the clinical or hæmatological results of treatment. Thus cases 1 and 5 showed dramatic clinical improvement and cases 5 and 6 showed an excellent initial or terminal hæmatological response, and yet their percentage absorption of fat was unaltered. Though the diagnostic value of this test is undoubted, its prognostic value is still uncertain.

Hæmatological Aspects

The published reports show that a macrocytic anæmia is often present in tropical sprue and idiopathic steatorrhœa, whereas in cœliac disease a hypochromic anæmia is more common. Since most of the reports were published before the introduction of sternal puncture as a routine diagnostic procedure, the proportion of patients with genuine megaloblastic blood formation cannot be assessed. There appears, however, to be sufficient evidence to show that when a severe anæmia—i.e., an erythrocyte count below 2,000,000 per c.mm.—is found in adults with the sprue syndrome, not only is the blood picture macrocytic but the bone-marrow is generally megaloblastic. This also appears to be true of some patients with cœliac disease.

During the past year we have investigated 33 adults with the sprue syndrome. The anæmia was usually only moderate (mean red-cell count about 4,000,000 per c.mm.). The blood picture was usually macrocytic, as judged by the stained film, the high colour-index, and the high M.C.V.; and the bone-marrow was normoblastic. The macrocytosis was presumably determined by the increased numbers of early and intermediate normo present. These patients had received treatment high-protein low-fat diets, supplemented with injections and vitamins, for months or years before saw them.

The degree of macrocytosis which may be present the sprue syndrome when the red-cell count is 4,000, 5,000,000 is an interesting and striking feature which rarely seen in our experience in cases of classical cious anæmia with similar blood-counts who have received adequate liver therapy. We have found the anæmia associated with the sprue syndrome to be particularly resistant to all forms of treatment, including the injection of both purified and crude liver ex and the administration of iron and vitamins. Our that folic acid might supply the answer to this t peutic problem does not appear to have been f judged by the unsatisfactory hæmatological resp obtained in 9 out of 10 patients reported in this p Accordingly we suggest that, since neither paren liver extract nor folic acid may be effective in rest the blood picture to normal, some other hæmatinic f as yet unidentified, is required. That this factor may present in liver is suggested by our findings in case in which a rise of 1,000,000 per c.mm. in the red-cell co followed 14 days' treatment with proteolysed liver (hepamino) after the count had been stationary for 37 days on folic acid.

The unsatisfactory hæmatological responses which we report are in striking contrast to the results obtained by Spies et al. (1946) and by Garcia Lopez et al. (1946) in cases of tropical sprue in Cuba. These workers laid down definite criteria for the selection of patients, one of which was that the marrow should be megaloblastic. Only one of our patients had a classical megaloblastic marrow at the start of folic-acid therapy, and it was in this case that we obtained the most dramatic initial hæmatological response. Cases 6 and 7 both had typical megaloblastic marrows when we first saw them several years before the present investigation. The bone-marrow immediately before the start of folic-acid therapy was mainly normoblastic but contained many nucleated red cells intermediate in appearance between megaloblasts and normoblasts. We attributed this appearance to the preceding course of injections of liver extract, which had produced a partial maturation of the megaloblast series without restoring the blood-count to normal. In cases 6 and 7 folic acid completed the transformation to normoblastic blood formation and produced a rise in the blood-count of about 1,000,000 red cells per c.mm.

The Cuban series included only cases with an initial red-cell count of less than 2,500,000 per c.mm., whereas the red-cell count in our series at the start of folic-acid treatment was, with one exception, about the same as that recorded by Garcia Lopez et al. (1946) at the end of folic-acid therapy. The mean red-cell count at the end of treatment with synthetic folic acid in the 18 cases of tropical sprue recorded by Garcia Lopez et al. was 4,073,000 per c.mm.; whereas in a random series of 13 cases of tropical sprue and 20 cases of idiopathic steatorrhœa seen by us the mean red-cell counts after treatment with diet, liver injections, and vitamins, but without the administration of folic acid or proteolysed liver, were 4,162,000 and 3,912,000 per c.mm., respectively. These mean figures are not significantly different from that of the Cuban series ($t = 0{\cdot}36$, $P = 0{\cdot}75$; and $t = 0{\cdot}79$, $P = 0{\cdot}43$, respectively).

Another point noted by Garcia Lopez et al. (1946) was that their patients had eaten for long periods a diet deficient in essential food factors, particularly first-class protein and the vitamin-B complex, and that infection and infestation of the alimentary tract was commonly present. In contrast, no evidence was obtained that our patients had been taking an unsatisfactory diet before the onset of the sprue syndrome, and after the diagnosis had been made and before the start of folic-acid therapy they had been given for months or years a high-protein diet with supplements of vitamins.

In other words, the patients in the Cuban series appeared to be suffering from both a direct and a conditioned nutritional deficiency, whereas in our patients the deficiency was solely conditioned by a failure in absorption or utilisation. Accordingly it is doubtful whether the cases of the sprue syndrome reported by Garcia Lopez et al. should not be classified as examples of primary nutritional macrocytic anæmia, and whether dietary deficiency, supplemented by infection or infestation of the alimentary tract, had not led to intestinal changes causing diarrhœa and steatorrhœa. A vicious circle would thus be created leading to superimposition of a conditioned dietary deficiency on a direct dietary deficiency. One of us (R. H. G.) has seen many cases of severe malnutrition and anæmia in Indian troops stationed east of the Brahmaputra river in India and Burma. These men had suffered from many years of malnutrition before joining the Army, and during the jungle fighting, where supply difficulties were extreme, they suffered from diarrhœa, sometimes watery, sometimes fatty; avitaminosis, chiefly of the B complex; and anæmia, which was sometimes normoblastic but was frankly megaloblastic when anæmia was severe.

In idiopathic steatorrhœa and cœliac disease in this country, we suggest that the steatorrhœa is not primarily due to dietary deficiency or infection but results from an abnormality of the bowel, genetic (constitutional) in origin and leading to jejuno-ileal insufficiency and steatorrhœa. In keeping with this hypothesis is our finding of a familial history of steatorrhœa in some of our patients, the most striking example being a family in which five members have the syndrome.

If the abnormality of the intestinal tract is a genetic character, how is it that the syndrome displays itself sometimes in infancy and sometimes not until adult life? It is possible that, associated with the gene(s) primarily responsible for the condition, there are modifying genes and special environmental factors—e.g., infection of the alimentary tract, dietetic indiscretions or deficiencies, climatic variables, and unaccustomed and excessive physical effort—which so influence the action of the principal gene(s) that in some instances the syndrome is expressed in the infant as cœliac disease, whereas in others it appears only in the adult.

That these suggestions are not unreasonable is indicated by a consideration of the closely allied condition, Addisonian pernicious anæmia. It is widely accepted that the primary cause of this disease is an abnormality of the stomach, genetic in origin, leading to achlorhydria and, with advancing years, to a failure in production of intrinsic factor and finally to a megaloblastic anæmia.

If this hypothesis is true, it is not surprising that the results of folic-acid therapy in idiopathic steatorrhœa and cœliac disease in this country may be far less striking than those obtained in patients with the sprue syndrome in whom long-continued pre-existing dietary deficiency and intestinal infection and infestation are significant features.

Though there is good reason to believe that folic acid will give dramatic results in the treatment of megaloblastic anæmia in the sprue syndrome, there is little published evidence to show that folic acid alone will invariably restore the red cells qualitatively and quantitatively to complete normality. In the 18 cases recorded by Garcia Lopez et al. (1946) 15 were given folic acid for periods ranging from 60 to 152 days. Of these only 4 attained a red-cell count of 4,500,000 per c.mm., and none reached a level of 5,000,000 per c.mm.

It may be that, after the marrow has changed from megaloblastic to normoblastic as a result of folic-acid therapy, some other missing factor is required to enable the erythropoietic mechanism to function normally.

SUMMARY

Folic acid was given to 10 patients with the sprue syndrome. In 9 cases the hæmatological response was considered unsatisfactory, in that this treatment either produced no significant rise in the red-cell count or failed to restore the blood-level and hæmatological picture to normal.

Diarrhœa was controlled and clinical improvement resulted in the 7 adults suffering from tropical sprue or idiopathic steatorrhœa. In contrast, no significant benefit was observed in the 3 patients with cœliac disease.

Folic acid did not improve fat-absorption, as estimated by fat-balance tests, in 5 out of 6 cases of the sprue syndrome.

Our results are compared with those of other workers.

We are indebted to Messrs. Lederle & Co. Inc. for supplies of folic acid, and to Prof. R. W. B. Ellis and Prof. L. J. Davis for permission to include in this report patients under their charge.

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CARE OF THE URINARY TRACT IN PARAPLEGIC PATIENTS

REVIEW OF 82 CASES

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THE experience gained in the treatment of 82 paraplegic soldiers in the Midland Regional Spinal Unit is here reviewed.

Almost all the men arrived with a suprapubic cystotomy of the high type—i.e., a fistula about 5 cm. above the pubis. In two patients this leaked, especially when the man lay on his face. The cause of the relaxed wound was evidently the poor condition of the patient, and possibly there was also a trophic element. Improvement in general health led in all cases to healing of the fistula round the tube and cessation of leakage.

BLADDER DRAINAGE

Since phosphatic incrustations were liable to form on the tube head, we changed the tube at weekly intervals. The Malecôt type was preferred to the de Pezzer, as being easier to withdraw and giving better drainage. We took special care to prevent the tube from playing in and out of the bladder, because this must carry in infection and probably damages the trigonal region. Too small a tube is easily blocked—a serious accident, often leading to ascending pyelitis. Size 28 Charrière was our standard. Some care is needed in reintroducing the tube, and the direction of the track must first be ascertained in each case. On one occasion the tube was pushed into the peritoneal cavity instead of into the bladder; fortunately the disaster was retrieved. We now teach ambulatory patients to care for their suprapubic apparatus and to wash out their bladders. We tried the Millin type of drainage bag, but the slightly greater pressure needed was too much for the paralysed bladder, and we had to go back to the leg bag.

Tidal Drainage

This was begun enthusiastically. Home-made apparatus of various kinds gave way rapidly to the Wells's type; and when, after some months, we received about a dozen of these, mounted on stands, we hoped that our difficulties were on the way to solution. But eventually we decided, not only that the urines were more cloudy, but also that pyrexial attacks were probably commoner with all methods of bladder drainage other than the direct simple one of leading the suprapubic tube into a bedside bottle. With regret, and after extensive trial, we gave up a double-channelled suprapubic tube which allowed continuous-drip irrigation of the bladder, because the exit channel was apt to become blocked.

While tidal drainage or continuous irrigation was the routine we tried many different lotions. The naked-eye appearance of the effluent mixture of urine and lotion seemed to be a reasonable guide to their effect. After trying proflavine (in various dilutions), potassium permanganate, 'Surfen,' and "solution G," we preferred the last; but more recently, for routine bladder lavage four times a day, we have been using 1 in 5000 neutral proflavine.

URINARY ANTISEPTICS

The flora of the drained bladder seems singularly constant. Again and again the laboratory report was *Bact. coli*, *Strep. fæcalis*, *B. proteus*, and *Ps. pyocyanea.*

We have taken reports on the urine of 19 patients at Barnsley Hall and 4 in the Queen Elizabeth Hospital for review. At Barnsley Hall *B. proteus* was reported present 34 times, *Ps. pyocyanea* 58 times, *Bact. coli* 137 times, non-hæmolytic streptococci 71 times, and other organisms twice. At the Queen Elizabeth Hospital *Bact. coli* was reported 19 times, *Ps. pyocyanea* 9 times, *B. proteus* 5 times, enterococci 4 times, staphylococci 4 times, non-hæmolytic streptococci 6 times, and various other organisms, such as monilia and diphtheroids, occasionally. Again it was usual for three or four organisms to be present together; and when the four common organisms were entrenched in the bladder they seemed rarely to disappear; occasionally one or other would not be reported for a few tests, but would reappear later.

It is noteworthy that some organisms do not flourish, and that the flora remains so constant and restricted.

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The urine from the bladder was always infected but sometimes almost clear to the naked eye. The kidneys were rarely, if ever, tender unless obstructed or the site of gross cortical or perinephric abscess. Indeed, since surgical intervention was not indicated except for these complications, we came to regard the absence of spontaneous pain and of tenderness as a strong reason for persisting in medical treatment. This last conclusion was not reached at first, because a patient injured abo the level of the D10 might be expected to have an insensitive kidney and perhaps an insensitive kidney bed. It is usually held that the sensory innervation of kidney is from D10–D12. One patient (sensory level D[illegible] complained of deep-seated pain below the right costal margin, and on investigation nothing abnormal was found except dilatation of the right kidney pelvis and ureter. *In this kidney stone was detected some months* later. In another patient (sensory level D10) the left kidney became tender when a perinephric abscess formed.

In spite of these two clinical observations we did not rely solely on the abovementioned rule but also sought to exclude an obstructed infected kidney by either excretory urography or cystoscopy with injection of indigo-carmine. We did not often find that a presumed pyelonephritis led to delay in the excretion of indigo-carmine; nor did we find, as some writers have maintained, that in such cases the ureter was always dilated. We usually made one or other of these investigations if pyrexial attacks did not respond to medical treatment.

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An unexplained and unexpected finding has been that in some patients wounded comparatively high—e.g., D6—whose leg reflexes have been absent from the beginning, there is no faradic response in the lower limbs. Probably in no case of this type have we succeeded in establishing automatic micturition; and, since voluntary control of the abdominal muscles has gone, it is clearly impossible to empty the bladder by straining.

In the patient whose cauda equina is injured, we have, as Watkins (1936) pointed out, an entirely different problem. Some of these patients can keep fairly dry and empty or partly empty the bladder by regular voluntary straining; no doubt residual urine is often or always present. In such cases we have found that considerable leakage of urine is likely, and that in every case the ureters are somewhat dilated. This is bound to harm the patient, and in one case was associated with deterioration of health and with pyrexia; hence we have thought it wise to defer closure of the bladder during the first two years of the man's paralysis, lest any recovery in the nervous system might be hindered by this depression of his vitality. Some patients have come under our care whose bladders have already been closed, or have never been drained, and it was in these that a dilated upper urinary tract was constantly found.

One patient with a cauda-equina injury (L5) raised special problems.

He came under our care because he appeared to suffer intense pain from his suprapubic tube, especially when he bent to a sitting position. His bladder was so much contracted that, when we tried to obtain a cystometrogram, the radio-opaque medium ran straight up his ureters after only a few cubic centimetres had been introduced into his bladder. Adequate cystoscopic study of the bladder was almost impossible.

It seemed likely that at some stage he had had severe infection, with sloughing of the bladder. After discussion with him we decided to attempt to punch away the region of his external sphincter, so that he would drain constantly through his penis into an apparatus. This was done, and the low pressure afterwards required to run lotion from the urethra into the bladder proved that the obstruction was removed. His bladder was then closed, and remained closed for three months; but unfortunately the obstruction at the urethra seemed to return, he became pyrexial, his previously dilated ureters dilated still further, and eventually his suprapubic wound burst open again.

This case is related because, though the treatment failed, its underlying plan may be correct: with a cauda-equina bladder the proper course may be to remove permanently the obstruction to urination in the region of the triangular ligament, and to allow the penis to drain into a urinal. Later it may be possible to restore some type of voluntary control by one of the well-known methods (using the gracilis muscle or a fascial sling from the rectus muscle). We hope to be able to explore this method further.

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We recognised from the beginning the importance of preventing stone formation, and the renal tract was always radiographed every two months. Instructions about fluid intake became more explicit as time went on, and soon an intake-and-output chart was kept for all patients. They coöperated well, and the average output is now about 130 oz. per man per day. An extra ration of tea was provided, and beer, too, helped. The position of patients was changed frequently. Lying prone for long periods, in the treatment of sacral bedsores, did not seem to predispose to stone formation.

We tried in all patients to secure a urine of pH 5–5·5. For this purpose ammonium chloride gr. 15 was given in a capsule or chocolate-coated tablet four times a day, and in addition in most cases a high-acid-ash diet was ordered. As a rule the suprapubic tube was changed weekly, because it quickly becomes encrusted—often after even this short period. A straight suprapubic tube seems less likely to become encrusted than a self-retaining one.

In one case vesical calculi formed in spite of tidal drainage with solution G, and in several cases they did not dissolve when the solution was used for six weeks. Only in one case, in fact, did it cause stones to dissolve, and these were small—1–2 cm. in diameter. Of the others, the stone was crushed in 5, evacuated through a cannula in 1, and was left alone in 1; this last patient died of renal sepsis and had calculi in both kidneys. Stones have not recurred in any of our cases after litholapaxy.

Vesical calculi are becoming rarer: presumably the routine care given is proving effective. Two cases which came under our care recently were on tidal drainage for many months up to the crushing of the stone, and this may have actually helped the formation of the calculi, which are presumably less likely to develop in the constantly empty bladder. No special flora seems to be associated with the formation of stone.

The stones were easy to crush, and the suprapubic fistula was not inconvenient, for the expanded end of the self-retaining catheter readily occluded the sinus and allowed the bladder to be distended. The only complication was a long pyrexial attack in one patient, in whom the intravenous pyelogram after the litholapaxy showed widely dilated ureters and kidney pelves; in a few months these contracted to normal. It seemed probable that the vigorous compression of the evacuator dilated the ureters, and in later cases the bulb was compressed very slowly and gently.

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In 16 cases renal or ureteric calculi were found. In 7, renal calculi developed while the patients were under our care, but in the last year we have found renal calculi in only 3 patients. In 1 of these the stone may have been present before admission; in another it formed while the patient was undergoing orthopædic treatment in another ward.

There is no apparent connexion between stone formation and the level of the paralysis. A stone developed in a dozen of these, mounted on stands, we hoped that our difficulties were on the way to solution. But eventually we decided, not only that the urines were more cloudy, but also that pyrexial attacks were probably commoner with all methods of bladder drainage other than the direct simple one of leading the suprapubic tube into a bedside bottle. With regret, and after extensive trial, we gave up a double-channelled suprapubic tube which allowed continuous-drip irrigation of the bladder, because the exit channel was apt to become blocked.

While tidal drainage or continuous irrigation was the routine we tried many different lotions. The naked-eye appearance of the effluent mixture of urine and lotion seemed to be a reasonable guide to their effect. After trying proflavine (in various dilutions), potassium permanganate, 'Surfen,' and "solution G," we preferred the last; but more recently, for routine bladder lavage four times a day, we have been using 1 in 5000 neutral proflavine.

URINARY ANTISEPTICS

The flora of the drained bladder seems singularly constant. Again and again the laboratory report was *Bact. coli, Strep. fæcalis, B. proteus*, and *Ps. pyocyanea.*

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ILATERAL CONGENITAL DISLOCATION OF RADIAL HEAD

R. K. MAGEE
M.D. Toronto, F.R.C.S., F.R.C.S.C.
MAJOR R.C.A.M.C.

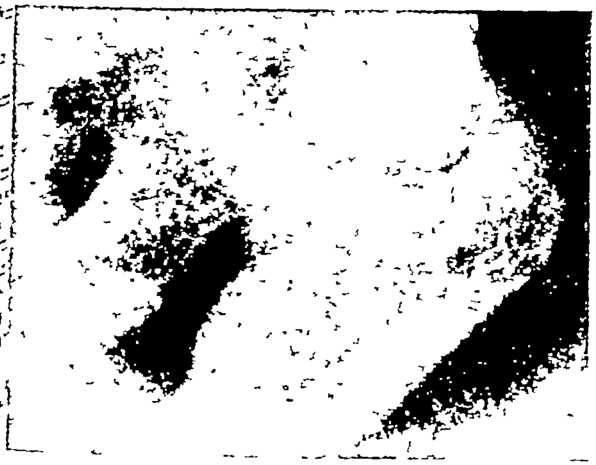
BECAUSE of its rarity and possible medicolegal signifi- ice the following case seems worth recording.

A man, aged 27, was admitted to hospital twenty-four urs after sustaining an injury to his left elbow by being own from a motor-cycle.

On examination there was swelling of the left elbow, with derness over the outer condyle. Flexion was limited to , and extension was 15° less than normal. Pronation l supination were painful and limited to half the normal ge.

Radiography revealed a dislocation of the head of the lius, without any fracture of the ulna or other bone (see ure). The head of the radius could be felt prominently der the swelling, and on supination and pronation it med not only to rotate on its long axis but also to move rough a small arc round the ulna, and it could not be luced. There was no shortening or other abnormality of e ulna.

Close questioning revealed that the patient had always d some limitation in flexion of both elbows, being unable to bring the finger-tips closer than 3 in. away from the shoulders. He had had slight pain in the elbows that had been diagnosed as arthritis. Radiography of the right elbow showed a condition similar to that of the left elbow—namely, a deformity of the head of the radius, which is rounded and has lost its cup-shaped articular surface. The head is bent forward and displaced forward, and the normal radial articular facet of the ulna is absent.



ateral radiogram of left elbow, showing congenital dislocation of head of radius.

The radiogram shows this case to be one of bilateral congenital dislocation, which is rare. In some reported cases it had been of medicolegal importance to establish that the dislocation was congenital and not traumatic.

Watson Jones[1] states: "Traumatic dislocation of the head of the radius unaccompanied by other injuries is practically unknown. It is almost invariably associated with a fracture of the upper shaft of the ulna."

This patient will recover his former range of movement and will require no specific surgery, unless arthritis justifies excision of the head.

I am grateful to Major R. M. Hall, R.C.A.M.C., for the radiogram.

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[1] Jones, R. W. Fractures and Other Bone and Joint Injuries, 1941, Baltimore, vol. II, p. 506.

TOXIC EFFECTS OF THIOUREA, THIOURACIL, METHYL THIOURACIL, AND AMINOTHIAZOLE IN THYROTOXICOSIS

MARGARET E. MORGANS
M.B. Lond., M.R.C.P.
ASSISTANT, MEDICAL UNIT, UNIVERSITY COLLEGE HOSPITAL, LONDON

SINCE Astwood (1943) first described the treatment of thyrotoxicosis with thiourea, abundant evidence has accumulated to show that the disease can be controlled by this and allied drugs (Cookson 1945, Himsworth 1943, 1944, Joll 1944, Nussey 1944, 1946). If these drugs had no toxic effects, their administration would probably be generally accepted as the treatment of choice. However, no preparation has yet been found which controls thyrotoxicosis and is entirely devoid of toxicity. It therefore seems desirable to assess the relative toxicity of the various preparations now available.

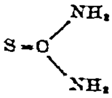
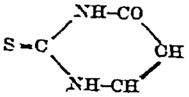
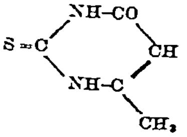
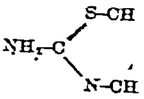
Agranulocytosis is the most serious and for practical purposes the only fatal toxic effect of the thiourea group of drugs. In the U.S.A., Moore (1946) found agranulocytosis in 19 (1·8%) out of 1091 cases, and Van Winkle et al. (1946) in 142 (2·5%) out of 5745 cases. The fatality-rates from agranulocytosis in the two series were 0·5% and 0·4%. All clinicians agree that a *leucopenia* may develop and that these drugs depress the level of granular cells of the blood. However, Perrault and Bovet (1946) and Bastenie and Tagnon (1946) claim that a related compound, aminothiazole, does not depress the level of these cells.

Other complications described include drug fever, rashes, petechiæ, glandular and splenic enlargement, joint effusions, and conjunctivitis (Cookson 1945, Eaton 1945, Himsworth 1943, 1944, Joll 1944, Newcomb and Deane 1944, Nussey 1944, St. Johnson 1944).

Pericarditis and heart-block were reported by Bain (1945); jaundice by Sloan and Sloan (1944), Kahn and Stock (1944), Paschkis (1944), and Gargill and Lesses (1945); and lesions resembling periarteritis nodosa by Gibson and Quinlan (1945).

Nausea, vomiting, and halitosis were observed by most writers in the early stages of treatment with thiourea. Swollen submaxillary glands were reported by Gargill and Lesses (1945) and by Williams and Clute (1944), and enlargement of the thyroid gland by Himsworth (1943) and Donald and Dunlop (1945).

In the investigation reported here the preparations tested and the number of cases in which each was used were as follows:

Preparation	*Chemical Composition*	*No. of cases treated*
Thiourea		7
Thiouracil		49
Methyl thiouracil		23
Aminothiazole		13

During the first three weeks, thiourea was given in the dosage of 3 g. daily as three doses of 1 g. Th first

TABLE I—EFFECT OF FOUR THIOUREA DRUGS ON GRANULAR CELLS DURING THE FIRST THREE WEEKS OF TREATMENT

Drug	Thiourea	Thiouracil		Methyl thiouracil	Amino-thiazole
		1·0 g. daily	0·6 g. daily		
No. of cases	7	29	20	23	13
Average initial level of granular cells per c.mm.	4700	4400	4400	4400	3300
Average change of level of granular cells per c.mm. from initial levels :					
End of first week..	..	−370	−970	−1000	+230
End of second week	..	−250	−850	+180	+300
End of third week	−560	−40	−340	+50	+100
Proportion of cases showing depression of absolute granular-cell count of 1000 per c.mm. from initial levels ..	14 %	31 %	30 %	39 %	38 %

29 patients treated with thiouracil were given 1 g. daily in five divided doses. The remaining 26 patients on thiouracil, those on methyl thiouracil, and those on aminothiazole received 0·6 g. daily in three divided doses. In these doses all the drugs appeared equally effective in the control of the thyrotoxicosis. Maintenance dosage varied according to the requirements of the patient, and with thiouracil, methyl thiouracil, and aminothiazole was usually 50–100 mg. daily. With thiourea the usual maintenance dose was 1 g. daily or twice daily.

INCIDENCE OF TOXIC EFFECTS

The assessment of the relative toxicity of the four drugs was made in the first eight weeks of treatment, because after that time toxic manifestations are so rare that insufficient were available for comparison.

Agranulocytosis may be arbitrarily defined as a fall in the granular-cell count to below 500 per c.mm., with or without infection. No case was seen while under treatment with any of these drugs during the first three weeks of heavy dosage, but 2 fatal cases were seen later.

Case 1.—A woman had received 65·2 g. of thiouracil in fifty-three days. This abnormally large dosage was used because the patient had had previous iodine treatment and appeared resistant to thiouracil.

Agranulocytosis developed on the fifty-third day after starting treatment with thiouracil and when the patient had been taking 0·6 g. daily for the previous sixteen days. No other drugs had been taken.

About fourteen days before thiouracil was stopped the patient had a furuncle in his nose, and a week later developed a whitlow. Terminally he had bronchopneumonia and a lung abscess.

The total white-cell count was 1500 per c.mm., with no granular cells. Marrow puncture showed that the agranulocytosis was of the non-maturation type. A blood-count before the patient left hospital showed no greater depression of granular cells than appears usual during treatment with the thiouracil group of drugs.

Case 2.—A woman reported to her private doctor with pneumonia and agranulocytosis, having taken 23·8 g. of thiouracil in thirty-six days (initial treatment was 1 g. daily for three weeks, and subsequently 0·2 g. daily). No details of marrow findings were available, but no granular cells were seen in a blood smear.

Both these cases of agranulocytosis occurred while the larger doses of thiouracil were being used, but with subsequent dosage no case has been encountered. This gives an incidence of 2·1% for the whole series, which agrees with the findings of Van Winkle et al. (1946). Both of our patients, however, died, so the fatality-rate was also 2·1%, whereas the fatality-rate for agranulocytosis in the corresponding American se was only 0·4%.

Leucopenia (granular cells less than 1500 per c.mm.) was seen in only 4 cases during the first eight w Of these, 3 were treated with thiouracil, 2 with 1 g. daily, and the other with 0·6 g. daily, and the fourth with methyl thiouracil. Severe leucopenia was not seen under treatment with thiourea or aminothiazole. A depression of the level of granular cells by 1000 or more per c.mm. was seen in many cases with all these drugs during the first three weeks. This period may be taken for comparison of this effect, since dosage in the four groups was comparable during this time. Excluding the thiourea group, where the number of cases is very small, the remaining three drugs depressed the granular cells with equal frequency.

Table I shows the effect of the different drugs on the average granular-cell count during the first three wee of treatment. The greatest fall appeared at the end of the first week, with a gradual improvement towards the end of three weeks. This fall was greatest in the methyl thiouracil series. Perrault and Bovet (1 and Bastenie and Tagnon (1946) claim that aminothiazole has no depressant effect on the granular cells. If the average figure in our 13 cases is considered alone there was no fall; but in two of them the granular-cell count was halved during the first three weeks, and in 38% of them the absolute granular-cell count was lowered more than 1000 per c.mm. from initial levels. In view of these findings and the relatively small number of cases in the series of Perrault and Bovet (1946) and Bastenie and Tagnon (1946) we feel that aminothiazole cannot be said to have no depressant effect on the granular cells. It has further serious drawbacks to its use which will be described below.

The incidence of other complications is shown in table II.

Drug fever, developing usually about the tenth day, was most common in cases treated with thiourea. The next highest incidence was among those treated with aminothiazole, and the lowest in those treated with thiouracil and methyl thiouracil.

Rashes, which included urticarial, erythematous, and maculopapular types, were seen most often with aminothiazole and were usually accompanied by fever. They were less common with thiourea, and none was seen wi thiouracil or methyl thiouracil.

TABLE II—TOXIC EFFECTS OF FOUR THIOUREA DRUGS DURING FIRST TWO MONTHS OF TREATMENT

Drug	Total cases treated	Agranulocytosis	Leucopenia*	Fever	Rash	Petechiæ	Enlarged glands	Enlarged spleen	Joint effusions	Pericarditis	Thyroid gland enlargement	Nausea	Halitosis	Salt taste	Myalgia	Jaundice
Thiourea 3·0 g. daily .	7	0	0	6	1	0	0	0	0	0	1	7	6	0	0	0
Thiouracil 1·0 g. daily .	29	2	2	2	0	1	0	0	0	0	0	0	0	0	0	0
0·6 g. daily ..	20	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Methyl thiouracil 0·6 g. daily ..	23	0	1	2	0	0	3	0	1	1	2	0	0	0	0	0
Aminothiazole 0·6 g. daily ..	13	0	0	6	5	0	1	0	0	0	0	3	3	1	3	2

* Leucopenia—granular cells below 1500 per c.mm.

Petechiæ, without thrombocytopenia, were seen only duri treatment with thiouracil and not with any other drug.

Enlarged lymph-glands were most common with amin thiazole, less common with methyl thiouracil, and never se with thiourea or thiouracil.

Splenic enlargement was not observed.

Joint effusions and *pericarditis* were noted in 1 case treated with methyl thiouracil about the forty-second day of treatment, when the dose was still 0·6 g. daily.

Heart-block was not observed.

Toxic jaundice was seen only with aminothiazole. It developed in 2 patients, 1 of whom was gravely ill.

Conjunctivitis was seen with thiourea only.

Nausea and vomiting occurred in all cases treated with thiourea and in some treated with aminothiazole, but not with either of the other two drugs.

Halitosis was noted most often in patients receiving thiourea and occasionally in those receiving aminothiazole. It was not noted with thiouracil or methyl thiouracil. One patient taking aminothiazole noticed a salt taste in the mouth.

Enlargement of the thyroid gland was seen in one patient treated with thiourea, and in one treated with methyl thiouracil. Both of them showed signs of overdosage.

COMMENTS

Thiourea is to be avoided in the treatment of thyrotoxicosis in view of the high incidence of unpleasant side-effects and because it definitely depresses the level of granular cells in the blood. Though Continental workers have claimed that aminothiazole does not produce granulopenia, our results show that it may depress the granular cells. Because 2 cases of jaundice were seen among 13 patients treated, 1 being extremely ill, the use of aminothiazole was given up in this clinic. Methyl thiouracil and thiouracil both produce some depression of the white cells and in some cases leucopenia, but the incidence of other toxic effects is very low. Of the preparations now available they appear to be the drugs of choice in the treatment of the disease. Table II shows that there is no difference in the incidence of the toxic effects of these two drugs.

During the preparation of this paper supplies of propyl thiouracil have been received. Astwood and van der Laan (1945) found no toxic effects in a series of 37 cases treated with this drug. Our own experience is as yet insufficient to compare its toxicity with the other four drugs.

SUMMARY

The toxic effects of thiourea, thiouracil, methyl thiouracil, and aminothiazole during the initial phases of treatment of thyrotoxicosis are compared.

Thiourea and aminothiazole have many toxic effects and both depress the granular cells of the blood. Their use in clinical practice is no longer justifiable.

Thiouracil and methyl thiouracil are more satisfactory. Both depress the granular cells of the blood and in a few cases to a serious degree. During their use the incidence of other complications is much lower than with the other two drugs. Provided the patients so treated are carefully watched, both drugs can be used with a reasonable degree of safety.

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Preliminary Communication

USE OF A TOURNIQUET TO PROLONG THE EFFECT OF PENICILLIN

In the search for a device to slow down the rate of absorption of penicillin into the circulation we have studied a simple method, which gives results very similar to those obtained by the oil-beeswax preparations. This is achieved by injecting penicillin subcutaneously in an area (thighs or arms) where the venous and lymphatic circulation can be delayed by exerting a light pressure with a rubber tourniquet. This pressure must not be sufficient to induce any unpleasant sensations in the limb.

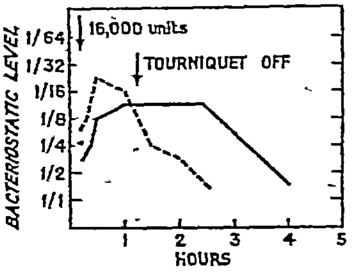

Fig. 1—Bacteriostatic levels of serum after injection of 16,000 units of penicillin with tourniquet applied (continuous line) and without tourniquet (dotted line). The curves represent the average of the results obtained with streptococci and with staphylococci as test organisms.

The penicillin concentration in the blood-serum was estimated by the capillary-tube method of Fleming, using streptococci, and by another method devised in St. Mary's Hospital with phenol red as indicator of growth of staphylococci. Both methods have given regular and reasonably comparable results.

The curves (figs. 1–4) show the amount of penicillin in the blood-serum (average of the results obtained with both methods) after subcutaneous administration. In each chart the broken line represents an experiment performed next day with the same dose in the same patient but without the tourniquet.

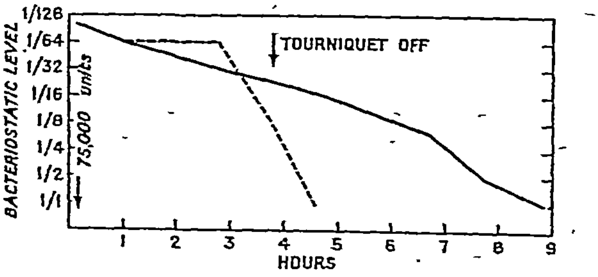

Fig. 2—As in fig. 1, but with 75,000 units of penicillin.

From these curves it appears that our method would be useful in reducing the number of injections needed to maintain a constant level in the blood without increasing the daily dosage of penicillin. Fig. 4 shows that the tourniquet should not be kept on too long, to avoid a double rise of penicillin concentration, which is probably

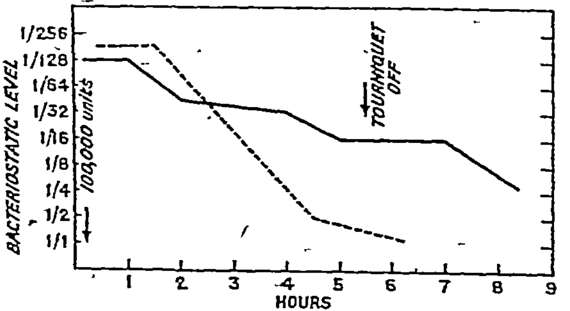

Fig. 3—As in fig. 1, but with 100,000 units of penicillin.

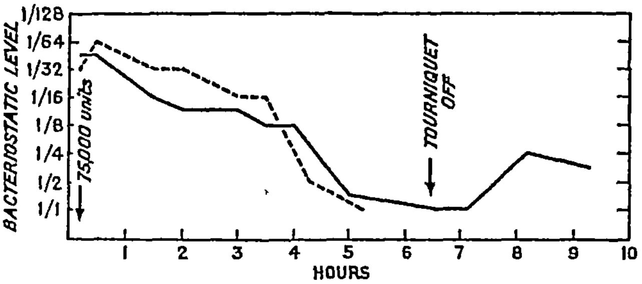

Fig. 4—As in fig. 2, but tourniquet was taken off late, causing a double rise of penicillin concentration.

less efficient than a constant level. In our experiments the time for which the tourniquet was applied varied from an hour for injections of 10,000 units to five hours for injections of 100,000 units; it must be progressively lengthened for higher doses.

With this method of administration the number of injections can be reduced to three of 75,000 units in 24 hours or five of 100,000 units in 48 hours without letting the penicillin concentration fall below the lowest effective level. An effective concentration of penicillin during 24 hours is also to be expected after a single injection of 600,000–800,000 units.

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Reviews of Books

Modern Attitudes in Psychiatry

March of Medicine 1945, no. x of the New York Academy of Medicine lectures to the laity. By IAGO GALDSTON, M.D.; JAMES H. WALL, M.D.; G. CANBY ROBINSON, M.D.; FRANZ ALEXANDER, M.D.; Colonel WILLIAM C. MENNINGER; EDWARD WEISS, M.D. New York: Columbia University Press. London: Oxford University Press. Pp. 150. 13*s.* 6*d.*

THESE "lectures to the laity" of the New York Academy of Medicine are all worth reading. Colonel Menninger tells concisely how the American Army organised its psychiatric service during the war; and if Dr. Robinson and Dr. Weiss write for laymen rather more pointedly than the others, they still have much to say that will be unfamiliar to many medical readers. The outstanding essay, however, is Dr. Alexander's on present trends and future outlook, a rewarding study for those who like definition to precede discussion. He is concerned with the "history of scientific thought" in psychiatry, and traces the progress of its "etiological orientation." Scientific psychiatry began, he says, when mental changes were correlated with neuropathological conditions, and it was possible to adopt the hypothesis that some neuropathology would be found in all psychiatric conditions. This was first put forward somewhere in the eighteenth century and was in its heyday in the first decade of the twentieth. In the meantime, Freud had introduced his new and revolutionary idea that psychological disturbances had psychological antecedents. This paved the way for the stage which psychiatry is now reaching—the anthropological:

> "This cultural point of view sharpens our eyes for detecting in the kaleidoscopic variety of emotional disturbances the common features determined by the milieu to which every person growing up in the same society is exposed. . . . Psychiatry is concerned not only with therapy but also with prevention. Large scale prevention is essentially a problem of education which requires a keen understanding of prevailing culture patterns."

The whole essay is in a sense a tribute to Freud, but not to Freud as the repository of revealed truth. It is not even because of Freud's own contribution that Dr. Alexander puts him among the great, but because he was the first explorer in a new territory into which others can now follow and journey far beyond the reach of the pioneer.

Physiologie pathologique et traitement chirurgical des maladies artérielles de la vaso-motricité

RENÉ LERICHE, professor, Collège de France. Paris: Masson. Pp. 304. Fr. 280.

Thromboses artérielles

R. LERICHE; with the collaboration of IVAN BERTRAND, director of the institute of neurobiology at the Salpêtrière. Paris: Masson. Pp. 534. Fr. 600.

IN the field of vascular disorders few people have had wider experience than Leriche. His interests have been both surgical and pathological, and his experimental work is widely known. In his two latest books, clinical methods have been supplemented by oscillometry, whose limitations he recognises, and arteriography, examples of which illustrate the text. More precise measurements by, for instance, plethysmographic or skin-temperature methods have not been attempted.

The books report his lecture courses for 1943 and 1944, and the first volume includes sections on burns and frostbite, "shock," hypertension, arterial spasm, and the Raynaud phenomenon. There are general preliminary chapters on arterial and capillary pathology. On the surgical treatment of essential hypertension—a subject of much interest at the moment—he has little to contribute, contenting himself with recording the results obtained in America by White and Smithwick. In England, where Raynaud's phenomenon is regarded, according to the teaching of Lewis, as due to hypersensitivity of the digital vessels to cold, readers may be surprised to find stellate ganglion damage, demonstrated histologically in sections reproduced in the text, held responsible for the disease.

The second volume, of more interest to the surgical reader, deals with arterial thrombosis after trauma, with the Volkmann contracture, with arterial disease in thrombo-angiitis obliterans, diabetes, and old age, and with coronary thrombosis; case-histories illustrate the author's points, but surgical treatment is discussed without much detail. Leriche advocates unilateral adrenalectomy at an early stage of Buerger's disease—a measure based on histological abnormalities found in the suprarenals at autopsy, and on animal experiments by his colleagues. Both he and Oppel claim promising results in arresting the disease.

A long and informative section is given up to penicillin and streptomycin in the 1946 YEAR BOOK OF GENERAL THERAPEUTICS (Chicago: Year Book Publishers. London: H. K. Lewis, pp. 443, 21*s.*), edited by Dr. Oscar W. Bethea. Advances in sulphonamide therapy are also fully reviewed, and there are sections on thiouracil, the treatment of malaria and syphilis, vaccines, anæsthetics, and drugs acting on the circulatory and autonomic nervous systems.

Dr. Evarts A. Graham, in his introduction to the 1946 YEAR BOOK OF GENERAL SURGERY (Chicago: Year Book Publishers, London: H. K. Lewis, pp. 679, 21*s.*), draws attention to accounts of Crafoord's operation for coarctation of the aorta, and Blalock's operation for the relief of pulmonary stenosis in blue babies. Other subjects covered are the use of penicillin in the treatment of appendicitis and of brain abscess, operations for idiopathic dilatation of the œsophagus, and advances in anæsthesia.

The nutrition panel of the food group of the Society of Chemical Industry invited 32 scientists interested in food to read papers on different nutritional problems before its members. These papers were revised and brought up to date by their authors, edited by Mr. A. L. Bacharach and Mr. T. Rendle, and published, with an introduction by the late Sir Joseph Barcroft, F.R.S. (THE NATION'S FOOD, London: Society of Chemical Industry, pp. 349, 18*s.*). Here is everything a dietitian, a scientific caterer, and a physician needs to know about the chemistry and physiological values of the nation's food. There is, moreover, a considerable amount of "fine confused feeding" for the market-gardener, the stock-breeder, the cook, and the (earnest) politician. Altogether this is a book to be commended.

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THE LANCET

LONDON: SATURDAY, APRIL 19, 1947

Grouping of Hospitals

VERY soon the new regional hospital boards will be appointed and will have to face the problem of forming hospitals into groups under the care of hospital management committees. "The object in forming a group," said the London survey,[1] "is to provide a pool of accommodation and treatment facilities which can be used as a single whole. The specialist medical staff should be common to all the units in the District Hospital group, and nursing staff should also be common, particularly for the purpose of training. In planning the coördination of the service, the first step is to determine the units to be included in the group; the second is to determine which inpatient and outpatient services can most efficiently be provided at the various units and how special branches should be allocated between them." These are most desirable objects, and clearly a large measure of grouping must be undertaken if they are to be achieved. Nevertheless it is worth recalling that at the time when the surveys were made the conception of regional organisation had not been developed; and some of the purposes for which grouping was then recommended might now be more easily achieved through regional influence on such matters as distribution of consultant staff and location of specialist units. Moreover these surveys, invaluable though they are, took little account of two practical issues which have since become much more prominent—namely, the extreme shortage of nursing staff in many hospitals and the urgent demand for decisions on priorities for development. These are two aspects of one problem which cannot be dissociated from any decisions taken in regard to the grouping of hospitals.

The nursing problem is without exception the most critical with which the regional boards will have to contend, and it would be folly to proceed with grouping of hospitals before examining the effect this grouping is likely to have on the recruitment and retention of nursing staff. As we have already noted,[2] many local-authority hospitals are proving unable to attract and retain sufficient nursing staff to keep their beds open, and the number of beds in use is therefore tending to fall rather than rise. Inclusion of such deficit hospitals in a group which contains a teaching hospital should tend to ease their situation, since generally speaking the tradition and reputation of the voluntary teaching hospitals is such that they should be able to enlarge their schools and take over the staffing of all the hospitals in their group. But where the local-authority hospital, by virtue of its size, becomes the major unit of a group, and decides to unify the nursing staffs under its control, the result may be very different and perhaps disastrous; for there is no solid ground for supposing that girls who are at present willing to work in the small voluntary hospitals, because of the "homely atmosphere," will be forthcoming if control passes into the hands of the large ex-local-authority neighbour, whatever new flag it flies. When discussing projects for expansion of existing hospitals or for erection of new ones it is well to recognise that they are primarily contingent not on money, or on labour, or on the organisation of medical staff, but simply on securing nurses. Until the decline in the nursing staff of the local-authority hospital of today has been arrested and reversed, expansion is likely to be limited to those hospitals—often quite small—which can get nurses and can keep them. Approval of plans for extension must depend primarily on the ability of the hospital in question to find its complement.

The surveys provide material on which the regional boards can work; but the surveyors could not give each hospital an opportunity of stating its point of view at all fully, and more information will in fact be required before the new boards can be sure of grouping all their hospitals in the way best suited to their area. Estimates for expenditure, however, will need to be submitted next autumn in anticipation of the appointed day in April, 1948, when hospitals will become an Exchequer responsibility; and since the management committees will be responsible for preparing these estimates there seems at first sight to be no way of escaping early demarcation of the groups they are to manage. The only alternative which appears feasible is that some of the existing hospital committees might be given, temporarily, the functions of hospital management committees—without prejudice to any future arrangements in regard to grouping which the board may think desirable. This would have the merit of enabling the boards to proceed at their own pace, and get to know the personnel and facilities of the various hospitals under their care, which would put them in a better position to judge the probable repercussions of any proposed grouping and alteration in function. In some cases the advantages of an immediate merger are of course overwhelming, but in others there is grave risk of friction and misunderstanding: there are places where the best results might be obtained in the first instance by unification of the medical staff and cross-representation of lay personnel, and others where some considerable time must elapse before it is clear where a unit would best fit into the new scheme. The main—and serious—objection to postponement of grouping is the position of the local-authority hospitals, which cannot continue to be run by their present owners yet seldom have committees qualified to accept responsibility for their management. But would it be impossible, where it appears desirable for a local-authority hospital to remain for the time being outside a group, to appoint an interim committee to manage it?

The case for avoiding a rigid time-table is reinforced by the desirability of experiment. It has often been said that if a group is to provide a complete range of general and specialist services (including maternity, infectious diseases, and chronic sick) it may need

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[1] Gray, A. M. H., Topping, A. Hospital Services of London and the Surrounding Area, 1945.

[2] *Lancet*, Feb. 1, p. 181.

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'Soluthiazole' is the sulphathiazole analogue of 'Soluseptasine' and presents sulphathiazole in the form of a soluble compound which produces approximately neutral solutions in water.

It provides a means for the parenteral administration of sulphathiazole by either the intravenous or intramuscular route, and for its topical application. The chief clinical indication of 'Soluthiazole' is to initiate therapy in patients who are acutely ill or to treat patients who are unable to take sulphathiazole by mouth. It may also be used by topical application in the treatment of infected conditions of the conjunctival sac, nasosinuses, joint cavities, pleural and peritoneal sacs.

SUPPLIES :—

'Soluthiazole' is supplied as a 45 *per cent.* sterile neutral solution (5 c.c. containing the equivalent of 1 gramme of Sulphathiazole) in ampoules of 5 c.c. (boxes of 6 and 25) and in multi-dose containers of 25 c.c.

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Radiophosphorus

PHYSICISTS like Sir JAMES CHADWICK[1] make it clear that artificially produced radioactive elements prepared in atomic piles will soon be readily obtainable for the treatment of disease. Two questions at once arise: for what conditions is such radioactive treatment useful, and how is the "dose" to be controlled?[2] It will be some time before facts and figures are gathered; but one of these elements—the isotope of phosphorus, known as radiophosphorus or P^{32}—has been on trial in the United States for 10 years, and Reinhard et al.,[2] who have reviewed the subject, show that a good deal of information has been gained about its uses and limitations.

The P^{32} used was prepared in the cyclotron, which produces much smaller quantities than the atomic pile. The isotope loses radioactivity by giving off beta rays of high energy that affect surrounding tissue, and in so doing is transformed to stable sulphur. Its half-life is 14·3 days—i.e., the radioactivity of a dose is down to half in 2 weeks, a quarter in 4 weeks, and so on. This is a convenient rate of decay, short enough to enable results to be controlled, yet long enough to ensure the protracted radiation of tissues which is important if, as has been suggested, cells are affected only during mitosis. Studies of the fate of P^{32} in the body showed that it is rapidly taken up by both red and white blood-cells within the first 24 hours; the red cells lose their P^{32} after 48 hours, but leucocytes retain their quota for a very long time, mainly in the nuclei. The tissues that take up most P^{32} are bone-marrow, lymph-nodes, liver, and spleen; leukæmic tissues take up much more than normal tissues. Many, but not all, forms of neoplastic tissue selectively absorb radiophosphorus. The degree of cellularity influences the uptake—for instance, in Hodgkin's disease the uptake of P^{32} decreases with increasing fibrosis of the lymph-nodes—because P^{32}, like normal P^{31}, is built into nucleoprotein; so the tissues multiplying fastest take up most P^{32}. Since the presence of much P^{31} reduces the uptake of P^{32}, in therapy the proportion of P^{31} should be kept as low as practicable. Unfortunately with P^{32}, as with other lethal substances, the difference between the concentrations in neoplastic and normal tissue is not wide enough to allow the former to be destroyed without affecting the latter; if enough P^{32} were given to destroy all the leukæmic cells, the tissues producing red cells and platelets would also be fatally affected.

Radioactive phosphorus was first used for treatment in 1936; and, since the results were published by LAWRENCE[3] in 1939, reports on the treatment of over 400 patients have appeared. REINHARD and his colleagues find that only 140 of the reports are sufficiently detailed for analysis, but by adding 155 cases of their own they have data from nearly 300 patients to draw on. The radiophosphorus was used in the form of dibasic sodium phosphate in an isotonic solution (15 mg. Na_2HPO_4 per c.cm.). The initial activity of such a solution was 0·20–0·40 millicuries per c.cm.; it gradually lost activity, but could be used until 0·04–0·05 millicuries per c.cm. was reached. Small frequent intravenous injections were given in preference to doses by mouth; the initial dose was 0·1–2·5 millicuries, and treatment was at first given two or three times a week. When the oral route was used the doses were larger, since only about 75% of the dose is absorbed. For comparison with X-ray treatment it has been calculated that if 1 millicurie of P^{32} is retained for 24 hours by a 70 kg. adult, the effect will be equivalent to 0·6 röntgens of whole-body radiation. The dose was carefully controlled by watching changes in the peripheral blood; in leukæmias with high white-cell counts, and in polycythæmia, the aim was to restore the blood-count to normal. In other diseases control was not so easy; in malignancy and Hodgkin's disease treatment was continued until blood changes suggested that bone-marrow activity was depressed; leukæmic patients without a raised white-cell count received doses similar to those found effective in the commoner type; in a few patients serial bone-marrow punctures were used. The dose required to bring about a given effect varies greatly from patient to patient, even in clinically similar stages of disease. The dose must therefore be carefully controlled and adjusted to the response in every case.

The best results have been in polycythæmia vera. A first course of 3·5–4·0 millicuries is given, and then no more for 3 months; if symptoms are severe blood is withdrawn by venesection, because 30–60 days elapse before the P^{32} dose effectively lowers the red-cell count. After 3 months, if the count is above 6 million per c.mm., a second course of 1–3 millicuries is given, and some patients need a third course 3 months later. By then a remission is invariably present and no treatment is given until a relapse occurs; remissions last for some time (the longest was 33 months); only 8 out of 21 patients needed more than one course of treatment. ERF[4] has confirmed these findings: he quotes the cases of polycythæmia treated in five different American clinics; 124 had satisfactory remissions, 11 were unsatisfactory, and 5 died; the longest remission after one treatment was 5 years. He notes that iron or large amounts of red meat or liver in the diet, can stop a remission. In chronic myeloid leukæmia treatment greatly relieved the symptoms, reduced the size of the spleen, and produced a remission in the anæmia. During treatment the proportions of myelocytes and myeloblasts in the blood fell, just as with X-ray treatment. Several patients have had remissions lasting a year or more. Difficulties arose in adjusting the dose; an initial dose of 1–2 millicuries was followed by four doses of 0·5–1·0 millicurie at 3 or 4 days' interval, and then 0·5–1·0 millicurie was given weekly until the leucocyte-count fell to 30,000 per c.mm. The blood-count must be carefully observed throughout, because it is impracticable to adjust the dose on a body-weight basis. P^{32} did not affect acute relapses or typical acute forms; nor, oddly enough, did it reduce enlarged lymph-glands which had resisted X-ray treatment. In lymphatic leukæmia P^{32} gave less satisfactory results: a similar treatment scheme somewhat improved signs and symptoms, but not so much as in myeloid leukæmia; no patient obtained a remission lasting as long as a year, one

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1. *Lancet*, March 15, p. 315.
2. Reinhard, E. H., Moore, C. V., Bierbaum, O. S., Moore, S. *J. Lab. clin. Med.* 1946, 31, 107.
3. Lawrence, J. H., Scott, K. G., Tuttle, L. W. *Int. Clin.* 1939, 3, 33.
4. Erf, L. *Blood*, 1946, 1, 202.

something like 1000 beds. In practice, however, the size of the group has to depend largely on the hospitals and specialists available, and the kind of locality in which they are placed: in some areas 1000 beds might be provided by one or two hospitals; but in others six or seven might have to be grouped together, and the advantages of the 1000-bed unit might be outweighed by the disadvantages of remote control. It is perhaps significant that the latest and most thorough of the American surveys—that made in Michigan—concludes that 750 beds is the maximum size for a general hospital if the management is to remain flexible and human. Have we any firm reason for supposing that 1000 beds will constitute a better unit than 750?

The Unburied Body

SINCE the snow melted there have been appeals for volunteers to search for dead sheep on some of the uplands whence water flows into our city reservoirs. The authorities concerned seem to have avoided alarmist remarks about the prospect of serious contamination of water-supplies from this source, but the public is perhaps unduly disposed to regard the unburied body, whether of animal or man, as a menace to health. Whenever, for example, there are reports of deaths in the mass, with delayed disposal of corpses, the newspapers speak of the likelihood of consequent epidemics of infectious disease. It may be worth considering, therefore, how far this risk is real.

Nobody, of course, except on grounds of necessity in an emergency, would defend the practice of non-disposal of the dead; but the danger that it causes to health may easily be exaggerated. Neither the older literature nor the reports of recent incidents in Europe, India, and the Far East provide evidence that the open exposure of collections of bodies to advanced putrefaction has in itself been responsible for any outbreak of infectious disease; nor, so far as we know, has disease attacked people burying bodies thus exposed. Confusion has undoubtedly arisen sometimes from the fact that when conditions are so bad that people no longer dispose of the dead there is usually a simultaneous failure of social organisation generally. Whether the massive death-roll has been due to famine, or epidemic disease, or both, the arrangements for feeding the population, preventing disease, and treating the sick have broken down in face of a crisis. With lowering of hygiene and loss of morale, conditions have deteriorated to a point where the dead lie unburied—the last state being a result of the first. The starving or sick wander, vainly seeking aid; they crawl from place to place until forced by weakness to remain in one spot, where they die. With gradual loss of self-respect their discharges are scattered without consideration; so if, as often, they are suffering from an intestinal infection, they can foul ground, pollute waters, and infect everything they touch with rich cultures of pathogenic bacteria. In this condition they remain indifferent to the thousands of flies which help to disseminate infection. Nevertheless, though such a state of affairs is evidently dangerous, it does not follow that the dead are themselves a source of danger.

When death overtakes the body, coliform and other intestinal organisms begin to invade the tissues, where they rapidly overgrow and crowd out the more de
gram-negative pathogenic bacteria. Immedi
after death from typhoid the spleen and mesen
glands may yield pure cultures of *Bacterium typho*
but a few hours later this organism can be reco
only by highly selective technique, and later none
the putrefactive bacteria will be found. Much
same sort of result is obtained with the inte
contents in salmonella or dysentery infections. Mo
of the experimental work on the viability of inte
pathogens has been concerned with voided disch
where the organisms are present in relatively
concentration, and it has been proved that in a
dry atmosphere and in sunlight the life of the
negative pathogenic bacteria is short. *Shigella*
may live for several days in fæces in the laborat
but exposed to the drying air and hot sun of
tropics its viability is much reduced. Similarly
vibrios of cholera may remain alive for many days
they reach water, but the thin stools from a ch
patient are rendered non-infective within an hou
so if allowed to dry quickly in sunlight. Subj
to anaerobic conditions within the dead body
vibrios of cholera die out very quickly, leaving
field to putrefactive organisms from the inte
The speed with which the latter invade the tissues
varies to some extent according to the disease respon-
sible for the death but mainly according to the
surrounding temperature. Tropical conditions lead
to very rapid multiplication of the putrefactive
bacteria, and very shortly after death the original
infective processes are completely masked by con-
taminating organisms. In temperate or cold climates
the march of events is retarded, and the resistanc
the gram-negative intestinal pathogens to cold ma
it easier to recover them post mortem. ZLATOGORO
in 1904 was able to cultivate *Pasteurella pestis* fr
the buboes of cadavers frozen for over 100 da
whereas with temperatures of about 100° F in Eg
the post-mortem diagnosis of plague in sporadic ca
was only possible when the material was obtai
very soon after death. Plague, typhus, and chol
are all diseases liable to cause mass death, in wh
the handling of the newly dead requires special p
cautions. Particular care is also needed in handli
anthrax. In cattle this disease always termina
as a septicæmia and frequently in an abrupt a
acute form so that groups of animals may be fou
dead or dying on the ground, which may be furtl
fouled by infective discharges escaping from the orifi
after death. Owing to the formation of spores in th
discharges the soil may remain infective for ma
years, and of all diseases anthrax is the one where
is most necessary that the body should be dispos
of without delay and by methods other than sim
burial.

It is clear, therefore, that there is some dang
from spread of infection from collections of expos
dead. But this danger (apart from animals dying
anthrax) appears to be no greater, and usually mu
less, than that attached to the same group during th
life. In the tropics failure to dispose of the de
adequately may result in more revolting and nause
ting conditions than are seen in cold climates, but tl
risk to public health is actually smaller there.

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1. Zlatogoroff, S. J. *Zbl. Bakt.* 1904, 36, 550.

Radiophosphorus

Physicists like Sir James Chadwick[1] make it clear that artificially produced radioactive elements prepared in atomic piles will soon be readily obtainable for the treatment of disease. Two questions at once arise: for what conditions is such radioactive treatment useful, and how is the " dose " to be controlled?[2] It will be some time before facts and figures are gathered; but one of these elements—the isotope of phosphorus, known as radiophosphorus or P^{32}—has been on trial in the United States for 10 years, and Reinhard et al.,[2] who have reviewed the subject, show that a good deal of information has been gained about its uses and limitations.

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[1] *Lancet*, March 15, p. 315

[2] Reinhard, E. H., Moore, C V., Bierbaum, O. S., Moore, S. *J. Lab. clin Med.* 1946, 31, 107.

[3] Lawrence, J. H., Scott, K. G., Tuttle, L. W. *Int. Clin.* 1939, 3, 33.

[4] Erf, L. *Blood*, 1946, 1, 202.

A technical difficulty in radiophosphorus therapy is the estimation of activity in terms of millicuries. At present different laboratories obtain widely different figures—for instance, the activity of a sample of P^{32} was estimated as 100 microcuries at one laboratory and 240 microcuries at another. As KRAMER points out in an appendix to REINHARD's article, this difficulty has led to discrepancies in the recommended dosages of P^{32}. A definite standard of measurement is vitally important with so acti substance.

Radiophosphorus, then, can be said to have p superior to other measures only in polycyth vera and chronic myeloid leukæmia; in these co tions the results seem to last longer than with X- therapy, there is no radiation sickness, and the t ment is more comfortable for the patient. There no evidence that P^{32} prolongs life any more t X-ray treatment does. The disadvantages of phosphorus are its scarcity, which one hopes temporary, and the fact that it must be used after manufacture, the lack of an agreed stand for measuring its activity, and the need for c individual control during treatment. Such active materials are clearly going to be useful, this is another set of therapeutic agents that be safely used only in specially equipped clinics are outside the province of the general practitioner

Annotations

THE GENERAL PRACTITIONER'S PENSION

LAST week Dr. Gordon Ward wrote us a letter condemning the proposal to pay pensions to general practitioners according to the number of years they have spent in the National Health Service and their average income during all those years. He compared their treatment unfavourably with that of the lay administrator, whose entry to the Civil Service at an earlier age gives him more years of service, and whose pension is based on his income during his last three years, when his salary is at its highest. Readers may well have wondered how such a proposal came to be made. The truth is that while there is no difficulty, and ample precedent, in arranging superannuation for anyone paid on an agreed salary scale, it has hitherto been deemed impracticable to devise a satisfactory scheme for people whose income fluctuates from year to year in response to factors not easily assessed actuarily. Once, therefore, the Government conceded that the remuneration of the general practitioner in the new service should be not solely, or even mainly, by salary, but should chiefly accrue from a continually changing number of capitation units, it was not surprising that difficulties and anomalies arose. In fact it was more surprising that the Government still felt able to attempt any superannuation scheme at all for general practitioners.

Dr. Ward's point about length of service has long been a grievance of medical officers in local-government work, who feel that they are penalised vis-à-vis their non-medical colleagues whose superannuation has perhaps accrued from the day they left school and came to learn their profession in the council's employ. Though the fact that the doctor reaches his office some ten years later, after a long and expensive undergraduate and postgraduate training, may be partly offset by relatively higher remuneration in the junior years of employment, the anomaly remains a cause of irritation. This could best be overcome if it were possible to establish that the unavoidable time-lag was compensated by allowing bonus years, counting for superannuation, to be added at intervals to those actually served by the doctor.

As for the period over which the average remuneration should be assessed for pension purposes, Dr. Ward agrees that the usual Civil Service practice of taking the final three years would be unfair, because for the general practitioner these are often years of waning earnings. Unfortunately his alternative suggestion, that the average of the three best consecutive years should be taken, could scarcely be accepted officially: to the Government actuary it must conjure up visions of doctors working for three hectic years to establish their claim to maxim superannuation, and thereafter steadily decreasing t load, secure in the knowledge that this will in no w affect their pensions. It seems inevitable that if pension is to vary with earnings it will have to be b on the average over a wide period. Hence, if we not accept the Government's proposal to take the ave age of the whole of the doctor's working years it mig be best to argue in favour of the average of those y when the doctor may be expected to be working optimum capacity—excluding his first years before b becomes established, and the last years before his retir ment when he would ordinarily be accepting fewer ne commitments.

Among his strictures Dr. Ward does not mention th disastrous effect these new provisions might have o any attempt to preserve present partnerships or promot group practice. Many doctors wishing to work togeth in the new service, and enjoy the advantages of grou practice, will want to find ways of sharing expenses an remuneration on a partnership basis—ways which wi not interfere with mutual aid, or with their encouraging and "feeding" a newcomer to the group. If, however, not only their present remuneration but their future pension prospects are to depend directly on the numbers patients on their individual lists, competition for patients is bound to be intensified, and the whole concept of group coöperation wrecked. We have always held that so far as general practice was concerned the test of success of the new service would be its ability to provide better conditions of practice—more coöperation between practitioners, opportunities for "graded specialism" with the wider use of diagnostic aids, and the sharing of ancillary help. Rather than have all these ends jeopardised by an ill-conceived pension plan, it might be better to leave the general practitioner outside the superannuation scheme altogether, adding enough to his remuneration to enable him to provide, by insurance or other forms of saving, for his own and his family's future.

REVIEW OF SILICOSIS

IN his Julius Wernher lecture to the Institution o Mining and Metallurgy on April 15, Major-General A. J. Orenstein, F.R.C.P., said that the important cause of silicosis is silica dioxide. With the exception of asbesto under certain conditions of handling in manufacture, the silicates produce a less deadly pneumoconioses; the suggestion that 'Sericite' (hydrated aluminium and potassium silicate) is the principal cause has not been substantiated. Silica damages the lung not as was once thought mechanically, but through slow solution. Animal experiments show that the smaller the particles the greater is the danger; this is at least partly due to the more rapid solubility of small particles, but another reason is that they remain longer in the air. Attention must be directed to minimising dust, especially fine dust; and there is some doubt as to the ability of water to remove the dangerous very fine particles from the air. On this point it is difficult to obtain convincing results: on the Witwatersrand gold mines it would take about thirty years to obtain suitable data, and there would be grave difficulty in the psychological reaction to a reversal of the accustomed wet-drilling routine. In practice, removal of dust by *suction at the drilling orifice* does not offer a satisfactory solution, at least in the Witwatersrand mines. At ore bins filtration has proved effective. Sprays deal partly with blasting dust, but its danger must be further neutralised by ventilation and by keeping miners away until the air is freed from dust and toxic fumes.

The place of aluminium in prevention is still undecided; the position has been fairly expressed in the joint report by the Council on Industrial Health and the Council on Pharmacy of the American Medical Association, which indicated that though in animal experiments aluminium has provided effective prophylaxis against the toxic action of relatively pure quartz, this does not necessarily hold for silicosis in man; the general use of aluminium, the report added, should be delayed until full trials have been completed, particularly in view of the known capacity of amorphous hydrated alumina to foster tuberculosis.

As regards *aluminium in the treatment of silicosis*, said General Orenstein, it is difficult to accept that any substance can reverse established fibrosis, though it may influence resolution of very early silicotic changes, before fibrosis is established. Subjective relief, or even improvement in breathing and general well-being, are poor criteria. "I would join Gardner and the American Medical Association in cautioning against reliance on any method of prevention which would push even ever so slightly into the background dust prevention and dust removal. Need I say then how much more blameworthy we should be if we allowed the mischief to happen and pinned our faith to a cure?"

PANEL LISTS

UNDER the pressure of war the regulations governing insurance practice were relaxed to allow principals to accept 500 patients beyond the ordinary maximum. Last January this concession was withdrawn; so the basic numbers now acceptable are, as before the war, 2500 for a principal (5000 for two partners, of whom one may have up to 3000) and 1500 for an assistant. Since 1938, however, the Minister of Health has approved, where necessary, percentage increases beyond this maximum, in view of the increment through the extension of the scheme to include juveniles who have reached school-leaving age. He has lately reaffirmed his willingness to receive applications both on this score and in the light of the increase, from 1942, of the income limit from £250 to £420, as well as for other special reasons. The increase normally granted for juveniles is 5%, and if a further 5% is conceded for the raised income-level doctors with the basic 2500 will again have nearly the 3000 patients permitted during the war.

It was hoped that the pre-war maxima, without increases, could be restored because the load arising from war-time extension of N.H.I. could now be transferred to doctors coming out of the Forces. This aim was abandoned for several reasons: (1) few panel doctors have *in fact anything* like the maximum permitted number of patients, and those with the largest lists usually work in highly industrial areas where most other doctors are reluctant to settle; (2) patients, it is said, attach themselves less to a doctor than to a particular surgery, and are unwilling to go to doctors newly arrived in an area; (3) the surplus patients would not provide a living for incoming practitioners; and (4) it is not worth disturbing the patients by insisting on their transfer at a time when the new service is only twelve months away. Not everyone will be convinced by this reasoning, which has won the day; strict adherence to the pre-war maximum would have provided employment in assistantships for at least some demobilised doctors until they found their place in the new service; and a few, having worked for a time in the industrial areas where the need is *greatest, might* have decided to stay there, thus making for a much-needed balance.

ARTIFICIAL INSEMINATION

THE Public Morality Council did a useful service last year in bringing together doctors, clergy, and lawyers to discuss *temperately* the difficult subject of *artificial* human insemination. The purpose of the conference (a report of which has now been published [1]) was not so much to reach conclusions as to uncover implications. Among the clergy there were speakers from the Church of England, the Roman Catholic Church, and the Free Churches; medical speakers included Dr. H. P. Newsholme, Mr. Kenneth Walker, F.R.C.S., Dr. William Brown, Dr. Mary Barton, Dr. Joan Malleson, and Mr. J. V. O'Sullivan, F.R.C.O.G.

In discussing the moral aspects of the practice, all the clergy were able to accept the principle of artificial insemination of the wife by the husband's semen, provided this was obtained from the vaginal pool after normal intercourse. The Church of England speaker was even willing to concede that, in his own *opinion*, where there was no other practicable alternative, the production of semen for the purpose by masturbation need not be condemned on moral grounds. All the clergy, however, found the principle of *artificial insemination with donor's* semen to be morally objectionable.

The legal drawbacks, some of which may not have been fully appreciated by doctors, were well set out by Mr. J. P. Ashworth. He made it clear that the signed statement of consent, usually obtained by the doctor from both the husband and wife before insemination with donor's semen (A.I.D.) is performed, is likely to be worthless legally. A better safeguard of the doctor would be some more formal type of consent, for example an oath; but few couples, he felt, would be willing to go *before* a commissioner of oaths on so personal a matter. Then, if the husband is registered as the father of the child, he and the mother are *making* a false statement under the Perjury Act, and could be prosecuted. Again, Mr. Ashworth had little doubt that the child is legally illegitimate, and questions of inheritance might turn on this. An assurance from the couple that no third *party* is interested cannot possibly be adequate, because legacies and bequests might be made later by relations ignorant that the child was illegitimate; and this *might* mean loss to other beneficiaries. Finally, there is the danger that, where several children in a neighbourhood are fathered by the same donor, some of them may later meet and marry; indeed, *the danger* of such incestuous matings cannot be wholly excluded, since the doctor must make a *point of* keeping the name of the donor secret.

Psychological difficulties between husband and wife, or arising in the child, were only superficially considered. Dr. Mary Barton drew *attention to the* resentment and frustration which a wife who knows herself capable of bearing a child may feel towards an infertile husband. Presumably this dissatisfaction could *not* be *wholly* relieved by a donor-pregnancy, but several of the medical speakers were confident that such a pregnancy usually has the effect of restoring harmony between the husband

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[1] Artificial Human Insemination. London. Heinemann. Pp. 81. 3s. 6d.

and wife, and has in some cases prevented a marriage from breaking up. Of long-term effects on the children it is clearly too early to speak.

The doctors agreed that the cases in which donor insemination might be considered form only a very small proportion of all cases of subnormal fertility, which in many couples can be treated successfully in other ways. Dr. Margaret Hadley Jackson, who was not present at this conference, has found occasion to advise A.I.D. less than 40 times at an infertility clinic where more than 900 patients have been treated in eight years; about half of these 40 patients conceived as a result of the measure. Dr. Mary Barton is reported to have said that she and her colleagues had "had only about 300 children conceived by this means," over a period of five years—a number which seems large rather than small if Dr. Jackson's experience is a guide.

TREATMENT OF STARVATION

OUR knowledge of the effects and treatment of starvation has increased immeasurably during the last few years. The scanty data available in the early years of the late war have been shown to be largely inaccurate. The first fact which surprised many was the rarity of specific deficiency diseases in Europe when all food was scarce and a severe shortage of vitamins was to be expected. The cause of this appears to be twofold. First, starvation or semi-starvation lowers the metabolic processes and the requirement of vitamins and other essential nutrients. Secondly, in Europe, the shortage of food led to the introduction of breads of high extraction and an increased consumption of all types of vegetables, resulting in a proportionately higher intake of vitamins and mineral elements such as iron than are found in more refined normal diets. Some nutritionists had foreseen this and had realised that the problem of reinstatement would be mainly one of calories.[1] Conditions were different among prisoners in the Far East, where the inadequate food was also appallingly deficient in vitamins, so vitamin deficiency diseases were rife. In European concentration camps, on the other hand, what was encountered was simple gross starvation. There was comparatively little famine œdema, but severe diarrhœa was so common as to lead to the diagnosis of bacillary dysentery; mental apathy and physical lethargy were intense, yet people on the verge of starvation were often so finicky about their food as to refuse to eat what they disliked. In other respects—the extreme loss of fat and muscular tissue, the lowering of the hæmoglobin and plasma-protein levels, and the high incidence of tuberculosis—the effects had been expected.

The greatest change has been in our views on treatment. On theoretical grounds, it had been believed that a valuable measure in the early stages of the treatment of severe cases was the parenteral administration of protein hydrolysates.[2] There was some evidence from India to support this belief.[3] But it was soon found that only in a very few cases, where it was impossible to feed the patients by mouth, were these preparations useful.[4] In almost all patients excellent results in the initial stages of treatment were obtained by oral feeding, and skim milk was better for this purpose than the usually very unpalatable protein hydrolysates. Lipscomb[5] gave skim milk, sugar, salt, and compound vitamin tablets for 3 or 4 days. This diet, which provided about 800 calories daily, was followed by one of about 1750 calories and finally by one of 3000 calories daily. The results reported by Dr. Murray in this issue suggest t at least after the initial stages, a much higher calo intake than 3000 is advisable. When his patients w seen, 2 or 3 weeks after liberation, they were still so 23% below their normal weight and still apathetic and dull. Within a very short time on a diet of the enormous calorie value of nearly 8000 daily they improved greatly. They gained over 2 kg. in weight in one week and continued to gain rapidly, though at a decreasing rate, for the whole of the 23 days during which they were observed. The most surprising feature was the tolerance which the patients showed to this huge intake. Not only were there no apparent ill effects but the rate at which they gained weight suggests that the diet was very well utilised.

Would it have been possible to give diets of such magnitude earlier? It is said[5] that in the first stages of treatment large amounts of food are harmful and may actually cause death. Yet Leyton[6] observed that Russian prisoners often ate large meals in the earliest stages of recovery with no untoward effects. It seems likely that, at any rate after the first few days, large diets *such as those used* by *Murray* would have accelerated recovery. The most encouraging lesson of Murray's experience, however, is that once improvement begins it normally leads to an uneventful and complete recovery.

GOOD NEIGHBOURS

THE help which the British War Relief Society of the U.S.A. gave us from 1939 to 1945 was as varied as it was discerning, and the record of what these Friends in Need[7] did for us shows how American resource and kindliness matched our changing wants. Nothing was too big—fleets of tea cars, mobile canteens, grants and equipments for clubs, rest-homes, hostels for tired workers, nurseries for evacuees, and equipment for hospitals. But equally nothing was too small—seeds for allotments, sweets in the pocket of a child's frock, crutches for orthopædic patients who would otherwise have had to stay in bed, and innumerable toys. As a final and permanent gift the society has left us with the new surgical block at the Queen Victoria Hospital Plastic Surgery and Jaw Injury Centre at East Grinstead.

BETTER LIMBS

ARTIFICIAL limbs, even the best of them, will always fall short of the real thing; and perhaps the worst disaster for the limbless would be the development of stereotyped patterns on which it was thought no improvement could be made. So far is the Limb Fitting Centre of Queen Mary's Hospital, Roehampton, from this sterile and complacent state that a new research department has been established there; and on March 25 a meeting was arranged to demonstrate recent designs and appliances. Dr. John Craft discussed problems of suspension of artificial legs. For women, with disarticulation at the hip, or with above-knee or below-knee amputations, the limb can be suspended best, he finds, from a corset instead of from the old pelvic belt. The corset is made on ordinary lines, but laced up the back, and the limb is held by an elastic strap in front and another behind. Patients wearing such limbs were able to show that they are well retained, and that the stump does not tend to leave the socket when the wearer sits down. A shaped belt is now being used for men, instead of the pelvic band, and this, like the corset, has the advantage that the wearer can dispense with shoulder-slings. On a recent visit to Germany, Dr. Craft found the suction-socket almost universally used, and he is reviving this device here. The socket closely fits the stump, and a valve at the side allows air to leave but not to enter; the partial vacuum thus produced holds the limb firmly in place. This works well, enabling the wearer to do without suspension from the pelvis, as various patients demonstrated. Further experiments on these lines are planned. Light elbow crutches, which can be taken to pieces for packing, are another German device which have advantages over English patterns. The Ministry of Pensions standard tool-holder for attachment to artificial arms is well known, and can be used for digging, working with tools, and batting at cricket; but the research department are also studying new designs for mechanical hands and fingers. The problems of the bath-tub have always puzzled the man who has lost both arms, because artificial limbs are damaged by water. A simple covering for the stumps, made of rubber, has now been made and fitted with a device to which a shaving-brush and razor can be fixed.

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[1] Drummond, J. C. Sir Jesse Boot Foundation Lecture. University College, Nottingham. 1946.

[2] Magee, H. E. *Proc. R. Soc. Med.* 1945, 38, 388.

[3] Narayanan, E. K., Krishnan, K. V. *Indian med. Gaz.* 1944, 79, 160. Krishnan, K. V., Narayanan, E. K., Sankaran, G. *Ibid*, p. 158.

[4] Vaughan, J. *Proc. R. Soc. Med.* 1945, 38, 395.

[5] Lipscomb, F. M. *Lancet*, 1945, ii, 313.

[6] Leyton, G. B. *Ibid*, 1946, ii, 73.

[7] Friends in Need. Prepared by the Central Office of Information. H.M. Stationery Office. Pp. 76. 1s. 6d.

German surgical measures include the Sauerbruch cineplastic amputation,[1] and the Krukenberg operation by which the forearm bones are made to act like a pair of pincers.[2] Prof. T. P. Kilner, discussing the results—which were demonstrated by a group of patients brought over from Germany—said that the amount of training necessary before either kind of stump could be used properly was so great that a man with a single arm amputation would seldom bother with it, preferring to use only his sound arm. For those who have lost both limbs, the Krukenberg procedure makes an appliance unnecessary and gives a good powerful grip; he thinks it useful and worthy of further consideration.

Sir Charles Darwin, F.R.S., chairman of the Ministry of Pensions standing advisory committee on artificial limbs, remarked that the versatility of the natural hand and arm are such that an infinite number of substitutes can be explored; and not only many mechanical problems of the artificial hand but problems in the training of other muscles in delicate control are still unsolved. The difficulties are such that the committee favour the development of new mechanical appliances rather than any attempt to reproduce finger movement faithfully. Several such appliances were demonstrated, including a nailbrush with two rubber suckers on the back; stuck on any flat surface, this can be used on the sound hand. Patients who joined in the discussion urged that these and other simple and helpful devices should quickly be made available to the limbless.

PREVENTIVE ASPECT OF REABLEMENT

So much has been written about fitting the disabled into useful employment that many people now regard reablement from the single standpoint of the resettlement in industry of those who are permanently crippled by injury or disease. In a lecture given recently at the Royal Empire Society, Mr. H. E. Griffiths said that on visiting Poland he found that interest centred almost entirely on the possibility of fitting amputees for suitable work; and the same attitude was noticeable at the International Red Cross Conference last October.

This limited view of reablement is unfortunate. In tuberculosis, for example, its rôle is partly to ensure appropriate occupation for the man or woman permanently handicapped by the disease, but far more to prevent or limit permanent disability by effective treatment and aftercare. The same is true of all potentially disabling disease and injury, and it is the preventive aspect of reablement with which doctors are chiefly concerned.

An illustrated booklet[3] just issued by the Ministry of Health gives an excellent account of what the Ministry has done to increase reablement facilities and what it hopes to do under the National Health Service. In 1939 hardly any hospitals in Great Britain were able to do all that was necessary in this line for their patients, but now no less than 204 offer comprehensive reabling treatment, including physiotherapy, gymnastic exercises, remedial games, and occupational therapy, while a further 129 already possess partial facilities and many others are making plans. The process of reablement, in both hospitals and special centres, is clearly described, and the booklet deserves wide circulation among doctors and all others whose aim is to restore health.

VELOCITY OF BLOOD-FLOW IN PREGNANCY

SOME have said that the velocity of blood-flow is decreased during pregnancy, while others believe it to be unaltered or increased. By observations every fortnight in 48 pregnant women, Manchester and Loube[1] seem to have settled the question. Estimating the arm-to-tongue time by the calcium-gluconate method, and the arm-to-lung time by the ether-paraldehyde method, they found that throughout pregnancy the velocity was within the normal limits—i.e., 9–16 sec. for the arm-to-tongue time, and 4–8 sec. for the arm-to-lung time. Nevertheless each trimester showed an increase in the mean velocity of blood-flow: thus in the first trimester 90% of the values for the arm-to-tongue time were between 10 and 14 sec., with the remainder between 14 and 16 sec.; in the second trimester only 4% were above 14 sec., with 19% less than 10 sec.; while in the third trimester 50% of the average values were under 10 sec. The practical implication is that in the latter part of pregnancy circulation-times at the upper limit of normality may suggest incipient heart-failure. The clinician cannot afford to neglect any method which may hasten the diagnosis of heart-failure in pregnancy, since the prognosis depends so largely on prompt recognition. While estimation of the velocity of blood-flow in all pregnant women is obviously not indicated, the method will be valuable in selected cases.

THE BUDGET

THE Chancellor's speech last Tuesday will do something to revive a confidence badly shaken by the economic crisis. It will be noted abroad that despite our military commitments and social expenditure we can already balance our budget and intend to do so for some years. Mr. Dalton can fairly claim that his proposals strengthen our position, both internal and external, and the only question is whether they will do so sufficiently. As he said, no other country faces so tough an external situation; and the final test of financial measures is their effect on our alarmingly adverse balance of trade. By their concessions on income-tax the Government go some way to restore incentives to harder work: the raising of the maximum for earned-income relief from £150 to £250 will incidentally be of substantial benefit to a large proportion of doctors, and the return of child allowances from £50 to £60 also diminishes the disabilities under which the middle-class parent has been labouring. If Mr. Dalton is right in hoping that increase of tobacco taxation by half will lower tobacco consumption by a quarter, he will have limited the waste of precious dollars on a commodity which we can no longer afford in such quantity. But whether such measures are really commensurate with the need remains to be seen. Before the year is out the crisis may well require more drastic action to check expenditure abroad and induce higher production at home. In particular we may have to devote much more of our efforts and resources to producing food.

WE have to record that Dr. S. Monckton Copeman, F.R.S., died at Hove on April 11 at the age of 85.

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[1] Morce, R. K. *Lancet*, 1946, ii, 904.
[2] *Ibid*, p. 910.
[3] The Road Back to Health: the Story of Medical Rehabilitation. H.M. Stationery Office. Pp. 29. 6*d*.

[1] Manchester, B., Loube, S. D. *Amer. Heart J.* 1946, 32, 215.

Special Articles

SCREENING-OUT THE NEUROTIC

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THE experiences of the war of 1914–18 demonstrated the desirability of excluding potential neurotics from the Armed Forces, and in both world wars many different schemes were proposed for effecting such a "screening-out." But the stream of neurotics passing through neuropsychiatric hospitals showed that a selection procedure which had proved successful in the field of intelligence and special abilities failed to grapple with the more intangible problems of emotion, adaptability, and character.

These problems still claim our attention now that the war is over. The likelihood of universal military service, the need to have large forces under arms for a long time to come, and the importance of husbanding man-power in industry generally make essential the development of suitable methods of selection on the temperamental side.

The aim of these methods should not be merely the negative one of preventing the neurotic from being chosen for a position for which he is unsuitable and in which he will break down; a more positive aim might be the selection of neurotics for suitable treatment or for guidance into jobs having a low "stress" value. It is clearly necessary to have valid and quick methods for identifying the neurotic or the potential neurotic; what use may be made of the information gained depends on factors outside the competence of the psychologist or the psychiatrist.

There are two main approaches to this problem: the psychological and the psychiatric. These two approaches have at times been held to be antagonistic, and there are undoubtedly considerable differences between them in methodology and underlying philosophy. Yet, in spite of disagreements, which have at times become vocal (Rodger 1943, 1944, Gillespie 1944), it seems clear that psychology and psychiatry have complementary functions, and have everything to gain by understanding each other's points of view.

The disputes which seem to divide psychologists from psychiatrists are often due to a failure to effect such an understanding. Thus psychiatrists often claim that for screening purposes the traditional psychiatric interview cannot be dispensed with, and that objective techniques have no place as yet in this field. On the other hand, psychologists often draw attention to the subjective nature of the psychiatrist's work and claim that tests developed along traditional lines can fill this important gap.

An extreme development of the psychiatric position is seen in the American practice of having large numbers of recruits seen for five or ten minutes by a psychiatrist who pronounces on their mental fitness on the basis of this brief interview (Wittson et al. 1943). An extreme development of the psychological position would consist in the classification of recruits as "neurotic" on the basis of objective tests alone.

"Screening" is essentially a dual task. In the first place, the extremely large number of recruits or applicants has to be sifted to find as many of the problem cases as possible. As a second step, it has to be decided whether each man is likely to adjust satisfactorily or not. This final decision must be left to the psychiatrist, but the *preliminary sifting* can be done by means of objective psychological tests. In other words, the screening should contain two filters, the wide-mesh psychological filter, and the finer psychiatric filter.

EFFICIENCY OF PSYCHOLOGICAL FILTERS

It is possible to compare the efficiency of diffe psychological "filters" by statistical indices (Hunt et 1944, Eysenck 1945). These indices are constructed on principle that, if a test can distinguish validly betw a group of neurotics and a group of normals, its efficie is a function of the percentage of correct neurotic ide fications and of the percentage of "false positives" i.e., normals diagnosed as neurotics. A simple but formula is the following:

$$\textit{Screening index} = \frac{P - N}{100}$$

where P is the percentage of neurotics correctly diagnosed by the test, and N is the percentage of normals wrongly diagnosed as neurotic by the test. The in varies between the limits of 1 (perfect discrimination) and 0 (no discrimination at all).

With this formula we can compare the efficiency of various psychological "filters," provided the populations tested are roughly similar. This condition appears to be fulfilled in a number of researches, one of which summarised work with three objective psychological tests and one American questionnaire (Eysenck 1945), another used individual interviews given by specially trained women of the W.R.N.S., and interpretations of their findings by psychiatrists (Curran and Roberts 1945), while the third made use of the "Maudsley medical questionnaire," a psychoneurotic inventory which I constructed on the basis of item analyses performed on a number of previous inventories (Eysenck 1947).

In all these researches the validating criterion of "neuroticism," against which the efficiency of the test was measured, consisted in the previous referral of the person concerned to a neurosis centre. The criterion of normality, on the other hand, was simply the failure of the person to be referred to such a centre. In other words, the normal group in each case almost certainly contained several actual or potential neurotics who would sooner or later find their way to a neurosis centre.

The results of comparing the six tests (interviewing, two questionnaires, and three objective tests) are as follows:

Tests	*Screening index*
Maudsley medical questionnaire ..	0·75
Dark vision test	0·63
Suggestibility test	0·55
Interview	0·38
American questionnaire ..	0·36
Ranking Rorschach	0·32

It will be seen that three of the psychological tests are superior to the interview, while the other two are only slightly inferior. All six tests show an efficiency rating which suggests that even in their present undeveloped form they might be useful in detecting potential neurotics. Since the tests in combination are likely to prove much more informative than they are *in isolation*, the figures present a strong prima facie case for further work along these lines. It may also be noted that though the figures quoted cannot pretend to great accuracy in view of the fact that different populations were used in the different researches, they suggest that an objective test, such as the suggestibility test, or a questionnaire, such as the Maudsley one, which can be given in a few minutes to several people at a time, and which does not require great skill in administration or scoring, may be superior to the *relatively complicated* interviewing technique described by Curran and Roberts (1945).

Proof that a test discriminates between normals and acknowledged neurotics is not proof that the test would pick out the potential neurotic *before his breakdown*. Our evidence on this point is only presumptive. Thus, in my work at Mill Hill Emergency Hospital, I found that he tests mentioned succeeded in differentiating the more seriously from the less seriously ill, agreeing well with the psychiatrist's opinion (Eysenck 1947). I also found that in "normal" groups these tests differentiated between the well-adjusted and the less well-adjusted. And in a large-scale experiment on R.A.F. recruits it was found that there was considerable agreement between a psychiatrist's report on the subjects' mental health and likelihood of breakdown, and the subjects' scores on the Maudsley medical questionnaire.

But the need for direct evidence on this point cannot be gainsaid. Such evidence can only be provided by large-scale follow-up studies, and it is one of the main purposes of this paper to draw attention to the need for such an extension of research.

SUMMARY

Attention is drawn to the importance of "screening" methods in military and industrial affairs, and to the necessity of coöperation between psychologists and psychiatrists in this field.

Data are presented to show that objective tests, questionnaires, and other modern techniques are comparatively successful in discriminating between "neurotics" and "normals," and it is suggested that a strong prima facie case exists for the inception of large-scale follow-up studies to investigate the effectiveness of these procedures in screening-out the neurotic.

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IMPERIAL CANCER RESEARCH FUND

1946-47

IN his summary of the work done during the past year in the laboratories of the Imperial Cancer Research Fund, Prof. W. E. Gye, F.R.S., the director, reports developments in most of the main lines of investigation.

In the chemical field Mr. H. G. Crabtree, M.SC., has continued his studies of the relation between carcinogenic action and sulphur metabolism. He has already shown that the induction of tumours by the application of carcinogenic hydrocarbons may be retarded by the simultaneous application of compounds interfering with sulphur metabolism, and has demonstrated that there is a parallel between the degree of anticarcinogenic and sulphur-inhibiting activity. If carcinogenic activity depends on the interaction between carcinogen and some sulphur-containing constituent of the cells, then it might be possible by the application of some endogenous sulphur-containing compound to compete with the normal interaction and so nullify it. In an attempt to bring this about Crabtree applied various thiol compounds at the same time as 3 : 4-benzpyrene. Several mono-thiol compounds were tested without effect. Two di-thiol compounds were tested: toluene-3 : 4-dithiol and 2 : 3-dimercapto-proponal (B.A.L.). Both these compounds are chemically extremely reactive. Unfortunately the first proved very toxic and could be used only in relatively small dosages, which were inactive. The compound known as B.A.L. could be given in quite high doses, but again no support for the hypothesis behind the experiment was forthcoming: there was no interference with the carcinogenic action of the benzpyrene.

Another aspect of the relation between cancer and sulphur metabolism is revealed by the fact that normal metabolites of the carcinogenic azo-dyes inhibit the activity of sulphhydryl enzymes. This relation seems to be in the opposite sense to that between the hydrocarbon carcinogens and sulphur metabolism. When the two types of carcinogen were applied at the same time to mice there was no additive effect—in fact, there was some inhibition of the action of the hydrocarbon in one case, but here the azo-compound used (*o*-aminoazotoluene) was somewhat toxic.

Dr. L. Foulds's researches have provided some illustration of the hereditary factor in cancer. He has investigated the action of 2-acetoaminofluorene in different mouse strains by including the compound in the diet. The tumours which resulted differed in their site according to the sex and strain of the mice. In R3 mice tumours of the bladder were produced in males but not in females. This sex difference is not universal, since Armstrong and Bonser did not find it in CBA mice. The treated R3 females developed mammary cancers, as they do spontaneously, but the treatment appeared to accelerate their appearance.

Sidelights on the virus aspect of cancer are provided by Dr. B. D. Pullinger's study of the parts played by œstrogen and milk factor in the development of nodular hyperplasia of the breast which appears in all females of the R3 strain of mice. A subline of this strain free from milk factor was established by rearing an original family with a foster-mother from a cancer-free line. Virgin females of this subline and of normal R3 mice were spayed when 56 days old and were given one or two applications of œstrogen. After these applications there was a progressive development of the mammary glands followed by a regression. This regression in the subline free from milk factor proceeded until at autopsy their mammæ were composed of shrunken ducts without any foci of acinous proliferation, while in the normally reared females there were scattered foci of adenomatous proliferation indistinguishable from those seen under normal conditions of cyclic œstrous phases or pregnancy. The result proves that the appearance of nodular hyperplasia is dependent on the milk factor.

The endocrine factors are implicated in Dr. E. S. Horning's researches. Before the war Horning had initiated an investigation into the possibility of inducing tumours of the prostate by local injections of methylcholanthrene. Tumours were readily produced but they were either sarcomas or squamous-cell cancers and quite unlike those seen clinically. The type of tumour depended on the strain of mice used: all sarcomas were produced in R3 mice and sarcomas and squamous-cell cancers in Strong A mice. Last year Horning took up this study again and was able to produce other types of prostate tumour by a development of Peyton Rous's finding that grafts of embryonal tissue mixed with carcinogen made in homozygous mice grow and develop cancerous properties. Horning found that strips of adult prostate tissue wrapped round a crystal of methylcholanthrene and implanted subcutaneously in homozygous normal mice of the same strain will readily develop into tumours. Again the type of tumour apparently depends on the type of mouse used. In Strong A mice almost all the tumours were glandular cancers, which were transplantable and showed various degrees of secretory activity. All the tumours in C3H mice were spindle-cell sarcomas. These tumours are under active investigation and obviously the method offers great possibilities for the study of the development of glandular tumours and of the direct and indirect effects on them of hormones and other agents.

Another application of the Peyton Rous technique has been made by Prof. Ida Mann, who produced cancers of the lens epithelium by mixing such tissue from young mice with methylcholanthrene and implanting the mixture into other mice of the same strain (C3H). This proves that the *immunity* of the lens from malignant change is not due to any immunity of the tissue itself, but probably lies in its situation in the body and its absence of blood-supply.

There have been several changes in the staff during the past year. Mr. R. J. Ludford, D.SC., Mr. E. S. Horning, D.SC., and Dr. L. Dmochowski have taken up appointments elsewhere. Newcomers are Dr. James Craigie, F.R.S., who should be a strong reinforcement to virus investigation; Mr. P. C. Williams, B.SC., as endocrinologist; and Dr. C. C. Spicer as geneticist.

Reconstruction

THE HOME CONSULTANT

F. HARWOOD STEVENSON
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ONE of the objects of the National Health Service Act is to extend and improve consultant facilities, so that patients may more readily have the benefit of a specialist's opinion. In arranging this extension, however, we must avoid any unnecessary loss of valuable features of the old dispensation.

Patients unable to pay a consultant's fee have hitherto had to rely either on a hospital or on a "further opinion" given by a kindly colleague or partner of the general practitioner attending them. Even this partial service has been inefficiently distributed throughout the country—difficulties of travel and inaccessibility of outpatient departments often proving insuperable obstacles.

In the new service opportunities for full investigation of patients are to be developed by opening new consultant centres for inpatients and outpatients in areas which are badly served. But in practice the shortage of domestic and nursing staff will make it difficult to extend hospital services. Instead, would it not be possible to bring the consultant to the patient?

Today, when a person is too ill to attend an outpatient department, the general practitioner often sends him into hospital, simply because he feels uncertain of the diagnosis or the treatment. With a consultation at the right moment many of these patients could be looked after at home, which they would usually prefer, and a hospital bed would be saved.

An extension of the system of consultations at hospital also carries the danger that the public may lose what many of them have at present—a doctor with experience and ability to take responsibility, who can enable them to get the best out of the medical services which will be at their disposal. No specialist can take this general practitioner's place; and even a group of specialists, however efficient, implies division of ultimate responsibility. Care from a practitioner, with specialist advice available when necessary, is of more value to the patient, special circumstances apart, than constant specialist direction. The practitioner stands to gain both from the consultations and from his continued responsibility for the patient, and the public gains from this enlargement of his experience.

In practice home consultation works well. I have found no difficulty in collecting at the bedside whatever specimens are required for investigation. The necessary sterile containers, solutions, pipettes, &c., are easily carried, and when appropriate I take with me, in the car, a technician with a portable X-ray apparatus or Cambridge portable electrocardiograph. X-ray photographs—chest films in particular—can be taken while the consultation is proceeding and are developed on return. Specimens are examined, and a telephone conversation with the practitioner usually completes the consultation.

The administrators of the new service would realise a very large saving in hospital beds. This saving would be effected by no second-best method but by one which would maintain for the public the highest standards of general practice.

A SUGGESTION

General practitioners are busy men, and if they are to do all they might for their patients they must have opportunities for acquiring new knowledge. If a general physician were appointed as "home consultant" in each area his contacts with the local practitioners, and his experience of their needs, would enable him to act as a dean of postgraduate studies for the practitioners of the district. Part of the duties of such a man would be to watch the literature; to a discussion groups, lectures, and demonstrations, himself or by specialists; and to pass on advances practical value to the general practitioners, re their knowledge of the less familiar aspects of ge medicine. He should have some beds to keep alive his clinical ability, and the practice of direct responsib

Many general practitioners who fear loss of respo bility and interest in the new service would approv appointments of this sort, and would willingly coöpe with the home consultant in a scheme designed to main and enhance their value to their patients.

Medicine and the Law

Workmen's Compensation—Costs of Visit to Medical Referee

IF a court orders a workman to go and be ex. by a medical referee under the Workmen's Compen. Act, it is difficult to imagine that there could be doubt of the power of the court to allow the man travelling expenses. Yet this question, which the itself ought not to have left in dispute, has occupied turn the Court of Appeal and the House of Lords has been answered differently by these two emin tribunals.

In 1940 a workman named Halliday was seriously injured. His employers recognised that his accident was within the Workmen's Compensation Act and the made him weekly payments on the basis of total inca pacity. In 1945 they had him examined (under section of the Act) by their own doctor, and soon afterwar they notified him (under section 12 (3)) of their intentio to reduce the weekly payments to 15s. on the groun that the incapacity was no longer total. Hallida thereupon sent his employers a counter-notice accom panied by a certificate from his own doctor who sai that the patient was not able to follow his occupatio and that payment on the basis of total incapacity shoul continue. As the doctors differed, the employers aske the county court for an order that the matter be remitte to a medical referee under section 19 (2) of the Act fo a certificate as to Halliday's condition and fitness fo employment. The court made the order and the patien was required to travel some 20 miles on two occasion for the purpose of the examination. The medical refere certified him fit only for very light work. No work o this nature was found for him, and the employers wen on paying on the basis of total incapacity. The county court judge awarded Halliday the costs of his tw journeys which had been undertaken in compliance wit the court's order. The Court of Appeal, by a majorit decision, said that the county court had no jurisdictio to award the travelling expenses, because the employer had throughout made the payments voluntarily an there had been no previous arbitration on a claim b Halliday for compensation. The House of Lords reversing the decision of the Court of Appeal, held tha there was in fact a dispute, that the matter would no have gone to the medical referee unless there had bee an absence of agreement, and that the medical referee in effect, arbitrated between the parties. Consequentl the costs incidental to the reference to the medical referee were within the jurisdiction of the county court.

The country has lately been asked to sanction an increase in the number of lords of appeal in ordinary. It has not been easy to persuade the whole of the legal profession that the judicial members of the House of Lords are at present overworked. The fact that the case of Halliday *v.* Barber Walker & Co. has occupied no fewer than five law lords in the supreme appellate tribunal is perhaps an illustration, rather than an explanation, of the use of our judicial man-power.

Under the auspices of the British Council Sir Alexander Fleming, F.R.S., is lecturing in Vienna on penicillin, and Dr. Robert Cruickshank, director of the central laboratory of the Public Health Laboratory Service, in Poland and Czechoslovakia on the Diagnosis and Control of Infectious Diseases.

In England Now

Running Commentary by Peripatetic Correspondents

I have just been addressing an undergraduates' club ambridge, and thus have renewed my slight acquain- ce with that old town. The chief building is Wool- th's. On my way up from the station I asked a ceman how to get to Sidney Sussex College, and answered "Do you know Woolworth's ?" I said I ected I could find it, and he answered that the college just beyond it on the same side. From his voice's e it sounded as though it were an appendage to it. er I was due to go to Girton and stood in a queue for 106 bus that I had been informed went there; but en it came it was going in the other direction, and I ed the conductor where was the stopping-place on the er journey, and he answered "Do you know Wool- rth's?" This time I could say with some pride, Yes!" "Well," he said, "the stopping-place is just posite."

After Woolworth's there is the Fitzwilliam museum. two favourites there are Sir William Nicholson's Girl with the tattered glove" and Stanley Spencer's of-scape of some red cottages. The first is now splen- lly hung in an alcoved recess. You are standing in the e-Raphaelite room and turn your head to the right, and ere you see her as a winsome little figure, luring you m the far end of the next room. Her features begin stand out clear as you pass the arch between the rooms. ou see a serious but not stern expression which changes a smile as you approach. And then there comes a tle twinkle in her mouth, first on the left side and then, you are half way down the room, with a twitch at the gle of the right. But she never looks at you; the eyes e inscrutable, but there is no glint in them. As you me near to her the smile all fades and is replaced by an estimable sadness. She was not smiling at you but at me happy memory before the glove was tattered or the in, in streaks, was showing through the fur of her coat.

There is also King's College Chapel. Its wonders would e beyond description were it not marred by the screen. o see a great church, stand at the west door and look up the east. There are some that were clearly built to e divided into two, with an inner sanctuary. Not so ing's Chapel. The mind that designed that great work meant it to be viewed as a whole with a vista from end o end. And then some creature of habit persuaded the King there really must be a screen. "Every great church has one." Later the organ was put on it, and the beauty of the sound that comes from it has become a part of the beauty of the stonework. And thus the organ has become a bar to the removal of the screen. Where could they put the organ? I believe it could go underground today, and that acoustic engineers could make it echo through the building as beautifully as when I was there the other day.

* * *

I attended a post-mortem examination the other day in an undertaker's work-room, with the undertaker as an interested spectator. I was remarking on the well-marked "nutmeg" liver when an old surgeon who was present scoffed at this term and complained that we referred in our descriptions to things which these days are seldom or never seen, especially by students. Whereupon the old undertaker produced from his hip-pocket half a nutmeg which had been carefully sawn. He said that he had had this in his hip-pocket for 30 years following the prescription of a gipsy whom he consulted for his lumbago. It had been a most successful and permanent cure.

* * *

If the doctor's bride is to deal adequately with night calls she must appreciate that they differ fundamentally from those in the day, which are called messages. The message impinges on the *personalities* of the doctor and his wife, but the night call digs at their *basic temperaments*. By "temperament" I mean the way the innate neurological set-up gets cracking when a stimulus forces it to respond by getting cracking. This is pretty scientific, but you will grasp what I mean if I describe the two types of response among men when the phone (the stimulus) rings in the middle of the night. To cope with the stimulus and its effects you must know to which of the two types your man belongs.

Primary Type.—As the bedside phone bell jangles, so the nerves and muscles of this type vibrate. With a twitch, jerk, tremble, and oath he is up and at it. Then, after a momentary pause while he grinds the handpiece into the bedclothes and his breathing-rate rises from basal-sleep rate to waking speed, he slams the phone against his ear. He bellows "Hullo, YES!" As he listens he scratches himself in some out-of-the-way place and rubs one foot against the other. "Who? Where? Why, of course. Take me a short while to get along. Hot water. Soap. Towels. 'bye." He dresses, hissing through his teeth.

Secondary Type.—This sort doesn't exactly hear the bell. He reaches for the phone in a cataleptic way like a warm mamba in search of an irritant. He gets hold of the alarm clock and as the phone continues to ring he pushes the clock under the pillow and settles for deeper sleep. At this point your job is to answer the call and at the same time to keep your man awake. This is fantastically difficult, but if you fail he won't be any good for at least an hour. When you have dealt with the call (see previous notes) flood the room with light and keep talking. This will bring him to a sitting position, whereupon you must thump his back violently, repeating with each thump, "Smith, 9, Times Square" (or whatever the address is). As like as not he will answer, "Nine squared equals eighty-one. Ninety-nine, say ninety-nine." But this is progress. He may even stagger out of bed and begin to dress; scratching his head thoughtfully all the time. He may then undress and go to bed again. In psychology this is known as regression. You have been warned and you must forestall it.

After returning from the night call each type has his own characteristics. The Primary will act according to the success or failure of his mission. If successful he will light the fires, bring you tea, keep you awake with sentences beginning, "I've always thought . . .", or recite bawdy rhymes or dawn poems according to his *Kultur*. If he has failed in some aspect of the case he will undress stealthily and, yawning manfully, return to sleep; on waking he will pretend to be as fresh as a daisy. Doctor Secondary, once he has got going, cannot be held back. On his return he will complete the case-notes, write to the *B.M.J.* or to an aunt—in fact, he will continue from where he left off the day before. He will certainly not return to the connubial couch to snatch further warmth and sleep. He does not snatch at anything. Therefore, my dear, do not be unduly miserable the first time this happens. It will only mean that you have married a Secondary Type.

* * *

Not long ago we used to think that a cell of the body, once adult, did not change much. Physiologists used to talk about endogenous and exogenous protein, as though they were quite separate; but now it seems that such a division is artificial, that *all* our body cells are in a state of constant flux, anabolism and katabolism without end. It is not strictly accurate to talk of individual cells, since the cell is never a finite individual even in death, but a chance aggregation of constantly changing basic chemical substances. If one follows this argument to its logical conclusion (a thing philosophers won't do, because they want to know what is logic and what is meant by conclusion), then we are priding ourselves unduly by thinking we are individuals (i.e., undivided and indivisible). We already realise that every person on this earth is dependent on others in some way, and that the aggregate is more important than the individual; but now it seems that we are closer to each other than we thought. Are we not chance aggregations of matter in constant flux? It's a sobering thought.

Reconstruction

THE HOME CONSULTANT

F. HARWOOD STEVENSON

M.D. Lond., M.R.C.P.

ONE of the objects of the National Health Service Act is to extend and improve consultant facilities, so that patients may more readily have the benefit of a specialist's opinion. In arranging this extension, however, we must avoid any unnecessary loss of valuable features of the old dispensation.

Patients unable to pay a consultant's fee have hitherto had to rely either on a hospital or on a "further opinion" given by a kindly colleague or partner of the general practitioner attending them. Even this partial service has been inefficiently distributed throughout the country—difficulties of travel and inaccessibility of outpatient departments often proving insuperable obstacles.

In the new service opportunities for full investigation of patients are to be developed by opening new consultant centres for inpatients and outpatients in areas which are badly served. But in practice the shortage of domestic and nursing staff will make it difficult to extend hospital services. Instead, would it not be possible to bring the consultant to the patient?

Today, when a person is too ill to attend an outpatient department, the general practitioner often sends him into hospital, simply because he feels uncertain of the diagnosis or the treatment. With a consultation at the right moment many of these patients could be looked after at home, which they would usually prefer, and a hospital bed would be saved.

An extension of the system of consultations at hospital also carries the danger that the public may lose what many of them have at present—a doctor with experience and ability to take responsibility, who can enable them to get the best out of the medical services which will be at their disposal. No specialist can take this general practitioner's place; and even a group of specialists, however efficient, implies division of ultimate responsibility. Care from a practitioner, with specialist advice available when necessary, is of more value to the patient, special circumstances apart, than constant specialist direction. The practitioner stands to gain both from the consultations and from his continued responsibility for the patient, and the public gains from this enlargement of his experience.

In practice home consultation works well. I have found no difficulty in collecting at the bedside whatever specimens are required for investigation. The necessary sterile containers, solutions, pipettes, &c., are easily carried, and when appropriate I take with me, in the car, a technician with a portable X-ray apparatus or Cambridge portable electrocardiograph. X-ray photographs—chest films in particular—can be taken while the consultation is proceeding and are developed on return. Specimens are examined, and a telephone conversation with the practitioner usually completes the consultation.

The administrators of the new service would realise a very large saving in hospital beds. This saving would be effected by no second-best method but by one which would maintain for the public the highest standards of general practice.

A SUGGESTION

General practitioners are busy men, and if they are to do all they might for their patients they must have opportunities for acquiring new knowledge. If a general physician were appointed as "home consultant" in each area his contacts with the local practitioners, and his experience of their needs, would enable him to act as a dean of postgraduate studies for the practitioners of the district. Part of the duties of such a man would be to watch the literature; to discussion groups, lectures, and demonstrations, himself or by specialists; and to pass on advan practical value to the general practitioners, ref their knowledge of the less familiar aspects of medicine. He should have some beds to keep alive his clinical ability, and the practice of direct responsib

Many general practitioners who fear loss of res bility and interest in the new service would appro appointments of this sort, and would willingly coö with the home consultant in a scheme designed to m and enhance their value to their patients.

Medicine and the Law

Workmen's Compensation—Costs of Visit Medical Referee

IF a court orders a workman to go and be ex by a medical referee under the Workmen's Compe Act, it is difficult to imagine that there could be doubt of the power of the court to allow the man travelling expenses. Yet this question, which the itself ought not to have left in dispute, has occupied turn the Court of Appeal and the House of Lords has been answered differently by these two c tribunals.

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The study of the literature on medical education leaves the impression that, as with medicine itself, diagnosis is usually considerably in advance of treatment, and that one of the causes of the sluggishness with which long-overdue reforms have been introduced over the past century is that there has often been a direct pecuniary interest in the perpetuation of anomalies.

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EXPERIMENTAL TUMORIGENESIS

SIR,—Referring to your editorial of Nov. 30 on the work of Professor Lipschutz, may I call attention to my experimental studies in guineapigs antedating Lipschutz by several years? We found that intraperitoneal administration of alkaline anterior-pituitary extracts or intramuscular implantation of bits of anterior-pituitary substance produced hyperplasia and metaplasia of the epithelium of the uterine cervix, with epithelial downgrowths extending deeply into the connective tissue. Papillary tumours of the parietal peritoneum, as well as hyperplastic phenomena in the connective tissues of the tube and the uterus, were observed (*Amer. J. Obstet. Gynec.* 1934, 27, 633; *J. Obstet. Gynæc.* 1939, 46, 232). The peculiarity of the structures of mesodermal origin of the female generative organs—to react to the stimulus of an overactive anterior pituitary, and in turn to the thus generated oversupply of œstrogens, with hyperplastic lesions—was duly stressed. No ætiological connexion, however, between the development of uterine fibroids and œstrogenic overstimulation seems to be clearly demonstrated.

Lipschutz's finding that many months elapsed before any hyperplastic lesions in the uterine wall occurred points to the *anterior pituitary*—which is well known to develop hyperplasia and even adenoma in the wake of long-continued administration of œstrogens—as the factor responsible for localised or universal growth phenomena in the uterine wall.

Cincinnati, Ohio, U.S.A. J. HOFBAUER.

AMYLOID MACROGLOSSIA

SIR,—The interesting case of atypical amyloidosis described by Dr. Margaret Baber (Feb. 8), a condition first described on the Continent by Lubarsch,[1] is almost identical with a case I saw in a man, aged 53, who died from heart-failure, thrombosis, and infarction of the lungs. Almost half the heart in this case was amyloid (fig. 1). The tongue (fig. 2), œsophagus, skin, and walls of many of the smaller arteries and veins were also involved, and hæmorrhages had occurred after palpation or other minor injuries to the skin.

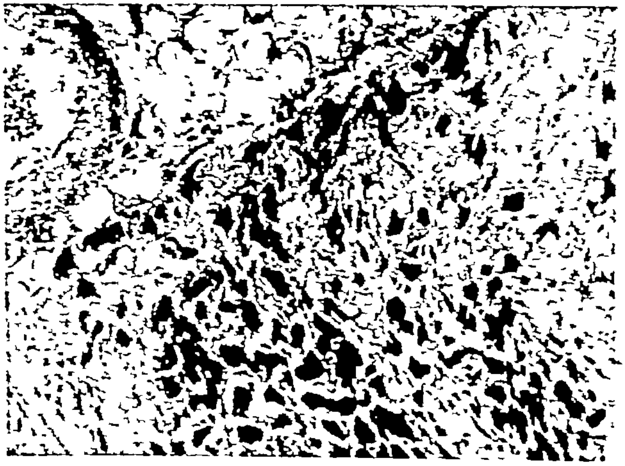

Fig. 1—Section of heart muscle, showing amyloid deposits (grey) between muscle-fibres (black) and in the wall of a blood-vessel. (Masson ×115.)

The pathological proteins, called paraprotein by Apitz,[2] are produced by plasmocytoma cells. One of these proteins is the Bence-Jones protein, which is excreted rapidly in the urine. Paramyloidosis is not due to Bence-Jones proteinæmia, but the same tumour cells that produce Bence-Jones proteinuria also produce other different pathological proteins which involve the tissue of the tongue, heart, and walls of the blood-vessels, and other muscles. The plasmocytosis can be localised to one or several parts of the body, as in multiple myeloma, or spread all over it, as in diffuse plasmocytosis. In some cases the tumour cells cannot be found, because the degenerated area is too small and the pathological plasma cells can occur in any part of the body and may not be recognised. This seems to have happened in Dr. Baber's case and in mine.

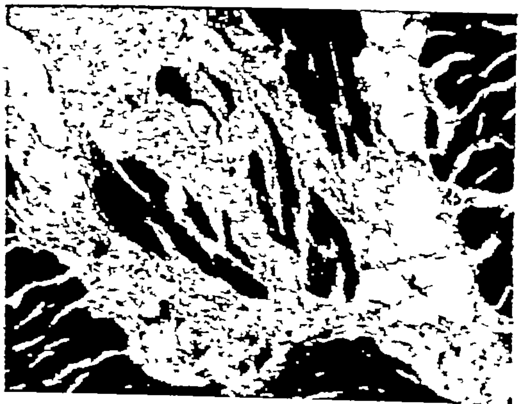

Fig. 2—Section of deeper layers of tongue, showing muscle bundles (black) and amyloid deposits (grey). (Masson ×115.)

Luisenhospital, Aachen, Germany. RUDOLF ENGEL.

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1. Lubarsch, O. *Virchows Arch.* 1929, 271, 867.
2. Apitz, K. *Ibid*, 1940, 306, 631.

Letters to the Editor

HÆMOLYTIC DISEASE OF THE NEWBORN

SIR,—I read with great interest the annotation in your issue of April 5 on the prognosis in what I am sorry to see you still call erythroblastosis fœtalis rather than hæmolytic disease of the newborn. I am not convinced that what Wiener himself has called the "formidable procedure" of exsanguination transfusion presents any advantages over simple transfusions with Rh-negative blood in amounts required to correct the degree of anæmia. Exsanguination transfusions would be more than justified if damage to the liver and brain could thereby be prevented, and although Wiener claims that they do prevent kernicterus there is no evidence that the products of hæmolysis ever produce such damage. Indeed, the evidence is all to the contrary; for instance, changes in the liver and brain have never been described in congenital anæmia of the newborn in which the degree of hæmolysis is greater than in icterus gravis, nor do the investigations by my colleague Dr. Baar bear out Wiener's view that these changes are due to the blocking of vessels with agglutination thrombi. The changes in these organs are almost certainly due to the action of the maternal antibody on the cells of the liver and, either directly or indirectly, on the brain-cells. It is possible that a small part of this antigen-antibody reaction occurs after birth, and therefore might be checked by exsanguination transfusion, but the greater part takes place before birth—a fact which is proved by the high proportion of stillbirths in the obstetric history of the mothers of these children, the not infrequent presence of icterus at birth, the occurrence of hydrops fœtalis, and the finding by Boorman and Dodd of the Rh antigen in the fœtal tissues.

Although the prognosis after treatment with Rh-negative blood falls far short of Gimson's claims for it, it is certainly better than you suggest. At the Birmingham Children's Hospital we now have records of 274 cases treated since 1931. From 1932 to 1936 intramuscular injections of serum were at first used, and later transfusions with blood in which regard was paid only to the ABO grouping in a group of 44 children with a resultant mortality-rate of 52%. From 1939 to 1941 blood-transfusions with compatible ABO groups only were given and the mortality-rate was almost unchanged, being 50·5% (66 children); but from 1942 to 1946 Rh-negative blood of the infant's blood group or of group O was used and the mortality-rate in a group of 163 children was reduced to 29·3%. Records of mortality-rates by other writers before the era of Rh-negative blood varied from 46% to 75%, and the only other series of cases treated by Rh-negative blood with which I am familiar is one by Snelling, of Toronto, dealing with 60 children. He found that his survival-rates were not increased by its use, although he has recently had excellent results in a small series of 17 cases when he gave a series of plasma "drips" in addition to the Rh-negative blood.

Clearly therefore, even when Rh-negative blood is used, the mortality is a severe one, and there is no doubt that you are right in saying that good results are only likely to come from treatment which will prevent the formation of Rh antibody by the mother or its passage across the placenta to the fœtus; moreover, such treatment will also prevent kernicterus which at present occurs in a proportion, variously estimated at 5 to 15%, of the survivors.

Birmingham. LEONARD G. PARSONS.

REST AND PROGRESSIVE RELAXATION

SIR,—Last year (1946, i, 440) you published a letter from me on the recuperative effects of rest and neuromuscular relaxation, and on the method of suggestion and deep breathing whereby relaxation may be produced.

For the sake of completeness I should now like to add that I have discovered, after many years' experience, that the maximum effect of deep breathing in producing physical and mental relaxation is attained by holding the breath for a fraction of a second after a normal effortless *expiration*. Holding the breath for a brief moment after *inspiration* is well known as a method of enhancing efficiency—e.g., in climbing—by increasing the oxygenation of the blood; and it is a potent factor in the b effect of the Yogic method of "interrupted bre (*pranayama*). But the beneficial effect which I observed, in myself and in my patients, of a pau expiration has a different physiological basis. A of profound quietude, akin to if not identical wit hypnosis, seems to be in my own case the inv result, and may mark the progress of the neurom relaxation from the voluntary muscles of the system to the *involuntary muscles* of the v digestive, and respiratory systems, and so on t sympathetic nervous system itself.

The method can be exceedingly potent in b anxiety and relieving mental and nervous tensio

London, W.1. WILLIAM BRO

PLASTIC EYES

SIR,—The statement in your annotation of M (p. 379) that "the iris is painted on paper and porated in the eye behind a layer of clear resin" be refuted. Eyes have been, and probably still are, in this way, but the most satisfactory results are o only when the eye is "all plastic" and no use is non-acrylic substances alien to the methylmeth and invariably antagonistic to complete fusion.

Your statement that plastic eyes are somewhat than glass ones needs qualifying. Plastic substan lighter than glass, but, while a glass eye of the or reform type is hollow, the plastic eye is soli therefore heavier. Comparison of weight between and plastic shell eyes, however, shows plastic eyes lighter. We have made hollow plastic eyes on the principle but these have many disadvantages, the of which is that they are not easily altered.

With regard to price it should be pointed out th manufacture of artificial eyes made entirely of bristles with difficulties which cannot be app without close acquaintance with the vagaries of comparatively new substance. It is these many v and unappreciated difficulties which make the produc of a plastic eye much more expensive than a glas Moreover, it is unfortunately a fact that much technical skill is required for making plastic eyes t glass eyes.

London, W.1. THEODORE HAMBLIN LTD.

REFORM OF MEDICAL EDUCATION

SIR,—In his extremely interesting account of revision of the anatomical curriculum at Birmin University (March 29), Prof. S. Zuckerman says that t ventilation of the problem of the reform of medi education by the Goodenough Committee "represents last of a series of reviews which started in 1925 wi Abraham Flexner's comparative study of med education."

This reference may possibly lead some readers overlook Flexner's earlier and far more detailed stud of *Medical Education in the United States and Canad* (1910) and *Medical Education in Europe* (1912), whic were published as Bulletins 4 and 6 of the Carne Foundation. These monumental studies still remain the main source of information on modern medical educati considered in its historical and comparative aspects, Flexner's later *Medical Education* (1925) largely repre-senting the essence of the earlier volumes. It is questionable whether later reviews of medical educatio contain any important conclusions that were not expressed or implicit in Flexner's pioneer studies, and it is perhaps worth pointing out that these studies were the work of a layman.

Another survey of earlier date than 1925 is Sir Georg Newman's memorandum to the president of the Boa of Education—*Some Notes on Medical Education in England* (1918)—which, despite its modest title, occupi 124 pages. This was followed by the same author's memorandum to the Minister of Health, *Recent Advance in Medical Education in England* (1923).

It seems appropriate to mention also Theodor Billroth's *Lehren und Lernen der medicinischen Wissenschaften* (1876), the importance of which may be judged from the publication nearly fifty years later of an English transla-tion, with an introduction by William H. Welch, under the title *The Medical Sciences in the German Universities*

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Cincinnati, Ohio, U.S.A. J. HOFBAUER.

AMYLOID MACROGLOSSIA

SIR,—The interesting case of atypical amyloidosis described by Dr. Margaret Baber (Feb. 8), a condition first described on the Continent by Lubarsch,[1] is almost identical with a case I saw in a man, aged 53, who died from heart-failure, thrombosis, and infarction of the lungs. Almost half the heart in this case was amyloid (fig. 1). The tongue (fig. 2), œsophagus, skin, and walls of many of the smaller arteries and veins were also involved, and hæmorrhages had occurred after palpation or other minor injuries to the skin.

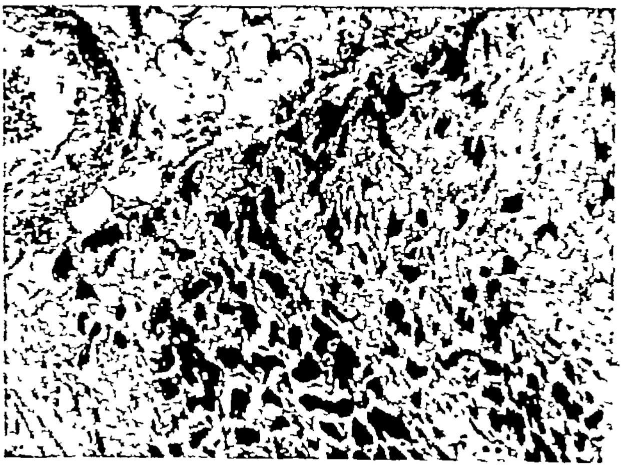

Fig. 1—Section of heart muscle, showing amyloid deposits (grey) between muscle-fibres (black) and in the wall of a blood-vessel. (Masson × 115.)

The pathological proteins, called paraprotein by Apitz,[2] are produced by plasmocytoma cells. One of these proteins is the Bence-Jones protein, which is excreted rapidly in the urine. Paramyloidosis is not due to Bence-Jones proteinæmia, but the same tumour cells that produce Bence-Jones proteinuria also produce other different pathological proteins which involve the tissue of the tongue, heart, and walls of the blood-vessels, and other muscles. The plasmocytosis can be localised to one or several parts of the body, as in multiple myeloma, or spread all over it, as in diffuse plasmocytosis. In some cases the tumour cells cannot be found, because the degenerated area is too small and the pathological plasma cells can occur in any part of the body and may not be recognised. This seems to have happened in Dr. Baber's case and in mine.

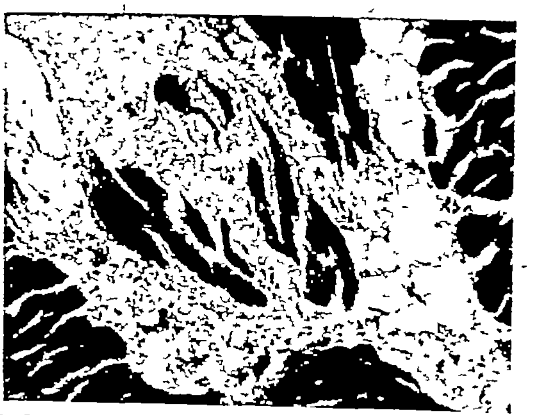

Fig. 2—Section of deeper layers of tongue, showing muscle bundles (black) and amyloid deposits (grey). (Masson × 115.)

Luisenhospital, Aachen, Germany. RUDOLF ENGEL.

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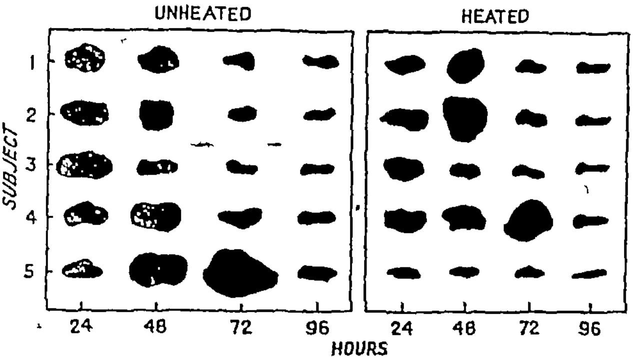
1. Lubarsch, O. *Virchows Arch.* 1929, 271, 867.
2. Apitz, K. *Ibid*, 1940, 306, 631.

REVACCINATION IN ADULTS

SIR,—*Dr. J. C. Broom's paper (March 22) prompts* us to report some observations made in the Middle East in 1945.

Lieut.-Colonel (now Professor) R. S. Illingworth had pointed out to us that a typical "reaction of immunity" was evoked by a heat-killed vaccine. To verify his statement a series of 20 previously vaccinated patients were revaccinated with both heated and unheated vaccine by a standardised technique with a single scratch 1 cm. in length. The response to both heated and unheated vaccines was similar in each case and had the characteristics of the "reaction of immunity." In a second series of 20 cases where the areas of erythema were plotted no constant differences between reactions to heated and unheated vaccine could be demonstrated. The figure shows the findings in 5 representative cases.

To prove that the virus had been killed, material from the same batch of heated vaccine was used to vaccinate 10 *previously unvaccinated infants. In no case* did a reaction occur; later these infants were successfully vaccinated with unheated vaccine. Intradermal tests on rabbits also showed that living virus was no longer present after heating.



Areas of erythema after vaccination with unheated and heated vaccine lymph.

As calf-lymph vaccine had been employed in these experiments the agents possibly responsible for the reactions were bovine protein, contaminant bacteria, the preservative added to the vaccine, or the proteins of the virus bodies themselves. A series of 10 previously vaccinated patients were accordingly revaccinated with heated vaccine, unheated vaccine, bovine serum, and the preservative. Reactions were noted only with the first 2. Dr. Dennis, of the American University of Beirut, kindly supplied us with vaccine prepared by culture on chick-embryo membrane, the bacterial content of which was negligible. In 10 previously vaccinated patients similar "reactions of immunity" were obtained to this vaccine both when heated and unheated. From these observations we concluded that the "reaction of immunity" was an allergic response to the proteins of the virus bodies in an individual sensitised by previous vaccination.

Circumstances had prevented us from reading the relevant published work; but at this stage we discovered that similar observations had been made in 1901 by von Pirquet, who had reached the same conclusion. We therefore pursued our somewhat naïve investigations no further, believing that we had been in ignorance of *facts well known to better-qualified workers in this* field.

If our conclusions were correct it followed that the "reaction of immunity" in fact only indicated that the patient was immune to variola when the vaccine employed was known to be potent and viable. This explained our previous experiences of seeing patients in whom we had ourselves noted a "reaction of immunity" develop fatal smallpox within two months of vaccination.

Dr. Broom is clearly aware of the problem, but he has noted a considerable number of cases in which unheated lymph gave a "reaction of immunity" while heated lymph gave no reaction. Our experience was different from this: in a few a "reaction of immunity" was given by unheated, but not by heated, lymph; in about an equal number the reverse was noted. We attributed these discrepancies to faults in our technique, and tion, by producing similar reactions with both heated unheated lymph, confirmed our view. Dr. Broom that the reaction to heated lymph may "closly simulate that to unheated; we concluded that the two indistinguishable. We share his uneasiness about *fication; on several occasions* we have seen the of security engendered by a "reaction of i prove disastrously false.

London, W.1. RONALD BODLEY SCOTT
Leeds. R. P. WARIN.

CHEST DISEASE IN RAND MINERS

SIR,—In their letter of Feb. 8 Dr. Frazer and Dr. Walker rightly say that we have a miniature rad plant at the Witwatersrand Native Labour Ass Hospital, which has now been in operation for years. (Like them, we consider that our miniatures of a very high standard, as also are the large X-ray films taken to check the abnormalities seen in the miniature radiographs.) They were wrongly informed, however, that native workers suffering from phthisis may continue *to work if they choose to do so. No native mine labourer.* found to be suffering from pulmonary tuberculosis and/or silicosis is allowed to continue working at the mines; he is compensated and repatriated at the expense of the mines. The compensation paid is, for silicosis, a sum equal to 36 times the amount of his monthly earnings, or £180, whichever of the two amounts is the greater. Similar compensation is paid for pulmonary tuberculosis where the labourer has been engaged in a dusty mining occupation for 8 or more years. Where the labourer is found to be suffering from pulmonary tuberculosis after *having worked in a dusty occupation for 30 days* or longer, he is given an amount equal to 20 times the sum of his monthly earnings, or £100, whichever of the two amounts is the greater.

Dr. Frazer and Dr. Walker add that "during a brief visit to the W.N.L.A. Hospital, no case of chest disease was seen." This seems strange, as we detain a large number of patients in hospital for sputum tests and other *investigations. Apart from these, all patients on the* mines who are suspected to be suffering from pulmonary tuberculosis and/or silicosis, after X-ray, clinical, or sputum investigation, or loss of weight, are sent to our hospital and detained here for examination by the medical officers of the Silicosis Medical Bureau, with a view to possible compensation.

Witwatersrand Native Labour Association, Ltd., Johannesburg. FRANK RETIEF
Chief Medical Officer.

BETTER CARE FOR THE HOMELESS CHILD

SIR,—Your annotation of April 5 suggests that there is fairly general agreement with the recommendations of *the Curtis Committee.* But it is in fact surprising that more written protests have not appeared from workers in public-health, medical, and educational circles considering the extent of the disagreement which exists. The largest single group of children mentioned in the report is that in public-assistance institutions. *It is remarked with* surprise that 60% of these children are short-stay admissions—e.g., children admitted because the mother is having a baby. To this extent the total figures are inflated, for this group can hardly be described *as* "deprived children." The committee consider *that* more accommodation for these short-stay children *is badly needed,* although they remark that there was ample accommodation in children's homes generally before the war. The overcrowding of the public-assistance institutions, therefore, seems to have developed with the war, when women were encouraged to send their children (even those of 2 years) into institutions while they either went to work or had a baby, and there was little warning to the mother that it might have a bad effect on the child's *emotional development.* The legacy of 5000 homeless evacuees tells its own *tale.* Some propaganda in reverse to emphasise the importance of keeping the child in its own or a relative's home where this is at all possible might now *be instituted,* with a quotation from the Curtis report on "the extreme seriousness of taking a child away from even an indifferent home." To a young child even two weeks is a long time.

The Government's decision to make the Home Office e responsible central department is itself remarkable, nce, of the three central departments concerned, this the only one without adequate trained visiting staff the local-authority level.

At a guess I should say the visiting of individual ildren for fostering, adoption, and boarding-out will ntinue to be done by the same people who do it at resent—namely, health visitors, school nurses, and school-ttendance officers, with the added complication that r this part of their work they will apparently be sponsible to the Home Office through the children's fficer. The Curtis Committee propose that this officer hould be an important administrative official of the ouncil, not on the staff of any other department, with pproximately 500 children under her care. As it will not e practicable for her to know and keep in touch with hem all (although the personal touch is the main argu-nent for her appointment) she will allocate groups of hildren to her subordinates. A boarding-out visitor is o be responsible for the supervision of 100–150 children, ach to be visited at least once in three months. She s to be a superior visitor (? a psychiatric social worker)—not a mere health visitor—and this may explain why she is apparently only to do two or three visits a day. Yet health visitors have at least 1000 children to visit, and local authorities have found it almost impossible to fill vacancies because of the shortage. Are psychiatric social workers more plentiful ?

Whether one agrees or disagrees in principle with the recommendations of the Curtis report the main single criticism is that it considers the matter as if in a vacuum. It ignores the fact that there is a shortage in almost every sphere of trained professional women. The inspecting staff of the central government department must be increased, children's officers must be appointed. But where will they be drawn from ? Health visitors, nursery-school teachers, psychiatric social workers, matrons—all are in desperately short supply. Thus we are faced with an increase at the supervisory and inspectorial levels, with a resulting decrease in the already overworked staffs who do the spadework.

Woodford Green, Essex. HILDA MENZIES.

SAND-FLY FEVER

SIR,—The article of April 5 by Dr. John Fleming, Major Bignall, and Captain Blades was of great interest to me as I witnessed a large series of similar cases in a military hospital in Athens during the summer of 1941.

These cases were considered not to be true sand-fly fever for three reasons: (1) the almost clock-like regularity of three days' duration which characterised the outbreak and which is not typical of sand-fly fever ; (2) the absence of really severe headache, which is certainly present in genuine sand-fly fever ; and (3) the absence of the well-known depression and asthenia which characteristically follow sand-fly fever.

The Greek doctors, who are used to these epidemics, have named it the three-day fever ; and it was their opinion that it was not due to the sand-fly. One suggestion made at the time was that it was an abortive form of anterior poliomyelitis, of which there was a concurrent epidemic. The outbreak also coincided with the sea-bathing season.

I suggest that among cases of short-term pyrexia which tend to be labelled sand-fly fever there is a separate entity—" P.U.O., three-day type "—of whose ætiology we are at present ignorant. To label such cases sand-fly fever is to hinder progress.

Brighton. EDWARD W. LINDECK.

SIR,—The review by Fleming, Bignall, and Blades must have evoked wistful memories in those of us who gave some minutes every summer night to hunting in the folds and corners of the mosquito-net for the elusive and diaphanous flies, only to wake on the morrow and find that quite a few had escaped our search and were now showing up all too easily by the large red blob of our blood in their bodies.

The sand-fly set us a nice problem in differential diagnosis. When a fairly large outbreak of sand-fly fever began in Greece, at a time when everybody was acutely smallpox-conscious, 3 cases of ?smallpox were admitted to the isolation ward of our hospital. Their history was one of a three-day fever, and they showed a petechial rash, most marked over the feet, including the soles, and less marked over the legs, hands, and face. The history and the distribution of the rash were in fact reminiscent of smallpox, but the rash was quite superficial and slightly irritating and itching. Our diagnosis of sand-fly fever and insect bites, probably caused by the phlebotomus, was borne out later in this outbreak when we saw a considerable number of similar cases with petechiæ over exposed parts of the body. We never saw weal formations in the patients exhibiting petechiæ.

The admission of ?smallpox cases was of course known to our higher administrative authorities, who, rightly conscious of their responsibility, were not so easily persuaded to regard these cases lightly. There were a number of consultations with Army authorities and Greek medical notables. In fact we were much in the limelight for some days and gained an interesting experience, at the cost of some disruption of communications to our " smallpox-infested " community.

London, W.1. P. F. MEYER.

STEVENS-JOHNSON SYNDROME

SIR,—The Commission on Acute Respiratory Diseases of the U.S. Army Medical Corps,[1] reporting 6 cases of Stevens-Johnson syndrome and inoculation studies from necropsy material of a 7th, emphasise the frequency of lung lesions closely resembling primary atypical pneumonia ; in 2 of their 3 pneumonic cases cold agglutinins were present in significant titres. They cite J. H. Stanyon and W. P. Warner,[2] who in a series of 17 cases found non-bacterial pneumonia in 14, with 2 fatalities showing widespread pulmonary consolidation with a mononuclear-cell exudate.

The disease, which is fairly uncommon, seems to come in small epidemics. Hebra,[3] who as early as 1860 noted its association with pneumonia, thought that it was commonest in April–May and October–November ; and Keil [4] reports that it is not rare in New York City during spring and autumn. That there may be no severe cases for years at a time is suggested by the absence of any example of it in Jonathan Hutchinson's *Archives of Surgery*, which are a good source of reports on unusual dermatological conditions in the 1890's.

Dr. Nellen (March 15) correctly quotes Rosenberg and Rosenberg as alleging that the first cases were described in 1822 by Alibert and Bazin. The Rosenbergs give as their source a thesis,[5] which I have so far been unable to trace ; but as Bazin in 1822 was at the tender age of 15 it seems that the Rosenbergs made a slip. Looking through Alibert's *Monographie des Dermatoses*,[6] I did not find anything relevant to the subject ; but Bazin's hydroa vésiculeux [7] most probably relates to the condition.

Without having a special grudge against eponymous titles I feel this particular one is unwarranted. In his scholarly paper Keil [4] discusses contributions to this subject back to 1860 ; perusal of it will dispel the belief that Stevens and Johnson contributed something essentially new. The Commission on Acute Respiratory Diseases also consider that this eponym has no historical justification.

None of the many terms used for it is wholly satisfactory. Hebra coined the term " erythema multiforme exudativum," all his cases having had only cutaneous manifestations. Later writers have often used terms according to the local signs (dermato-stomatitis ; gingivo-stomatitis ; atypical ulcerative membranous stomatitis ; mucosal respiratory syndrome). Even the more embracing term, " muco-cutaneous fever," is not ideal, for there may be no fever and tissues other than skin and mucous membranes may be involved. Hebra's original term is still more often used than others by authors describing cases with extra-cutaneous manifesta-

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1. *Arch. intern. Med.* 1946, 78, 687.
2. *Canad. med. Ass. J.* 1945, 53, 427.
3. Handbuch der speziellen Pathologie und Therapie (R. Virchow), Erlangen, 1860, vol. 3.
4. Keil, H. *Ann. intern. Med.* 1940, 14, 449.
5. Beaudonnet, B. Thèse de Paris, 1894, no. 354.
6. Paris, 1832.
7. Leçons théoriques et cliniques sur les affections génériques de la peau, Paris, 1862–1865 ; quoted by Keil.

tions; compromising on it may help to bring home that skin lesions are often only part and parcel of a systemic disease.

Bethnal Green Hospital, London, E.2. HERBERT LEVY.

SIR,—The publication of three or four communications on the so-called Stevens-Johnson syndrome will certainly stimulate interest in this condition. Some years ago, having become acquainted with the disease, I extracted the literature fairly widely; and I find that the records, including my own, cover some seventy cases, excluding others less well defined and a hundred-odd cases noted by one author in an epidemic. I have not published any account of the disease as it would be too long.

To anyone who has once seen a full-blown case the clinical picture remains unforgettable; faced with a case for the first time, the medical man will surely be baffled.

Some of my tentative conclusions, based on my own observations and a study of all the published cases, are that: (1) while perhaps the majority of cases manifesting this syndrome run true to type, there may be many variations, including for instance the condition referred to by Forman and Whitwell [1] in an article on the association of herpes catarrhalis with erythema multiforme; (2) the syndrome, which occurs more commonly in sporadic form, may also occur in small groups or even in epidemics; (3) there is often an association with some other disease, such as pneumonia; (4) recurrences are sometimes seen; (5) the so-called Stevens-Johnson syndrome belongs to or is part of the condition called erythema multiforme; (6) the evidence points to erythema multiforme and this syndrome as originating in a virus infection rather than an allergic state as has been suggested; and (7) it might be a pity if the syndrome's present designation were perpetuated. Stevens and Johnson wrote in 1922, whereas there are descriptions of the condition certainly as far back as 1896.

London, W.1. HUGH S. STANNUS.

SIR,—Dr. Nellen and Dr. Murray by their papers have aroused considerable interest in the Stevens-Johnson syndrome, partly because they have cleared away the fog around certain rare cases and partly because they, and others, have underlined the comparative rarity of English case-reports, though in America the condition seems to be fairly well known. Because of this I would like to record a further case which at the time it was seen was diagnosed as erythema multiforme bullosum with pneumonia and rheumatic carditis.

The patient was a girl, aged 13, who had been healthy except for growing pains during 1945. She was admitted to hospital in May, 1946, under the care of Dr. C. N. Armstrong, having been ill for three days with left-sided chest pain, sweating, shivering, and general weakness. She was breathless but had no cough or sputum; and on examination she looked ill, with an increased respiration-rate and slight cyanosis. There was limited movement over the left lower chest with impaired percussion-note over both lung bases and an area of tubular breathing over the left lower lobe. A loud systolic murmur was heard at the cardiac apex. Urine was normal. The electrocardiograph showed no significant abnormality, and chest X ray showed a shadow in the lower left axillary region. Blood-count: red-blood cells 4,780,000 per c.mm.; hæmoglobin 88%: colour-index 0·92; white-blood cells 11,300 per c.mm. Some sputum obtained a few days after admission showed no significant abnormality.

For the next ten days she continued, despite treatment, to run a temperature up to 103·8° F, with chest signs; then a patchy erythematous rash appeared on her arms, legs, and trunk, becoming deeper in colour, confluent, and vesicular on the limbs. Her mouth and tongue showed ulceration, and her eyes moderately severe conjunctivitis. During the next day or two the rash became bullous, and the mouth lesions more extensive. The temperature rose to 104·8° F, and the general condition deteriorated.

Five days after the appearance of the rash, her condition, which had been very poor, suddenly improved; the temperature dropped to normal, the rash gradually faded, and the skin peeled in places, leaving a mild pigmentation which rapidly cleared. The mouth lesions quickly healed, and the conjunctivitis improved. From this time on her condition gave rise to no further anxiety, and she was discharged a month after admission.

A blood-culture taken at the height of the erupti sterile, and a chest X ray taken at the same time sho lung fields to be almost normal, while the white-cell was 6100 per c.mm. (polymorphonuclear cells 66%, l cytes 26%, monocytes 2%, eosinophils 5%, degenerate 1%). The urine showed no abnormality, and specimens of sputum were negative. A further full examination during convalescence was normal.

Treatment with penicillin and sulphamethazine was throughout the illness, but had no effect on the although it may have prevented secondary skin infection.

I saw this patient again on March 27, 1947. She was well and had had no recurrence of the condition. Her eyes, and mouth were normal. There was an apical murmur, but no radiological evidence of cardiac or disease, and her blood-count and film were normal.

This case seems to illustrate Dr. Sneddon's ment concerning the association of the syndrome atypical pneumonia.

University of Durham.
R. MOWBRAY
First assistant to the Depa of Medicine.

ESTIMATION OF PENICILLIN IN SERUM

SIR,—In my letter last week I described a modifi of the micro-method for penicillin assay, using D tubes. The directions should read:

> Starting with two drops of the serum to be assayed two drops of 1% glucose peptone water and An indicator, doubling dilutions are made on paraffined The last two drops are discarded. (A control, of is put up as well.) The final two drops of each dilution inoculated with the Oxford staphylococcus and int by means of a Pasteur pipette into sterile Dreyer's tubes.

Cotton-wool plugs can be used in the Dreyer's tu instead of sealing them with 'Plasticine,' without noticeable diminution in the volume following incubatio

General Hospital, Birmingham. M. J. PIVAWER

AGE AND SEX DISTRIBUTION OF DIPHTHERI

SIR,—*In his interesting paper on diphtheria in* Olde burg, Germany, in your issue of March 29, Colo Walker records the preponderance of female cases (especially in those over fifteen years of age) and high incidence among adults relative to children. *says that the German medical officers of health* exp both of these features by reference to artificial immunisa tion of children. I agree with Colonel Walker that it is questionable whether this explanation is wholly adequate.

In a study of the epidemiology of diphtheria in Dublin *over a long period* [1] I noted, like Colonel Walker, the preponderance of female cases. Of his 3538 cases, 2296, or 64·9%, were females. Among 6261 cases notified in Dublin in the years 1935–42, females numbered 3474, or 55·4%; and among the 1012 cases aged fifteen years *and over females numbered* 723, or 71·4%.

More striking, perhaps, is the high incidence found by Colonel Walker among those of fifteen years and over—60·9%. Between 1933 and 1942 the average incidence in Dublin in those of fifteen years and over was only 16·4%.

I also showed how over a period of years the incidence of the disease might steadily shift from a lower to a higher age-group, as it did between 1928 and 1937. This shift was accompanied by an increase in severity, as shown by analysis of the fatality-rates according to *age-groups.*

A decline in general incidence, as observed in Dublin, coincided with a decline in general severity *and a shift* in incidence to the lower age-group—i.e., 0–5 years. This decline in incidence happened to accompany an *intensified artificial*-immunisation campaign, the decline being maximal about 1941. The decline, however, was almost certainly not related to immunisation, because it could have been foreseen from the fluctuations in incidence in Dublin since 1801. Since that time there had been fairly uniform cyclical variations, with ten-yearly peaks. Further, the *age-distribution* of the cases in 1940–41 was comparable with that of the years 1929–32, a period before the introduction of immunisation in blin. Such variations in severity and age-incidence ve been observed by Deicher and Agulnik[2] and by ers. They were observed even before *C. diphtheriæ* s discovered.

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[1] Forman, L., Whitwell, G. P. B. *Brit. J. Derm.* 1934, 46, 309.

[1] *Irish J. med. Sci.* 1943, pp. 97, 140.

One further point. Colonel Walker says that although htheria was common in Land Oldenburg during the riod of observation, it did not reach epidemic pro- rtions. He says its weekly incidence averaged about per 100,000 of the population. An incidence of at order in Dublin would certainly be regarded as aching epidemic proportions. J. C. GAFFNEY.

School of Pathology, Trinity College, Dublin.

ANKYLOSING SPONDYLITIS AND FLUOROSIS

SIR,—Mr. Eric Lloyd's interesting letter in your last ue draws attention to the possibility of fluorosis play- g a part in the ætiology of ankylosing spondylitis. nce reading Dr. Oliver Lyth's paper (*Lancet*, 1946, i. 3) I have been at pains to find anything to suggest orosis on examination or history-taking of cases of kylosing spondylitis, but I have drawn a complete ank in the 15 cases I have examined since then. The st 60 cases attending this hospital have come from all arts of the United Kingdom; nearly all were town-wellers drinking the same water and breathing the me air as their normal neighbours. I have one patient ith ankylosing spondylitis of thirty years' duration, but e radiological picture is not that of fluorosis. Were ere an association one might expect radiological changes ore frequently in the aged. At the most, fluorosis ould only be one factor at work in these cases, and the eason why one man suffered while all his neighbours ent free would still be lacking. And why the difference n sex incidence? The progress in the development of the ony changes differs largely in the two conditions, and most f the apparent similarities disappear on closer inspection. Nevertheless, association there may possibly be, and Mr. Lloyd has done a service in drawing attention to the fact.

Westminster Hospital, London, S.W.1. F. DUDLEY HART.

CONVALESCENT HOMES

SIR,—The convalescent-home service in this country has developed in a somewhat haphazard way, mainly outside the hospital framework, with the resulting advantage that the main emphasis is laid on the return to normal life rather than the continuation of medical treatment. But it is, perhaps, in consequence of this independence that convalescence does not, even now, receive adequate recognition as an extension of hospital treatment, but is often regarded as a pleasant but unessential extra.

The attitude of the homes themselves is not always helpful. Some, often those belonging to organisations covering large sections of the community, are reluctant to give details of the care they provide, or to allow visitors from hospitals which send them patients. They regulate the admission of patients through a committee of laymen; and they restrict stay to two weeks, irrespective of medical requirements.

The standards in some homes today are still below those laid down by Florence Nightingale in 1863, and the regimen is by no means always adapted to the mental needs of the patient, which, in the convalescent, are often as great as the physical. Use is rarely made of occupational therapy or recreation under expert supervision. Little interest is taken in the possibilities of research. Scientific knowledge about diet is the exception rather than the rule, and the services of a dietitian are rarely sought.

Many homes work in isolation without any yardstick y which to measure their standards, and without means of exchanging ideas. There is need for greater curiosity on the part of homes, but the absence of any reliable pool of information and advice has been a great drawback. Action now being taken by King Edward's Hospital Fund (*Lancet*, April 5, p. 454) to remedy this in the London area needs to be extended over the whole country. In this way standards could be raised and gaps in provision filled; whereas coercion and regimentation might well destroy many of the smaller homes, which, whatever their faults, are a valuable part of the convalescent-home service in Great Britain.

London, S.W.1. MARJORIE L. WARD.

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[2] *Dtsch. med. Wschr.* 1927, 53, 825.

Public Health

Smallpox

FIFTEEN separate introductions of Asiatic smallpox occurred during 1946. Fortunately, on each occasion vaccination and surveillance of contacts brought the disease under control with remarkable speed, and only 40 persons became infected during the year.

In mid-February, after an interval of seven months, the disease again appeared, and since then 33 cases have been notified up to April 15 (15 at Grimsby, 2 at Stepney, 7 at Scunthorpe, 1 at Doncaster, and 8 at Bilston). The disease was introduced from an unknown source into a common lodging-house at Grimsby, where 2 old men sickened on Feb. 13 and 16. Subsequently, 13 further cases arose, all of which were in the direct line of contact with the 2 original cases. 1 was in a man who had spent the night of Feb. 16 at the lodging-house, and subsequently developed smallpox at his home in Grimsby. 2 members of the staff of the Public-health department who had been concerned with the disinfecting of the lodging-house developed smallpox while living at home. With the exception of these 3, all the secondary cases occurred among the contacts either at the common lodging-house (4) or in the ward of the public-assistance infirmary (6) into which the original patient was unfortunately admitted. The total number of cases in this outbreak was thus 15. There were 6 deaths; the high mortality was associated with the advanced age of the patients, and in 4 with previous debilitating disease. The last case at Grimsby was removed on March 9, and the town is now believed to be free from infection.

It is probable that an unidentified contact at Grimsby infected an attendant at a hostel for seamen at Stepney; fortunately, this man was admitted early in the disease to a general hospital, where he infected only 1 patient. Since the removal of this secondary case on March 21 no further case has been notified in the London area.

The disease next appeared at Scunthorpe, 28 miles by road from Grimsby. The first patient resided in a common lodging-house where 2 contacts who had absconded from surveillance at Grimsby were staying. Initially this man was diagnosed as having varicella and he was admitted to an infectious-disease hospital. 6 cases in the second generation have been notified, the first developing the rash on April 4. They include a doctor, vaccinated in infancy only, and an unvaccinated nurse, both of whom were attending the patient; the others were residents at the common lodging-house. 5 contacts (Kenny, McGennity, Finegan, Ancliffe, and Andrews) have absconded from this lodging-house while under surveillance; their whereabouts are unknown and they may be incubating or suffering from smallpox.

There is no further information concerning the source of infection at Doncaster. The disease there, in a schoolmaster (rash March 27, removed March 31), was detected early, and prompt vaccination appears to have prevented further spread. Surveillance of contacts has now ceased.

The above series appears to be Asiatic smallpox of moderate severity. In contrast, the disease at Bilston, Staffordshire, is said to be variola minor although it originated in India or Cairo, more probably the former. The third generation of cases (onsets April 3–9, rashes April 5–10) numbers 5, of whom 1, a woman, aged 79, died during the prodromal period. The initial case and the second generation (2), although confidently diagnosed as chickenpox until variola virus was isolated in the laboratory, remained confined to their beds from onset; and the infection is believed to be limited to a circle of relatives and friends in three households. The clinical picture has been misleading. In 2 of the patients there were less than half-a-dozen lesions, and the illness is described as being like "influenza with a few spots."

A further patient is under observation, awaiting diagnosis (April 15), at Rubery, Birmingham.

Because of the difficulties in diagnosis, and, more important, because ambulant cases of variola minor, which are sometimes relatively numerous, if missed, may bring about a wide dispersal of infection, the reappearance of mild smallpox should be viewed with apprehension, and every effort made to detect new foci promptly. A medical officer of health should be consulted whenever there is the slightest suspicion.

From Paris it is reported that there were 32 cases, with 2 deaths, between Feb. 10 and April 2. There have lately been several cases in New York.

Control of Ice-cream

Regulations announced by the Minister of Health for the heat-treatment of ice-cream [1] are similar to those drafted last year.[2] Where a "complete cold mix" is reconstituted with drinking-water and nothing is added other than colouring or flavouring materials, the mixture must be converted into ice-cream within an hour of reconstitution. When any other ingredients are used the mixture must not be kept for more than an hour at a temperature exceeding 45° F before being heated to a temperature of not less than 150° F for 30 minutes or 160° F for 10 minutes; and within 1½ hours it must be cooled to a temperature not exceeding 45° F, and kept below that limit, until freezing is begun. Records from recording thermometers, where these are in use, must be preserved for at least a month. Ice-cream is not to be sold unless it has been kept at a temperature not exceeding 28° F since freezing; or if it has exceeded that temperature it must be submitted to heat treatment again. It must be protected from dirt, dust, or other contamination; and utensils must be thoroughly cleansed immediately after use, and must be kept clean.

These regulations, which are to be enforced by local authorities, become effective on May 1. From a day to be appointed by the Minister, such indicating and recording thermometers as may be required by the local authority must be used during processing and storage; the imposition of this regulation is being deferred to allow time for the purchase of thermometers. In view of the possible difficulty in obtaining equipment, proof of having ordered the necessary apparatus shall constitute a defence against charges of infringement of the cooling regulation up to May 1, 1948, provided every attempt has been made to comply as far as possible with the regulation.

The Minister has decided against imposing a bacteriological standard of cleanliness; but he commends the methylene-blue test,[3] and suggests that further investigation is needed if samples consistently fail to reach grade 1 or 2.

Report on Nutrition

In the latest Ministry of Health survey of nutrition,[4] covering the period from last October to January, 4658 people were examined. The proportion with nutrition classified as good was 92·9%, while the proportion classified as fair was 6·6%, and as poor 0·5%. These figures differ little from those at the previous survey for January–June, 1946; but the percentage rated as good is 3·2 higher than in the 24,723 people examined between June, 1942, and June, 1946. Comparison is, however, difficult, since the earlier surveys were carried out by selection in formerly depressed areas, when improvements in the national dietary from the more equitable distribution of food had been operating only a short time.

In the latest survey the incidence of folliculosis was 8·5%, compared with 15·6% for the whole of last year; while that of gingivitis was 14·7%, compared with 8·8%. Among school-children the percentage classified as nutritionally good was 90·9, compared with 92·9.

Infectious Disease in England and Wales

WEEK ENDED APRIL 5

Notifications.—Smallpox, 2; scarlet fever, 995; whooping cough, 1775; diphtheria, 184; paratyphoid, 6; typhoid, 8; measles (excluding rubella), 8843; pneumonia (primary or influenzal), 730; cerebrospinal fever, 86; poliomyelitis, 4; polioencephalitis, 1; encephalitis lethargica, 1; dysentery, 44; puerperal pyrexia, 115; ophthalmia neonatorum, 68. No c cholera, plague, or typhus was notified during the

The 2 cases of smallpox were notified at Scunthorpe and Do respectively.

Deaths.—In 126 great towns there were 1 (0) from enteric fever, 1 (0) from scarlet fever, 5 (0) diphtheria, 20 (0) from measles, 13 (2) from wh cough, 89 (20) from diarrhœa and enteritis under years, and 27 (6) from influenza. The figures in theses are those for London itself.

The number of stillbirths notified during the was 285 (corresponding to a rate of 32 per the total births), including 27 in London.

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[1] Ice Cream (Heat Treatment, &c.) Regulations, 1947; and circular 69/47.

[2] See *Lancet*, 1946, ii, 571.

[3] See *Mon. Bull. Min. Hlth, P.H.L.S.*, March, 1947, p. 60.

[4] Adcock, E. W., Magee, H. E., Milligan, E. H. M. *Ibid*, p. 54.

Appointments

ACFIELD, J. R., M.B. Leeds, D.O.M.S.: asst. ophthalmic Hull Royal Infirmary.

BARKER, H. A., M.B. Edin., D.P.H.: senior M.O., health de and deputy medical superintendent, Bradford M General Hospital.

BIRKETT, A. N., F.R.C.S.: asst. orthopædic surgeon, Not General Hospital.

COWAN, EMANUEL, M.B. Dubl.: asst. maternity and child officer and asst. M.O.H., Portsmouth City.

*GIBB, ERIC, D.M. Oxfd, M.R.C.P.: asst. physician, St. Barthol[illegible] *Hospital, London.*

HOLLINGSWORTH, GEOFFREY, M.B. Edin., D.OBST.R.C.O.G., D.M.R.: consultant radiodiagnostician, Northampton General Ho[illegible]

JONES, C. D. F., M.B.E., M.B. Lond., F.R.C.S.: asst. surgeon, [illegible] Sheffield Infirmary and Hospital.

KENDALL, DAVID, D.M. Oxfd, M.R.C.P.: neurologist, West K[illegible] General Hospital, Maidstone, and Kent County Ophth[illegible] and Aural Hospital, Maidstone.

MENZIES, ALEXANDER, M.B. Edin., D.P.H.: deputy M.O.H., deputy school M.O., and deputy port M.O., Middlesbrough.

PEAKER, MARGARET, M.R.C.S.: asst. school M.O., Middlesbrough.

SUMMERS, T. C., M.B. Lond., F.R.C.S.: ophthalmic surgeon, Kin[illegible] George Hospital, Ilford.

SWEENEY, P. J., M.B. N.U.I., M.R.C.P., M.R.C.P.I.: first asst., medical department, Royal Victoria and West Hants Hospital, Bournemouth.

Radcliffe Infirmary, Oxford:

PERCIVAL, R. H., B.M. Oxfd, F.R.C.S.: surgical registrar.
SHEPHERD, J. A., M.D. St. And., F.R.C.S.E.: surgical tutor.
SMITH, F., F.R.C.S.: surgical registrar.

Royal Albert Edward Infirmary and Dispensary, Wigan:

Visiting physicians:
GOLDMAN, H. P., M.B. Glasg., M.R.C.P.
SUTTON, W. S., M.B. Lpool, M.R.C.P. (temporary appointment).

Examining Factory Surgeons:

ARMSTRONG, REGINALD, O.B.E., M.B. Durh.: Rothbury, Northumberland.
CAMERON, D. F., M.B. Leeds: Builth, Brecon.
FENN, C. M., M.B. Birm.: Llanwrtyd Wells, Brecon.
MORRISON, E. F. S., M.C., M.B. Dubl.: Kibworth, Leics.

* Amended notice

Births, Marriages, and Deaths

BIRTHS

CRITIEN.—On March 30, in Malta, the wife of Surgeon Lieut.-Commander G. R. Critien, R.N.—a daughter.

MCAULIFFE-CURTIN.—On March 25, in Dublin, Dr. Maeve Kennedy, wife of Mr. J. M. McAuliffe-Curtin, F.R.C.S.I.—a daughter.

MASON.—On April 9, the wife of Dr. A. S. Mason—a son.

MAWSON.—On April 8, the wife of Dr. Richard Mawson—a son

MOWLL.—On April 5, at Surbiton, the wife of Dr. R. F. Mowll—a daughter.

MURRAY.—On April 8, in London, the wife of Dr. R. Murray—a daughter.

WISE.—On April 7, at Sandwich, Kent, the wife of Dr. C. S. Wise—a daughter.

MARRIAGES

DEWAR—THOMSON.—On April 10, at Newcastle-on-Tyne, Hewan Archdale Dewar, M.D., to Margaret Thomson.

NEVIN—LEESON.—On April 8, at Winchester, Robert Wallace Nevin, F.R.C.S., to Audrey Leeson.

ROBINSON—NIMMO.—On April 5, at Adel, Yorks, Cecil H. V. Robinson to Charlotte S. Nimmo, captain R.A.M.C.

ROSS—HOARE.—On April 11, at Epsom, J. N. MacBean Ross, M.D., to Betty Adine Hoare.

DEATHS

BANTING.—On April 8, at Ramsgate, Cecil Banting, M.D. Lond., F.R.C.S.

BOWLE.—On April 4, at Bexhill, Charles William Bowle, M.B. Camb., lieut.-colonel R.A.M.C., retd., aged 67.

CARSON.—On April 12, at Richmond, Surrey, Walter Peter Carson, M.B. Dubl., lieut.-colonel I.M.S., retd., aged 91.

COPEMAN.—On April 11, at Hove, Sydney Monckton Copeman, M.D. Camb., F.R.C.P., F.R.S., aged 85.

GODWIN.—On April 8, Herbert James Godwin, O.B.E., M.B. Durh., F.R.C.S.E., of Liss, Hants.

LITTLEJOHNS.—On April 6, at Farnham, Surrey, Archibald Smith Littlejohns, M.R.C.S., D.S.O., lieut.-colonel late R.A.M.C.

MITCHELL.—On April 4, at Bridge of Allan, John Stevenson Mitchell, M.B. Edin., F.R.C.S.E.

Notes and News

HONOURING A GREAT FRENCHMAN

At the opening of the Pasteur exhibition in London on April 9, M. René Varin, cultural counsellor at the French Embassy, pointed to the spontaneous nature of Louis Pasteur's work; rather than pursue a predetermined plan he investigated, with an open mind, such subjects as were brought to him. Sir Henry Dale, O.M., emphasised the close friendship between Pasteur and his British contemporaries, and the ubiquity of his work.

The exhibition, lent by the Palais de la Découverte, Paris, will remain open at the Science Museum, South Kensington, until May 26. Such homage to the great, if it is to grip the public's attention, must catch something of its subject's personality or of the purpose and the drama of his life. With the arts it is easy; the painter lives again in the gallery and the musician at the festival. With science it is not so easy; for here the achievement is not readily sensible to the eye or ear. This exhibition shows the difficulty very clearly. The story of Pasteur's life and work is told on a series of coloured boards inscribed with variously coloured inks. The tale could be read just as well, and certainly more comfortably, from the printed page. The necessary "lift," to persuade the casual visitor to follow the story to its end, would be provided by sufficient illustrations; and these, unfortunately, are lacking. Contemporaneous photographs are not to be expected; but Pasteur lives on in his influence on our daily lives; and pictures suggesting our debt to him, even today, would have brought home, like nothing else, the measure of his greatness. The exhibition is, however, enlivened by a display of letters in his hand and by some of the apparatus he used. If only for this section, it should be visited by those not too preoccupied with the present to glance back at the great past.

University of Oxford

The George Herbert Hunt travelling scholarship for 1947 has been awarded to Mr. Selwyn Taylor, M.CH., of Keble College.

University of Durham

On Thursday, May 29, at 5.15 P.M., at the Royal Victoria Infirmary, Newcastle-on-Tyne, Prof. G. Grey Turner will deliver the first Rutherford Morison lecture. He has chosen as his subject Rutherford Morison and his Achievement in Surgery.

Royal College of Physicians of London

On Tuesday and Thursday, May 20 and 22, Prof. R. E. Lane will deliver the Milroy lectures at the college, Pall Mall East, S.W.1, at 5 P.M. He will speak on the Care of the Lead Worker.

Society of Apothecaries of London

The honorary freedom of the society is to be conferred on Sir Stanley Hewett, and the mastery of midwifery, honoris causa, on Sir Allen Daley, Sir Eardley Holland, and Sir William Fletcher Shaw. The society's gold medal in therapeutics for 1947 has been awarded to F. H. S. Curd, D. G. Davey, and F. L. Rose, in recognition of their combined research which culminated in the discovery of 'Paludrine.'

British Legion Rheumatology Unit

At a meeting with the Minister of Health on April 14 a deputation from the British Legion suggested that experience gained in the British Legion unit of rheumatology, which was set up last June at the Three Counties Emergency Hospital, Arlesey, Beds., showed that the rheumatic and arthritic diseases could be treated successfully. At the centre, to which Dr. C. B. Heald is consultant, no new treatment was given, but various known methods were intensively applied, and the greater proportion of patients had left the unit to return to work. The deputation therefore suggested that similar units should be set up in all hospital regions. The Minister replied that he had watched this experiment with great interest and he valued highly the constructive nature of the work done by the Legion, which had resulted in so many men returning to their normal employment. The British Legion unit, complete with staff, was to be transferred to the Royal Free Hospital, and he fully intended to encourage the provision of further units on a similar basis.

Royal College of Surgeons of England

At a meeting of the council, held on April 10, with Sir Alfred Webb-Johnson, the president, in the chair, Dr. S. S. Beare (Weybridge) and Dr. E. H. R. Altounyan (Aleppo) were elected as fellows of the college, being members of over 20 years' standing. The Begley prize was awarded to Mr. R. C. Jordan, of Cardiff.

Prof. W. E. Gye, F.R.S., and Dr. James Craigie, F.R.S., were appointed Imperial Cancer Research Fund lecturers for 1947. Mr. E. A. Crook was re-elected a member of the court of examiners. It was decided to hold an additional primary examination for the fellowship in July, 1947. The subject set for the Jacksonian prize for 1948 was Malignant Disease of the Thyroid Gland.

The category of those entitled to attend the monthly dinners was widened so as to include fellows (when elected) and licentiates in dental surgery, holders of any of the specialist postgraduate diplomas, and all postgraduate students of the college, together with their wives and guests.

The following posts were recognised for the final fellowship examination:

House-surgeon and resident officer, Demerdash Hospital, Egypt; assistant medical officer, Paddington Hospital; senior house-surgeon and supernumerary house-surgeon, Royal Buckinghamshire Hospital, Aylesbury.

A diploma of fellowship was granted to P. D. Trevor-Roper, and the following diplomas were granted, jointly with the Royal College of Physicians:

D.T.M. & H.—H. E. Al-Abed, Harry Annamunthodo, D. W. Bell, R. H. Bell, J. S. Calnan, M. V. Chari, F. G. Domaingue, A. E. Eissa, H. S. Fuller, V. V. Gharpure, D. J. Gilbert, John Harper, Leslie Jacobson, V. N. Jai, Sze-Kin Kaan, Endre Kertész, R. R. Lam, J. I. Lesh, K. H. Lim, J. P. P. Mackey, R. D. Maclean, R. C. Macleod, G. Y. Nan, M. G. Nelson, Y. H. Ng, Qaiyum Pasha, S. H. Patel, I. B. Patwari, Abdurrahman Qattan, R. V. Rele, S. C. Sanghani, A. O. Sasegbon, K. S. Seal, I. H. Syed, W. J. U Tin, J. M. Vaizey, A. J. N. Warrack, Dorothy W. Wells, J. P. F. Whelan.

D.C.H.—Esmé Abelheim, J. M. Alexander, Raymond Asquith, J. N. Berry, B. W. Beynon, D. M. Brierley, Margaret Brodigan, Janos Brody, J. C. Brown, R. W. W. Brown, Janet Cameron, W. A. B. Campbell, F. S. Carter, R. H. Caughey, Roma N. Chamberlain, N. A. Daniel, H. H. Davies, H. L. Ellis, Edith M. Evans, C. G. Fagg, D. M. Foubister, Elsie C. Gibbons, Mildred C. Green, Joan Guy, Homer Habibis, Nell Hamlin, Margaret A. Hay, Frances A. Hepburn, J. B. Heycock, Patricia E. Hingle, Aron Holzel, J. N. Horne, Margaret E. Hughes, Joseph Jacobs, A. P. Kalra, Nora Kelly, Doreen M. King, Philip Kushlick, J. H. Lawrence, Joan M. Levett, M. E. MacGregor, Runa B. Mackay, G. F. Maggioni, S. L. Malhotra, N. M. Mann, Betty M. Margetts, Paul Maurice, Lilian Morris, P. D. Moss, E. F. Murphy, A. P. Norman, W. H. Opie, Arnold Palley, A. N. Pearson, V. R. Pickles, B. W. Powell, P. M. M. Pritchard, E. P. Quibell, Joan M. Redshaw, Attracta G. Rewcastle, Frank Rousseau, G. R. Royston, Alexander Russell, Isabel S. Smellie, Marion E. Smith, Angele M. P. Snow, Margaret H. Stanfield, J. H. Steeds, Eluned M. Steven, J. K. Steward, Marian E. Sturrock, Laura Thompson, J. P. M. Tizard, I. P. Todd, A. B. Tompkins, V. V. Tracey, G. B. R. Walkey, Pauline H. Webb, R. C. Webster, R. H. White-Jones, Llary M. Williams, D. A. J. Williamson.

London Association for Hospital Services Limited

This association, which was introduced five years ago by King Edward's Hospital Fund under the chairmanship of Sir Bernard Docker and Dr. W. Russell Brain to enable provision to be made for the cost of serious illness, is now offering the following increased benefits: an additional £1 1*s.* per week; cover for tonsillectomy, previously excluded; and a choice of three, instead of two, rates of subscription. Further particulars of the scheme, which was lately described in our columns (March 15, p. 352), may be had from the secretary of the association, 10, Old Jewry, E.C.2.

Travelling Fellowships in Medicine

The Medical Research Council invite applications for the following travelling fellowships for 1947–48.

Rockefeller Medical Fellowships.—These fellowships are intended for graduates resident in this country who have had some training in research work in clinical medicine or surgery, or in some other branch of medical science, and who are likely to profit by a period of work at a centre in the United States or elsewhere abroad, before taking up positions for higher teaching or research in the United Kingdom.

Dorothy Temple Cross Research Fellowships in Tuberculosis.—The object of these fellowships is to give opportunities for study or research to British subjects of either sex "intending to devote themselves to the advancement by teaching or research of curative or preventive treatment of tuberculosis in all or any of its forms." They will, as a rule, be awarded to candidates who wish to make their studies or inquiries elsewhere than in the United Kingdom. They will ordinarily be awarded for one academic year.

The fellowships carry a stipend of £525 per annum for a single fellow and £800 for a married fellow, together with allowances for travelling and incidental expenses. Applications must be lodged, not later than June 1, with the secretary of the council, 38, Old Queen Street, Westminster, S.W.1, from whom further particulars may be had.

and every effort made to detect new foci promptly. A medical officer of health should be consulted whenever there is the slightest suspicion.

From Paris it is reported that there were 32 cases, with 2 deaths, between Feb. 10 and April 2. There have lately been several cases in New York.

Control of Ice-cream

Regulations announced by the Minister of Health for the heat-treatment of ice-cream[1] are similar to those drafted last year.[2] Where a "complete cold mix" is reconstituted with drinking-water and nothing is added other than colouring or flavouring materials, the mixture must be converted into ice-cream within an hour of reconstitution. When any other ingredients are used the mixture must not be kept for more than an hour at a temperature exceeding 45° F before being heated to a temperature of not less than 150° F for 30 minutes or 160° F for 10 minutes; and within 1½ hours it must be cooled to a temperature not exceeding 45° F, and kept below that limit, until freezing is begun. Records from recording thermometers, where these are in use, must be preserved for at least a month. Ice-cream is not to be sold unless it has been kept at a temperature not exceeding 28° F since freezing; or if it has exceeded that temperature it must be submitted to heat treatment again. It must be protected from dirt, dust, or other contamination; and utensils must be thoroughly cleansed immediately after use, and must be kept clean.

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In the latest survey the incidence of folliculosis was 8·5%, compared with 15·6% for the whole of last year; while that of gingivitis was 14·7%, compared with 8·8%. Among school-children the percentage classified as nutritionally good was 90·9, compared with 92·9.

Infectious Disease in England and Wales

WEEK ENDED APRIL 5

Notifications.—Smallpox, 2; scarlet fever, 995; whooping cough, 1775; diphtheria, 184; paratyphoid, 6; typhoid, 8; measles (excluding rubella), 8343; pneumonia (primary or influenzal), 730; cerebrospinal fever, 86; poliomyelitis, 4; polioencephalitis, 1; encephalitis lethargica, 1; dysentery, 44; puerperal pyrexia, 115; ophthalmia neonatorum, 68. No cholera, plague, or typhus was notified during the

The 2 cases of smallpox were notified at Scunthorpe and respectively.

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The number of stillbirths notified during the was 285 (corresponding to a rate of 32 per the total births), including 27 in London.

Appointments

ACFIELD, J. R., M.B. Leeds, D.O.M.S.: asst. ophthalmic Hull Royal Infirmary.

BARKER, H. A., M.B. Edin., D.P.H.: senior M.O., health de and deputy medical superintendent, Bradford M General Hospital.

BIRKETT, A. N., F.R.C.S.: asst. orthopædic surgeon, No General Hospital.

COWAN, EMANUEL, M.B. Dubl.: asst. maternity and child officer and asst. M.O.H., Portsmouth City.

*GIBB, ERIC, D.M. Oxfd, M.R.C.P.: asst. physician, St. Barth Hospital, London.

HOLLINGSWORTH, GEOFFREY, M.B. Edin., D.OBST.R.C.O.G., consultant radiodiagnostician, Northampton General H

JONES, C. D. F., M.B.E., M.B. Lond., F.R.C.S.: asst. surgeon, Sheffield Infirmary and Hospital.

KENDALL, DAVID, D.M. Oxfd, M.R.C.P.: neurologist, West General Hospital, Maidstone, and Kent County Oph and Aural Hospital, Maidstone.

MENZIES, ALEXANDER, M.B. Edin., D.P.H.: deputy M.O.H., school M.O., and deputy port M.O., Middlesbrough.

PEAKER, MARGARET, M.R.C.S.: asst. school M.O., Middlesbrough.

SUMMERS, T. C., M.B. Lond., F.R.C.S.: ophthalmic surgeon, George Hospital, Ilford.

SWEENEY, P. J., M.B. N.U.I., M.R.C.P., M.R.C.P.I.: first asst., department, Royal Victoria and West Hants H Bournemouth.

Radcliffe Infirmary, Oxford:

PERCIVAL, R. H., B.M. Oxfd, F.R.C.S.: surgical registrar.

SHEPHERD, J. A., M.D. St. And., F.R.C.S.E.: surgical tutor

SMITH, F., F.R.C.S.: surgical registrar.

Royal Albert Edward Infirmary and Dispensary, Wigan:

Visiting physicians:

GOLDMAN, H. P., M.B. Glasg., M.R.C.P.

SUTTON, W. S., M.B. Lpool, M.R.C.P. (temporary appointment).

Examining Factory Surgeons:

ARMSTRONG, REGINALD, O.B.E., M.B. Durh.: Rothbury, Northumberland.

CAMERON, D. F., M.B. Leeds: Builth, Brecon.

FENN, C. M., M.B. Birm.: Llanwrtyd Wells, Brecon.

MORRISON, E. F. S., M.C., M.B. Dubl.: Kibworth, Leics

* Amended notice

Births, Marriages, and Deaths

BIRTHS

CRITIEN.—On March 30, in Malta, the wife of Surgeon Lieut.-Commander G. R. Critien, R.N.—a daughter.

MCAULIFFE-CURTIN.—On March 25, in Dublin, Dr. Maeve Kennedy, wife of Mr. J. M. McAuliffe-Curtin, F.R.C.S.I.—a daughter.

MASON.—On April 9, the wife of Dr. A. S. Mason—a son.

MAWSON.—On April 8, the wife of Dr. Richard Mawson—a son.

MOWLL.—On April 5, at Surbiton, the wife of Dr. R. F. Mowll—a daughter.

MURRAY.—On April 8, in London, the wife of Dr. R. Murray—a daughter.

WISE.—On April 7, at Sandwich, Kent, the wife of Dr. C. S. Wise—a daughter.

MARRIAGES

DEWAR—THOMSON.—On April 10, at Newcastle-on-Tyne, Hewan Archdale Dewar, M.D., to Margaret Thomson.

NEVIN—LEESON.—On April 8, at Winchester, Robert Wallace Nevin, F.R.C.S., to Audrey Leeson.

ROBINSON—NIMMO.—On April 5, at Adel, Yorks, Cecil H. F. Robinson to Charlotte S. Nimmo, captain R.A.M.C.

ROSS—HOARE.—On April 11, at Epsom, J. N. MacBean Ross, M.D., to Betty Adine Hoare.

DEATHS

BANTING.—On April 8, at Ramsgate, Cecil Banting, M.D. Lond., F.R.C.S.

BOWLE.—On April 4, at Bexhill, Charles William Bowle, M.B. Camb., lieut.-colonel R.A.M.C., retd., aged 67.

CARSON.—On April 12, at Richmond, Surrey, Walter Peter Carson, M.B. Dubl., lieut.-colonel I.M.S., retd., aged 91.

COPEMAN.—On April 11, at Hove, Sydney Monckton Copeman, M.D. Camb., F.R.C.P., F.R.S., aged 85.

GODWIN.—On April 8, Herbert James Godwin, O.B.E., M.B. Durh., F.R.C.S.E., of Liss, Hants.

LITTLEJOHNS.—On April 6, at Farnham, Surrey, Archibald Smith Littlejohns, M.R.C.S., D.S.O., lieut.-colonel late R.A.M.C.

MITCHELL.—On April 4, at Bridge of Allan, John Stevenson Mitchell, M.B. Edin., F.R.C.S.E.

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[1] Ice Cream (Heat Treatment, &c.) Regulations, 1947; and circular 69/47.

[2] See *Lancet*, 1946, ii, 571.

[3] See *Mon. Bull. Min. Hlth, P.H.L.S.*, March, 1947, p. 60.

[4] Adcock, E. W., Magee, H. E., Milligan, E. H. M. *Ibid*, p. 54.

SURGICAL HANDICRAFT*

Sir Heneage Ogilvie
K.B.E., D.M., M Ch. Oxfd, F.R.C.S.
URGEON TO GUY'S HOSPITAL; CONSULTING SURGEON TO THE ROYAL BUCKS HOSPITAL, AYLESBURY

Surgery began as a handicraft. In ancient times it was conducted by journeymen who plied their simple rade, often coupled with that of the barber, at fairs and inns. Gradually, through the vision and by the abours of a series of guilds and corporations to which his College stands in direct succession, it was elevated from a humble craft to a science and art. Within the last few years British surgery has attained a level higher than it has ever reached before; we have hitched our wagon to a star; let us see that the wheels are well planted on the road.

I speak of the craft of surgery, for the word craft retains unsullied its honourable tradition of sound work well done, whereas the word "art" is dragged down under the weight of those who claim its appellation. The hairdresser, the crooner, the juggler, the Hollywood extra, are all artists, whereas the watchmaker, the plumber, the smith, the carpenter, and the shipwright are proud to remain craftsmen. A surgeon, like a shipwright, must consider the design and purpose of the task he is about to undertake, his materials, his tools, the arrangement of his workshop, and the training of his assistants. His aim is the same, to please the customer.

The tasks we undertake in surgery are five:

(1) We incise; to gain access to all deep regions, to drain abscesses, to remove stones, and to provide an outlet to the surface.
(2) We excise tumours and dead or unhealthy tissue.
(3) We repair damage; we stop hæmorrhage, close perforations, approximate fractures, suture tears, and close the incisions we ourselves have made.
(4) We remodel, to restore form on the surface of the body, or function in its deeper structures.
(5) We transplant, to substitute what we may for that which has been lost.

The tissues that are the material of our craft are for the most part skin, fat, connective tissue, muscle, and bone.

SKIN

Skin is the ensheathing coat, the doorway to the rest of the body. A wound is not healed till the skin is healed, nor is its sterility secure till the skin-cover is complete. Skin consists of a tough felting of connective tissue with an epithelial cover. It possesses a considerable amount of elasticity, but this elasticity varies from place to place, according to the functional needs of the part.

The elasticity of the skin is a necessary quality in the external envelope of a body that grows, moves, and constantly alters the position and contour of its component parts. A cut in the skin tends to gape. An excised Wolff graft is smaller, and the hole left behind is larger, than the pattern originally marked on the surface (fig. 1). The elasticity varies from place to place according to the functional needs of the part. Over the abdomen it is well marked, to allow room for the constantly recurring expansion of respiratory movement, the frequent distension of meals, and the occasional encroachment of babies; over the back it need not, and therefore does not, stretch to any great extent. The elasticity is graded not merely to the extent but also to the direction of the stresses. Over parts that move, the skin must be able to stretch during extension and take up the slack during flexion, to twist during rotation, and always to return to the position of rest, which for any part of the body is usually that assumed in sleep.

But elasticity alone could not adapt the skin to the flexure surface of a hinge joint, where the tendency to shorten would make it bridge the angle during flexion and come away from the surface. This tendency is counteracted by the flexure creases which appear in the skin at all joints (fig. 2). As Wood Jones has pointed out, these creases are planes of stasis where the skin is anchored by a web of fibrous tissue that extends through the fatty layer to the deep fascia.

Incisions.—The first step in any surgical operation is an incision through the skin; and the last step is suture of the skin so that the least possible trace of the operation in altered function or visible scar remains. The patient will judge the success of the operation by the appearance of the scar rather than by what has been done beneath it.

An incision must give access for the operation that is to be performed; but, in planning it, the functions and movements of the skin in that part and the need to suture it exactly as it lay before must be borne in mind. In general, incisions should be made across lines of tension, particularly over the flexures of joints, where the movement, the elasticity to accommodate it, and therefore inherent tension are always greatest—i.e., in places like the front of the neck and the lower half of the abdominal wall (fig. 3). By cutting across lines of tension the elasticity of the skin in that line is interfered with only by the width of the inextensile scar, which with first-intention healing is measured in fractions of a millimetre rather than by its length, which always extends in inches. What is functionally desirable may not always be anatomically possible. Transverse incisions over Scarpa's triangle are excellent for any approach to the vessels, but of little value as an approach to the underlying hip-joint. Transverse incisions over the distal joints of the limbs are limited in length by the need to avoid the sensory nerves and surface veins that run longitudinally, and are suitable for small and superficial operations only. Where possible an incision should be made in a natural crease, for only where a surgical scar corresponds to a physiological one can it achieve perfection—perfect invisibility and function perfectly restored.

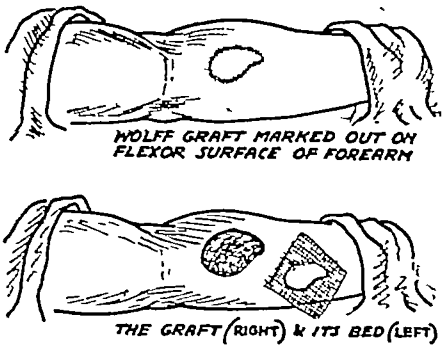
WOLFF GRAFT MARKED OUT ON FLEXOR SURFACE OF FOREARM
THE GRAFT (RIGHT) & ITS BED (LEFT)

Fig. 1—Shrinkage of graft when excised.

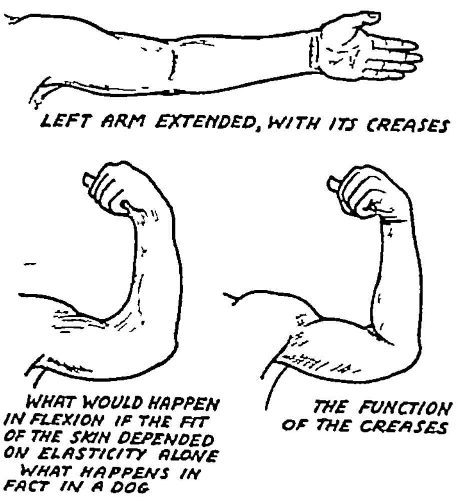
LEFT ARM EXTENDED, WITH ITS CREASES
WHAT WOULD HAPPEN IN FLEXION IF THE FIT OF THE SKIN DEPENDED ON ELASTICITY ALONE WHAT HAPPENS IN FACT IN A DOG
THE FUNCTION OF THE CREASES

Fig. 2—Function of creases.

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* Bradshaw lecture delivered at the Royal College of Surgeons on Nov. 14, 1946.

Royal Flemish Academy of Medicine of Belgium

Prof. E. D. Adrian, F.R.S., Sir Henry Dale, F.R.S., Mr. W. Sampson Handley and Prof. A. V. Hill, D.SC., F.R.S., have been elected foreign members of the academy.

Lund Research Fellowships in Diabetes

To encourage research in diabetes the Diabetic Association is offering whole or part time fellowships which will carry an annual salary of up to £750. A medical and scientific subcommittee will administer the fund and further particulars will be found in our advertisement columns.

St. Bartholomew's Hospital, London

The medical college is shortly to appoint a man or woman "to give practical instruction to medical students in the proper use of the social services available for children." The appointment is to be whole time and will carry a salary of not less than £450.

Irish Tuberculosis Society

A meeting of the society will be held at the Royal College of Surgeons, Dublin, on Friday, May 2, at 7.30 P.M., when Dr. G. S. Todd will speak on Collapse Therapy; Dr. William MacPhail on Rehabilitation; Dr. Morgan Crowe on Dispensary Organisation; and Mr. F. J. Henry on Surgery in the Treatment of Pulmonary Tuberculosis.

Conference on Industrial Health

The north-west area group of the Association of Scientific Workers are holding a conference on Saturday, April 26, at 2.45 P.M., at Milton Hall, Deansgate, Manchester, at which workers, management, and medical staff will discuss health problems in industry. Dr. C. Metcalfe Brown will be in the chair, and the speakers will include Prof. R. E. Lane and Dr. M. W. Goldblatt. Further information may be had from Mr. H. G. Bevan, 79, Russell Road, Manchester, 16.

Tribute to Sir Leonard Parsons

On March 28 a service of dedication was held at the Children's Hospital, Birmingham, when the babies' block was named the "Leonard Parsons block," to commemorate his services to sick children. Later at a private dinner held in his honour, Sir Leonard was presented with his portrait and an illuminated address recording the thanks of the board of management for his services to the hospital as physician and research-worker. Sir Leonard and Lady Parsons were also given a silver tea-service.

Production and Care of Laboratory Animals

On Monday, April 21, and May 12 the biological methods group of the Society of Public Analysts will hold the concluding meetings of their symposium on this subject, which opened on March 17. The meetings will take place at 6 P.M., at 1, Wimpole Street, London, W.1, and on April 21 Dr. H. J. Parish will speak on Common Diseases and Mr. N. T. Gridgeman on Records. On May 12 Dr. J. I. M. Jones and Mr. Eric Wood, PH.D., will read a paper on Housing, and afterwards there will be a general discussion of all the subjects covered at the three meetings.

Kent Pædiatric Society

The first general meeting of this society will be held on Saturday, April 26, at 2 P.M., at the County Hospital, Farnborough, Kent, when Dr. Duncan Leys will speak on a County Pædiatric Service. The society has been formed to encourage the study of children in health and in disease, to promote the welfare of children in the county, and to afford opportunity for coöperation between members of the child-health services. Membership is open to doctors engaged wholly or partly in work among children, including general practitioners, whether resident in the county or not. The secretary is Dr. P. N. Swift, pædiatric unit, Farnborough Hospital, Kent.

British Medical Association

At a meeting of the council of the association held on April 2 a unanimous recommendation was made to the representative body that Sir Hugh Lett be re-elected president for 1947–48. The annual meeting of the association in 1948 will be held at Cambridge and Sir Lionel Whitby was recommended as president for 1948–49.

Dr. Guy Dain, chairman of the council, Dr. Charles Hill, secretary of the association, Dr. Hugh Clegg, editor of the *British Medical Journal*, and Dr. J. A. Pridham, chairman of the international relations committee, are to represent the association at the centenary celebrations of the American Medical Association to be held at Atlantic City in June of this year.

Institute of Metals

On Thursday, April 24, at 7 P.M., at the James Memorial Institute, Great Charles Street, B Dr. Neil G. Marr will address the Birmingham section of institute on *Medical Services in the Non-ferrous Industry.*

Change of Owner

The Minister of Health has asked all voluntary non- hospitals to return to him by June 30 a statement of assets as at Dec. 31, 1946, so that a central record may be prepared to facilitate the transfer of hospital property under the National Health Service Act. Hospitals are asked to state any conditions attaching to their endowments so that due consideration may be given to them.

A new quarterly, the *British Journal of Nutrition*, is to be published for the Nutrition Society by Cambridge University Press. It will include, as well as original work, the society's *Proceedings*, which at present appear separately. Papers for publication should be sent to the chairman of the editorial board, Mr. S. K. Kon, D.SC., at the National Institute for Research in Dairying, Shinfield, Reading. Subscriptions (for non-members of the society £3 per volume of four quarterly parts, or £1 for each separate part) should be addressed to the Cambridge University Press, 200, Euston Road, London, N.W.1.

Corrigendum.—Sir Adolphe Abrahams writes to point out that the diagrammatic representation of irregularity of living in his article on Chronic Fatigue (*Lancet*, 1945, ii, 421) was wrongly attributed to Richard Cabot. The figure was inspired by the frontispiece of Cabot's book *What Men Live By*, but was the work of Dr. E. J. Kepler (*Proc. Mayo Clin.* 1942, **17**, 340).

Diary of the Week

APRIL 20 TO 26

Monday, 21st

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, London W.C.
5 P.M. Mr. Rainsford Mowlem: Replacement of Skin Loss in Traumatic Injuries.
6.15 P.M. Prof. R. R. Macintosh: Anæsthesia in Abdominal Surgery.

Tuesday, 22nd

ROYAL COLLEGE OF SURGEONS
6.15 P.M. Dr. Geoffrey Organe: Anæsthesia in Thoracic Surgery.
ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
8 P.M. *Medicine.* Dr. Geoffrey Evans, Mr. A. Dickson Wright, Dr. C. Wyndham: Management of Patients with Essenti Hypertension.
UNIVERSITY OF EDINBURGH
5 P.M. (University New Buildings.) Dr. C. H. Kellaway, F.R.S. Perfusion Experiment in the Study of Tissue Injur (Sharpey-Schafer lecture.)

Wednesday, 23rd

ROYAL COLLEGE OF SURGEONS
5 P.M. Mr. Julian Taylor: Surgery of the Anterior Cran Fossa.
6.15 P.M. Dr. Bernard Johnson: Intravenous Anæsthesia

Thursday, 24th

ROYAL COLLEGE OF SURGEONS
5 P.M. Sir Lionel Whitby: Blood Transfusion.
6.15 P.M. Dr. Stanley Rowbotham: Anæsthesia in Thyro Surgery.
ROYAL SOCIETY OF MEDICINE
8 P.M. *Urology.* Mr. H. Hamilton Stewart: Treatment Hydronephrosis associated with Abnormal Vessels.
MEDICO-LEGAL SOCIETY
8.15 P.M. (26, Portland Place, London, W.1.) Mr. David Mac PH.D.: Marriage Breakdown and Divorce.

Friday, 25th

ROYAL COLLEGE OF SURGEONS
6.15 P.M. Dr. W. S. McConnell: Anæsthesia in Thyroid Surger
UNIVERSITY COLLEGE, London, W.C.1
5.15 P.M. (Department of Pharmacology.) Mr. J. F. Daniel D.SC.: Cell Physiology and Pharmacology (first of s weekly lectures).
BRITISH ORTHOPÆDIC ASSOCIATION
9.30 A.M. (Washington Singer Building, University Colleg Exeter.) Mr. G. R. Girdlestone, Mr. Norman Capenc Mr. M. C. Wilkinson, Mr. J. P. Campbell, Mr. B. McFarland, Mr. J. A. Cholmeley: Surgical Treatment Tuberculosis of Bones and Joints.

Saturday, 26th

BRITISH ORTHOPÆDIC ASSOCIATION
10 A.M. (Royal Devon and Exeter Hospital.) Short papers.
MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES, 1 Chandos Street, W.1
2.30 P.M. Sir Weldon Dalrymple-Champneys: Epidemiologic Control of Venereal Disease.

Secondly, fat is a store of fuel to be drawn on when od is lacking.

Thirdly, fat, combining the displaceable qualities of a uid with the permanence of a solid, is used as cushioning aterial, to bear weight, as over the heel and the tuber schii, to allow structures to move or change their shape a confined and rigid space, and to protect vessels and erves exposed to sudden angulation near a joint.

Fat has a scanty blood-supply and therefore a poor esistance to trauma and infection. It must be treated ently, cut cleanly, not torn or undermined. The fatty ayers of a wound should be drained under conditions of ontamination in which more vascular tissues could be rusted. Fat is on the whole the enemy of surgical handiraft. It tends to alternate with connective tissue in the interspaces of the body, such as the subcutaneous layers and the mesenteries. Where there is little fat there is much fibrous tissue and stitches hold well; where there is much fat blood-vessels have hardly any adventitious sheath, and tear easily or slip out of ligatures, and stitches tend to cut out.

CONNECTIVE TISSUE

Connective tissue is the framework of the body, the limiting agent that draws a boundary line between one structure and the next, the clothing agent that furnishes the uniform in which each organ serves, the strengthening agent that gives the necessary toughness to more specialised tissues. It provides the sheaths of muscles, nerves, and blood-vessels; the capsules and ligaments of joints; the envelopes of glands; the aponeuroses and tendons of muscles. It gives toughness to epithelial mucous and serous coverings and linings, whose surface cells give the special properties of lubrication, secretion, and resistance to infection. It is the only structure that holds stitches. Where there is no connective tissue, as in the brain, suture is impossible: where there is little, as in the liver and kidney, it is difficult. Connective tissue is a simple structure needing very little blood-supply. For this reason it is very viable and can be transplanted. For the same reason it has a low resistance to infection; but, since it usually occurs in thin sheets accompanying more vascular structures, it does not slough like fat. When infected it may take many months to sequestrate.

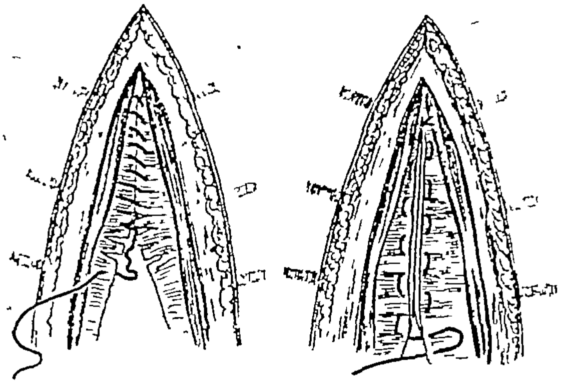
(a) (b)

Fig. 6—Suture of posterior rectus sheath: (a) over-and-over stitch; (b) running mattress stitch.

The properties of connective tissue as the basic material of surgical handicraft vary with its site and function. The derma is a felt-work, equally strong in all directions. It can and does stretch, and is therefore unsuitable for transplants where strength is desired. Tendons and aponeuroses consist of parallel fibres laid down in the line of strain and are strong in the line of their fibres but easily torn across it. The posterior rectus sheath and Poupart's ligament are examples of connective-tissue structures constantly encountered by the surgeon that are strong in one direction only. To obtain adequate access, the posterior rectus sheath must usually be divided across its fibres, and the cut edges therefore offer very little hold to sutures, which tear out if there is any tension (fig. 6*a*). Here a running mattress suture (where, instead of a single stitch pulling in the line of the fibres, a loop holds a bunch of fibres securely and everts the peritoneum) is the one workmanlike method of approximation (fig. 6*b*). No surgeon would willingly cut across Poupart's ligament, but all must use it as the inferior anchorage of any reconstruction of the inguinal canal. For such work, living sutures, such as pedicled strips of external oblique, and transplanted strips of fascia lata, have the considerable disadvantage that their necessarily coarse calibre splits the ligament into a leash of separated fibres. For these reasons many surgeons prefer foreign suture material of finer calibre. Where aponeuroses are felted, as are the layers of the rectus sheath at the linea alba, stitches hold well. Scar tissue is usually felted and gives secure anchorage.

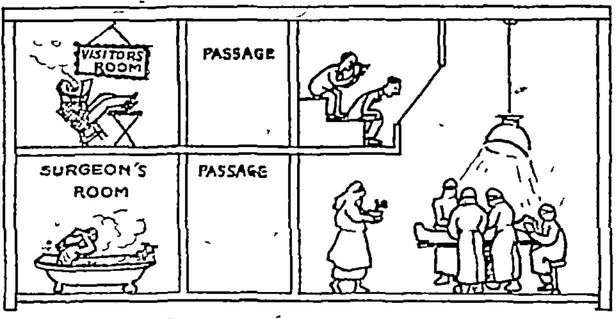

Fig. 7—Scheme for theatre and spectators.

MUSCLE

Muscle, unlike skin, fat, and bone which are structural, is a functional tissue. Muscle which does not function because its nerve-supply is cut dies as surely as if it is deprived of blood. Muscular tissue has an abundant blood-supply on whose uninterrupted continuity its survival depends.

Free incisions into a muscle may lead to the death of a segment by cutting the vessels that supply that part;

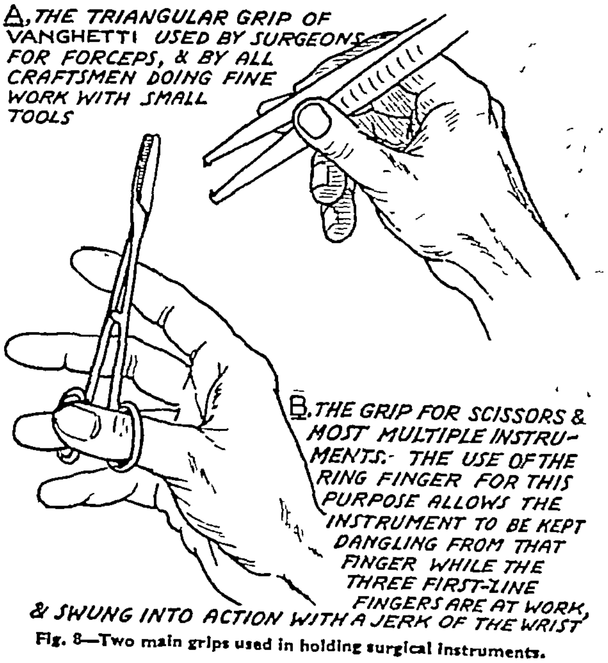
A. THE TRIANGULAR GRIP OF VANGHETTI USED BY SURGEONS FOR FORCEPS, & BY ALL CRAFTSMEN DOING FINE WORK WITH SMALL TOOLS
B. THE GRIP FOR SCISSORS & MOST MULTIPLE INSTRUMENTS:- THE USE OF THE RING FINGER FOR THIS PURPOSE ALLOWS THE INSTRUMENT TO BE KEPT DANGLING FROM THAT FINGER WHILE THE THREE FIRST-LINE FINGERS ARE AT WORK, & SWUNG INTO ACTION WITH A JERK OF THE WRIST

Fig. 8—Two main grips used in holding surgical instruments.

The incision having been planned, care must be taken before making it to ensure that when sutured the two edges shall lie exactly as before. The elastic skin over any part tends to return to the position of rest, which is not necessarily the extended and supine position of a patient on the operating-table, and, when cut, the two edges may take independent directions (fig. 4). To ensure that they are brought together by suture as they lay before incision, they must be marked by lines drawn across the site of the cut before it is made. These marks are usually made by scratches, an effective method but a crude one, for the scratches often show permanently, and being in tension lines occasionally become keloid. They should be made with a dye such as Bonney's blue, drawn in bold strokes across the skin with a poster nib.

Sutures.—In suturing, the superficial fascia as well as the skin should be brought together accurately with a tension that keeps them in apposition but does not interfere with their blood-supply. The same stitch cannot bring the deeper layers together as well as the superficial unless it embraces them in a wide sweep, when it will be too far from the skin edge to secure exact epithelial apposition (fig. 5A). Methods that appose the skin edges exactly, particularly Michel's clips, leave spaces in the subcutaneous layers in which infection may appear, and which in any case leave a broad band of scar tissue in the deeper layers (fig. 5B). The use of separate suture for the subcutaneous and cutaneous layers is undesirable, for fat resents buried foreign material (fig. 5C). A continuous suture is easy and rapid, but is not accurate anywhere unless it is a blanket stitch, for the material is inserted as a spiral whose coils are nowhere opposite each other, and tightening approximates the ends of the incision, not its edges (fig. 5D). The best method is probably to insert a series of tension stitches at intervals of about an inch, including all layers and piercing the skin about half an inch from the incision, and to approximate the skin by other stitches between these (fig. 5E).

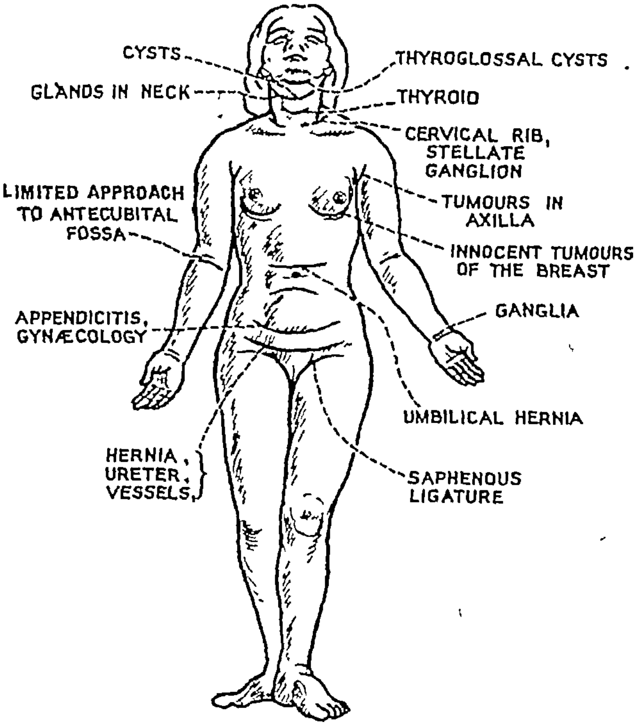

Fig. 3—Incisions.

Skin cannot be sterilised except temporarily and on its surface. Stitches passed through its thickness traverse the deeper layers, where sweat and sebaceous glands harbour resident organisms, and form a track along which these organisms may spread. Infection along a stitch track is largely mechanical. Suture materials with a mesh—e.g., silk, linen, and cotton—form a wick that absorbs tissue fluids, giving not merely a path to bacteria but also food for their journey. A thick strand makes a larger hole and is likely to perforate more glands and allow more bacteria through than is a fine one. The impervious monofilament suture materials are in theory the best, and in practice they seem to give healing with least reaction and to leave no stitch marks if they are removed early. The favourites of the moment, nylon and steel wire, both have disadvantages: nylon is not very strong, and will not tie securely with a single reef knot; and steel wire can only with difficulty be prevented from kinking. Fine selected silkworm gut is hard to beat.

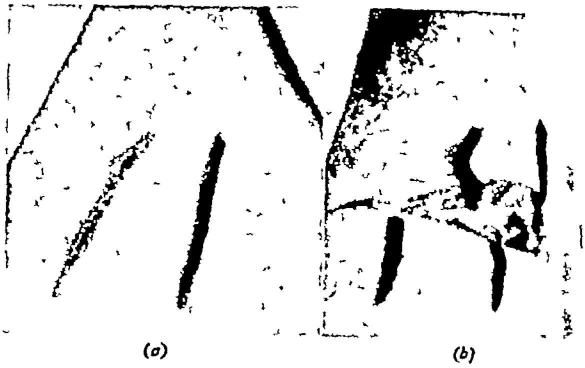

Fig. 4—Method of obtaining correct apposition of skin in suturing: (a) lines marked with dye before incision; (b) distortion of skin after incision.

FAT

Fat in the body has three main purposes. First, it is a heat insulator. Man is almost unique among land mammals in using fat for this purpose. Other land mammals, indeed all warm-blooded creatures who live in the air, use the non-conducting properties of air for heat protection by trapping a layer of it round their bodies in fur or feathers, and by varying the thickness of the layer to suit the needs of the moment. The human being who loses his fat loses his human appearance. The very old man or the starved child looks like a monkey.

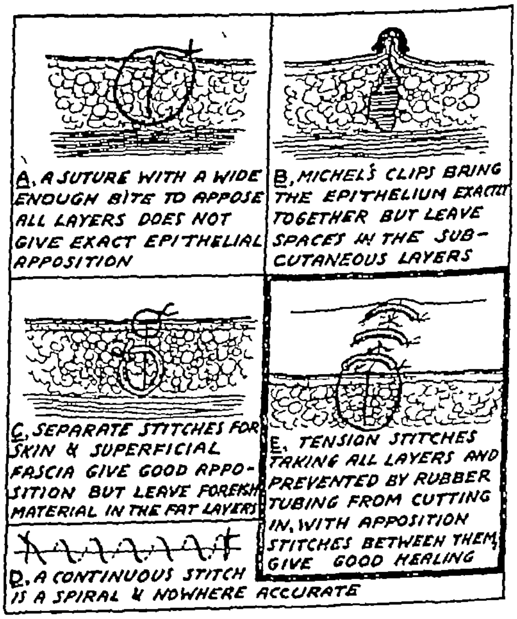
A, A SUTURE WITH A WIDE ENOUGH BITE TO APPOSE ALL LAYERS DOES NOT GIVE EXACT EPITHELIAL APPOSITION
B, MICHEL'S CLIPS BRING THE EPITHELIUM EXACTLY TOGETHER BUT LEAVE SPACES IN THE SUB-CUTANEOUS LAYERS
C, SEPARATE STITCHES FOR SKIN & SUPERFICIAL FASCIA GIVE GOOD APPOSITION BUT LEAVE FOREIGN MATERIAL IN THE FAT LAYERS
D, A CONTINUOUS STITCH IS A SPIRAL & NOWHERE ACCURATE
E, TENSION STITCHES TAKING ALL LAYERS AND PREVENTED BY RUBBER TUBING FROM CUTTING IN, WITH APPOSITION STITCHES BETWEEN THEM GIVE GOOD HEALING

Fig. 5—Sutures.

le, the anæsthetist's stool and apparatus, and the trument stands.

INSTRUMENTS

In this workshop we do our tasks of incision, excision, pair, and reconstruction, and in doing them we must t, pick up, hold, crush, fix, and join the tissues which e our materials. Special instruments are needed to cut, ld, and fix bone with its special properties; for the ke of brevity and simplicity we will leave these out id consider only the craft of soft-tissue surgery. In is we use a knife to cut skin, and scissors to cut fascia sutures; dissecting forceps to pick up; tissue forceps r a gentle hold, and hæmostats for a firm one; Ochsners hold or crush, and needles to sew. These are our basic tools, though we must have others, such as towel-clips and needle-holders, and a few one-purpose tools for special jobs.

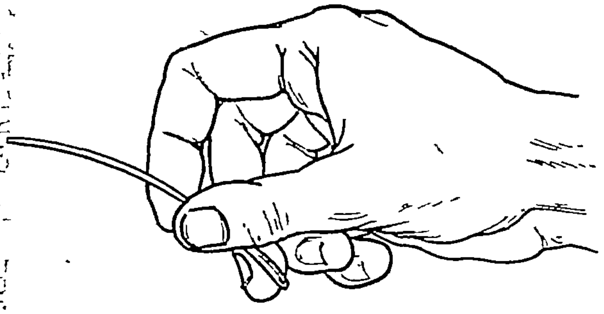

Fig. 13—Three-finger grip for hand sewing.

The aim of every craftsman should be to do the best work he can. Skill comes with repeated performance, and a surgeon can increase the number of times he does any particular thing either by doing everything more often or by limiting the number of things he does. The second alternative is the more practicable. He can limit the number of different instruments he uses and limit the types of movement his hands are called on to perform.

Two movements are in constant use in surgery: the opposition of the thumb to the index and medius, with which spring tools, such as dissecting forceps, are held (fig. 8A); and the abduction and adduction of the thumb opposite the radial side of the curved and fixed index, medius, or annularis, with which hinged instruments, such as scissors, hæmostats, and needle-holders, are opened and closed (fig. 8B). By limiting his designs to these two movements, the surgeon can hope to make his fingers automatically dexterous; but, if he uses needle-holders that close with a whole palm grip and open with a further squeeze, or dissecting forceps that open with pressure and close with a spring, he tends to confuse the association-centres of his parietal cortex.

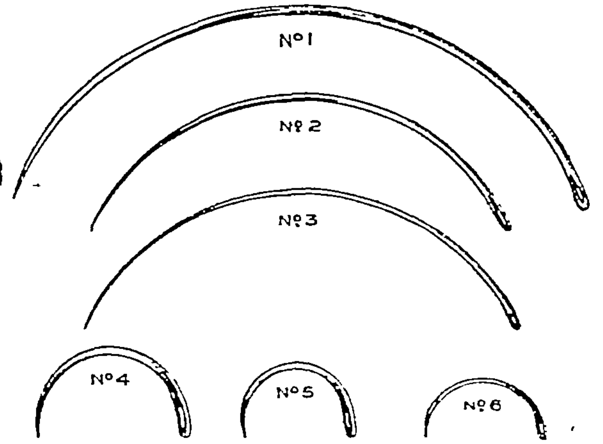

Fig. 14—Standard needles.

Having selected his design, he should decide on the pattern, weight, length, and curve of each that is most suitable to his requirements, and see that only these are given to him when he operates. To be put off with an odd assortment, to accept different patterns at different hospitals, is to abandon all hope of acquiring that instinctive control of the working end of his tools that is the hallmark of a skilled craftsman.

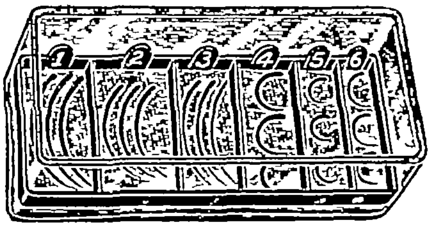

Fig. 15—Needle grid and box.

Cutting Instruments.—Surgical knives are as traditional as the black silk scarf of the sailor, which was introduced to protect his collar from the grease on his pigtail. The shape is that of the sword or dagger, an instrument designed in the Bronze Age to stab but only occasionally to cut (fig. 9A). A knife cuts with its edge, and a straight knife should therefore be used only to cut a rounded surface (fig. 9B) raised to waist level, such as a ham, a loaf of bread, or a limb to be amputated, or to take a shaving from a flat surface in the horizontal plane, as in skin grafting. In most surgical manœuvres the knife is held at about 30° to the surface to be cut, so that the effective edge is a short section near the tip, beyond which the point projects to an unknown depth (fig. 9C). Surgical manufacturers have tried to introduce sense without offending tradition by making a knife with a rounded belly (fig. 9D), but this is no more than a timid move in the right direction. The correct blade was designed shortly before his death by Cecil Joll, and is made by Gillette Bros.; it fits a Bard-Parker handle and, when held in the usual working position, its cutting edge is parallel to the skin (fig. 9E).

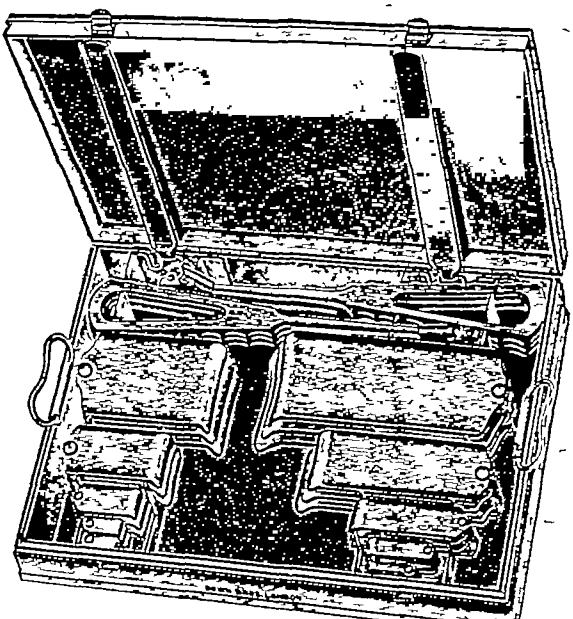

Fig. 16—Detachable retractors in case.

Holding Instruments.—These must pull structures out of the place in which they lie and to which they tend to return. They must therefore take a grip, which will rough handling and strangulation by sutures tightly tied may do the same. On the other hand, muscle with its free blood-supply offers a high resistance to infection, and its cut surfaces heal rapidly if approximated without tension or strangulation. Septic conditions in the abdomen should therefore be approached by incisions through muscles rather than through fibrous planes. A colostomy should be brought out through muscle to avoid sepsis and fibrosis. Muscle cannot be transplanted as a free graft, but a strip whose blood-supply is preserved may be swung as a pedicled graft to fill a cavity.

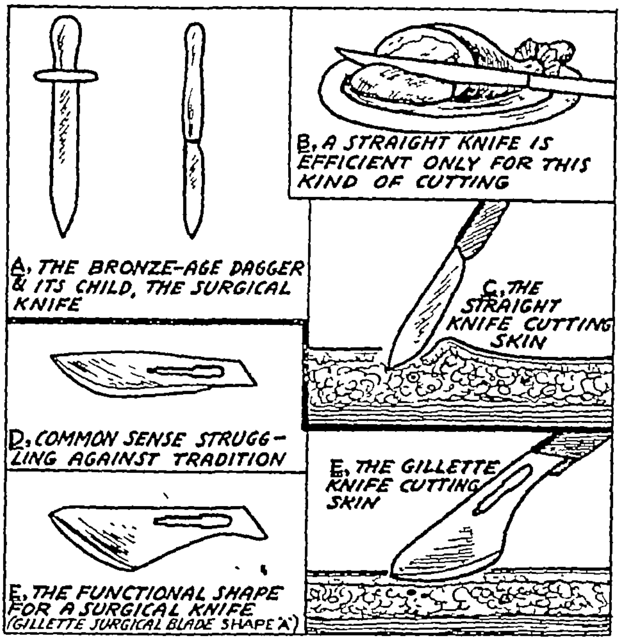
A, THE BRONZE-AGE DAGGER & ITS CHILD, THE SURGICAL KNIFE
B, A STRAIGHT KNIFE IS EFFICIENT ONLY FOR THIS KIND OF CUTTING
C, THE STRAIGHT KNIFE CUTTING SKIN
D, COMMON SENSE STRUGGLING AGAINST TRADITION
E, THE GILLETTE KNIFE CUTTING SKIN
E, THE FUNCTIONAL SHAPE FOR A SURGICAL KNIFE (GILLETTE SURGICAL BLADE SHAPE 'A')

Fig. 9—Knives.

BONE

Bone is specialised connective tissue and has many of the same properties: the strength, the ability to hold fixing materials, the low blood-supply, the poor resistance to infection, the transplantability. It differs in being rigid. It cannot be bent, and a bone surface can be approximated to another surface of bone or soft tissues only if the two are a mechanical fit. Its properties are partly those of hard wood, like oak or teak, partly those of stone or concrete. Long bones and young bones are more like wood, square bones and old bones like concrete.

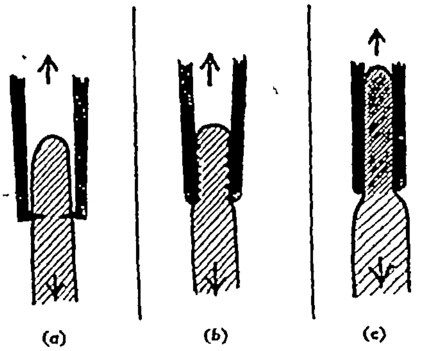

Fig. 10—Holding instruments: (a) instrument with points can grip without pressure; (b) instrument with serrated jaws can grip with light pressure; (c) smooth instrument can grip only with strong pressure.

OPERATING-THEATRE

These then are our main materials; what of our workshop, the operating-theatre? The design is a matter of functional needs, individual preference, and architectural fashion, but it must meet certain requirements. The air in the immediate neighbourhood of the wound must be sterile or at least free from pathogenic organisms, and the temperature must be warm enough to conserve the body heat of the patient, yet cool enough to allow the team to work without exhaustion. The lighting must be adequate and dirigible on the operating field from all points of the hemisphere above it.

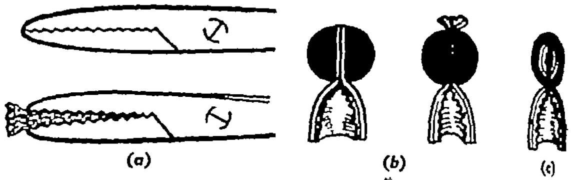

Fig. 11—Forceps blades: (a) above, forceps with blades closed; below, forceps with blades forced apart by included tissue; (b) hold given by blades of normal design; (c) hold given by blades of trap-jaw pattern.

The first essential in an operating-block is that the theatre and its annexes must be accessible only to sterile materials and "sterile" personnel, that is to the patient and the operating team. Spectators must be on another floor reached by another staircase or lift (fig. 7). This arrangement not only avoids unnecessary contamination of the air and furniture of the theatre but also gives better facilities for instruction. The spectators' gallery, sealed off from all air communication, can be brought right over the operating-table so that the visitor can look into the depths of the wound instead of over its edge, as he does when he stands beside the team, and with field glasses he can see detail as well as the surgeon can. In the near future television installed in the lamp assembly will allow any number of spectators to get the same view. The separate gallery does more than reserve the theatre for its proper purpose; it becomes part of an instruction floor where demonstrations and exhibitions can be arranged for visitors between operations.

The air on an upper floor, where theatres are usually built, is practically free from organisms. Airborne infection comes from dust, which in turn accumulates on projecting fittings and is distributed by air currents, and from droplet infection. Fittings, such as cupboards, stoves, and shelves, have disappeared from any modern theatre, and those that remain, such as X-ray viewing screens and electric fittings, can be flush with the walls. Many of the projections that accumulate dust, and many of the air currents that distribute it, are bound up with the lighting, ventilation, and warming of the theatre. Air-conditioning, serving at one time the needs of ventilation, temperature regulation, and air purification, solves most of these problems, since pipes and hot panels disappear and air currents are diminished and predictable. Whether windows should disappear is debatable, but they probably will. Daylight is inferior to a properly designed lamp, and it cannot be laid on or varied at will. A lighting system can be exteriorised, and the only furniture that must remain in the theatre is the operating-

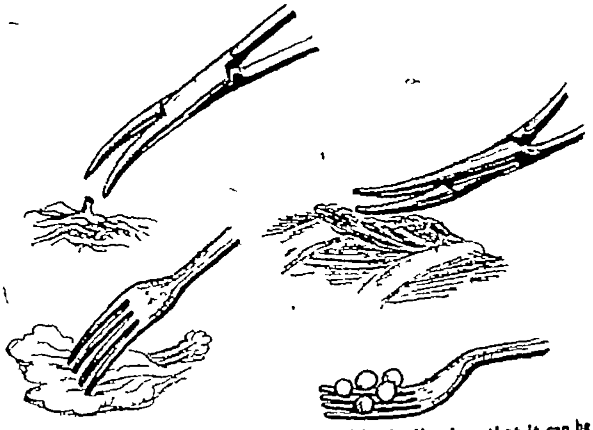

Fig. 12—A hæmostat, like a fork, should be inclined so that it can be used at right angles to a surface or parallel to it.

e, the anæsthetist's stool and apparatus, and the rument stands.

INSTRUMENTS

n this workshop we do our tasks of incision, excision, air, and reconstruction, and in doing them we must pick up, hold, crush, fix, and join the tissues which our materials. Special instruments are needed to cut, d, and fix bone with its special properties; for the e of brevity and simplicity we will leave these out consider only the craft of soft-tissue surgery. In we use a knife to cut skin, and scissors to cut fascia utures; dissecting forceps to pick up; tissue forceps a gentle hold, and hæmostats for a firm one; Ochsners hold or crush, and needles to sew. These are our asic tools, though we must have others, such as towel-lips and needle-holders, and a few one-purpose tools or special jobs.

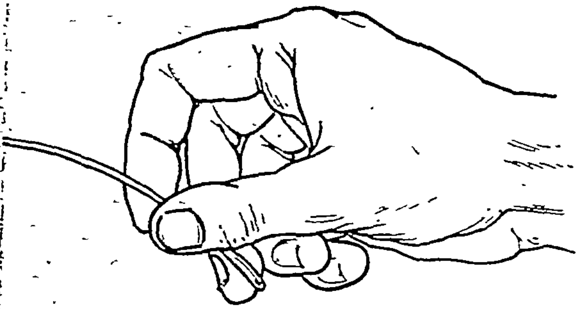

Fig. 13—Three-finger grip for hand sewing.

The aim of every craftsman should be to do the best work he can. Skill comes with repeated performance, and a surgeon can increase the number of times he does any particular thing either by doing everything more often or by limiting the number of things he does. The second alternative is the more practicable. He can limit the number of different instruments he uses and limit the types of movement his hands are called on to perform.

Two movements are in constant use in surgery: the opposition of the thumb to the index and medius, with which spring tools, such as dissecting forceps, are held (fig. 8A); and the abduction and adduction of the thumb opposite the radial side of the curved and fixed index, medius, or annularis, with which hinged instruments, such as scissors, hæmostats, and needle-holders, are opened and closed (fig. 8B). By limiting his designs to these two movements, the surgeon can hope to make his fingers automatically dexterous; but, if he uses needle-holders that close with a whole palm grip and open with a further squeeze, or dissecting forceps that open with pressure and close with a spring, he tends to confuse the association-centres of his parietal cortex.

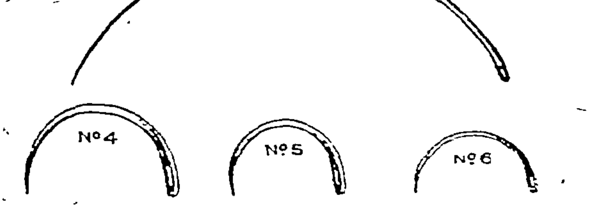

Fig. 14—Standard needles.

Having selected his design, he should decide on the pattern, weight, length, and curve of each that is most suitable to his requirements, and see that only these are given to him when he operates. To be put off with an odd assortment, to accept different patterns at different hospitals, is to abandon all hope of acquiring that instinctive control of the working end of his tools that is the hallmark of a skilled craftsman.

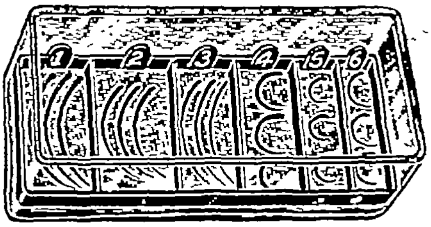

Fig. 15—Needle grid and box.

Cutting Instruments.—Surgical knives are as traditional as the black silk scarf of the sailor, which was introduced to protect his collar from the grease on his pigtail. The shape is that of the sword or dagger, an instrument designed in the Bronze Age to stab but only occasionally to cut (fig. 9A). A knife cuts with its edge, and a straight knife should therefore be used only to cut a rounded surface (fig. 9B) raised to waist level, such as a ham, a loaf of bread, or a limb to be amputated, or to take a shaving from a flat surface in the horizontal plane, as in skin grafting. In most surgical manœuvres the knife is held at about 30° to the surface to be cut, so that the effective edge is a short section near the tip, beyond which the point projects to an unknown depth (fig. 9C). Surgical manufacturers have tried to introduce sense without offending tradition by making a knife with a rounded belly (fig. 9D), but this is no more than a timid move in the right direction. The correct blade was designed shortly before his death by Cecil Joll, and is made by Gillette Bros.; it fits a Bard-Parker handle and, when held in the usual working position, its cutting edge is parallel to the skin (fig. 9E).

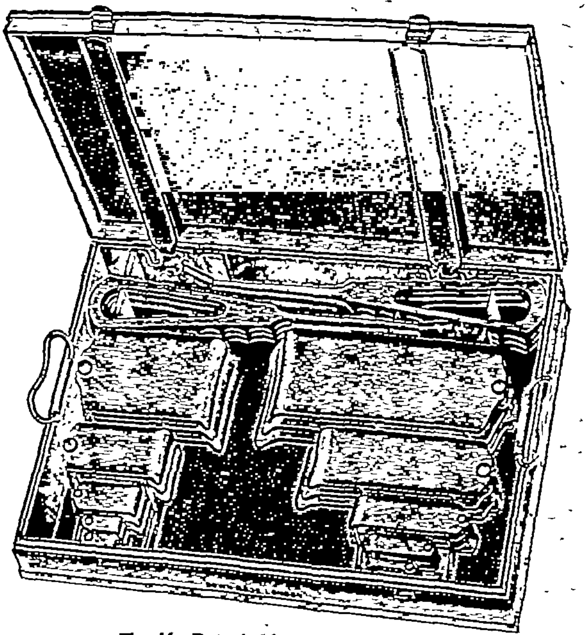

Fig. 16—Detachable retractors in case.

Holding Instruments.—These must pull structures out of the place in which they lie and to which they tend to return. They must therefore take a grip, which will

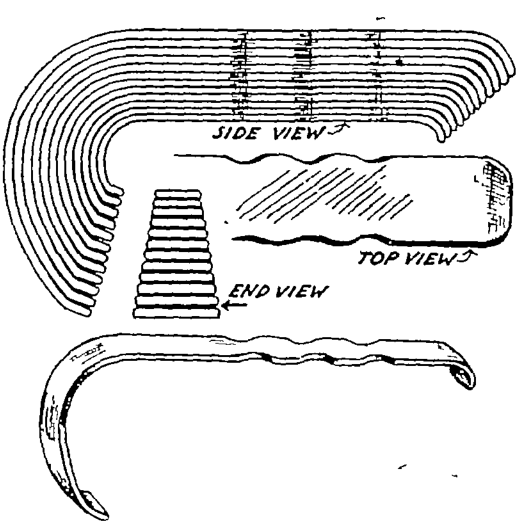

Fig. 17—Nested retractors of new design.

depend for its security either on surface friction or on *contour deformation.* The better the surface grip, the less need there is for deformation—i.e., for pressure. Instruments intended to hold tissues gently must therefore be able to grip their surface, or even have points to prick it (fig. 10*a*), for a small prick does much less harm than a wide or heavy crush. A stitch through the tongue will hold it out with little damage, a spade-shaped tongue forceps will leave it bruised for days. Intestinal clamps have been carefully designed with little ridges, like the papillary markings on a finger-tip, to hold intestine firmly without undue pressure (fig. 10*b*); if the blades are covered with rubber tubing they must be closed to the point of ischæmia to give the same grip (fig. 10*c*). When damage to included tissue is intended or unimportant, holding and crushing become synonymous. Holding forceps, such as hæmostats, Mayo-Ochsners, or gall-bladder forceps, depend for their security on the forcible apposition of their jaws. When hinged blades are applied forcibly they are kept apart by the tissue compressed between them in a gap which is wedge-shaped, holding the gripped tissue firmly at the hinge end and less firmly towards the points (fig. 11*a* and *b*). Even when the surfaces are roughened or corrugated they are unable to hold securely a tube like the duodenum, the appendix, or the cystic duct, if it is cut off flush with the blades. Only when a flange of uncrushed tissue is left projecting beyond is the hold safe. I have lately redesigned my holding instruments on what I call the trap-jaw principle. The blades are hollow, with a narrow rounded rim. The rim holds a strip of tissue in compression, while the hollow accommodates an uncompressed part that prevents slipping in the same way as does a projecting flange of tissue in the usual design (fig. 11*c*). The trap-jaw principle has been applied to dissecting forceps, hæmostats, V Ochsners, and gall-bladder forceps.

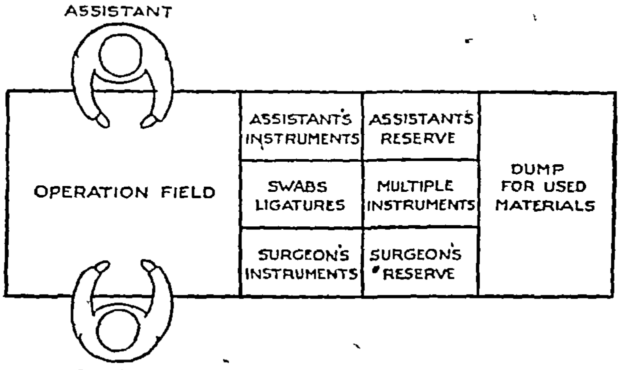

Fig. 18—Lay-out of operating-table.

With hæmostats we must also consider the curve. in the knife, they should be so designed that thei end is correctly aligned when the surgeon's hand arm are in their position to function. A hæmostat used either for picking up small vessels, when its p are applied at right angles to a surface, or for wide oozing areas, when its blades are closed p to a surface. For both purposes a straight instrument wrong. A straight instrument is suitable for transmitt a push or a pull in its long axis ; one that is used for m skilled purposes is given a functional inclination. arrow, a spear, and a ramrod are straight ; a scythe golf-club, a hockey-stick, a spoon, and a fork are curv An aspirating needle must be straight to push and a ti forceps or Mayo-Ochsner to pull, but a hæmostat sho have a curve or angle of about 30° on its blade, to ma it suitable, like a fork, for application in either pla (fig. 12).

Sewing Instruments.—Sewing is one of the m important tasks in surgery and, for a man, one of t most difficult. It is therefore one in which the surge must at the outset select his methods and his instr ments, so that he may by repetition ultimately co within reasonable distance of the skill with which his wife darns his socks.

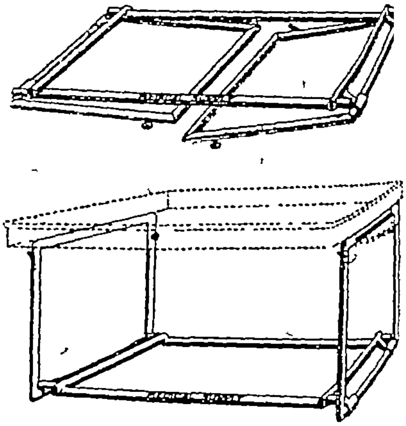

Fig. 19—Folding stand for tray.

First he must decide whether he intends to be a hand sewer or a user of needle-holders. Every surgeon must be prepared to work with a small curved needle and a needle-holder in inaccessible places. Many, particularly those who have the whole-time service of an expert theatre team, prefer to use a needle-holder for all sewing, since it uses the same movement, a half-turn of the wrist, all the time.

The man who prefers interrupted sutures likes to work with a needle-holder. The surgeon who works with a continuous suture prefers sewing with his fingers, which brings him nearer his work by the length of a needle-holder and gives a more delicate control of the movements of the needle point and a more accurate estimation of the tension of the sutures. Hand sewing is on the whole neater and faster.

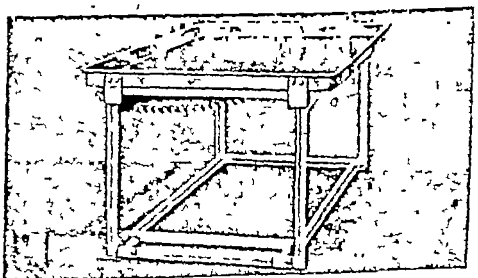

Fig. 20—Instrument tray and stand.

Having decided his method, the surgeon must select the shape, diameter, and length of the needles he will use. For hand sewing a straight needle should be the best. It is the shape that women use. It is propelled by a thrust along its length ; and, while it is being propelled, e direction of its travel and the site of its point are actly known. But women have their sewing on their ps, and they work on fine flexible fabrics. A straight needle cannot be used in the depths of a wound, and it can be made to take a small bite only if the tissue through which it is being thrust is folded. Curved needles may be of any length, diameter, or curve. The more open the curve, the more do they partake of the advantages and drawbacks of a straight needle—i.e., the more easily are they propelled, the less are they suited to taking up a small bite of tissue and to working in a hole.

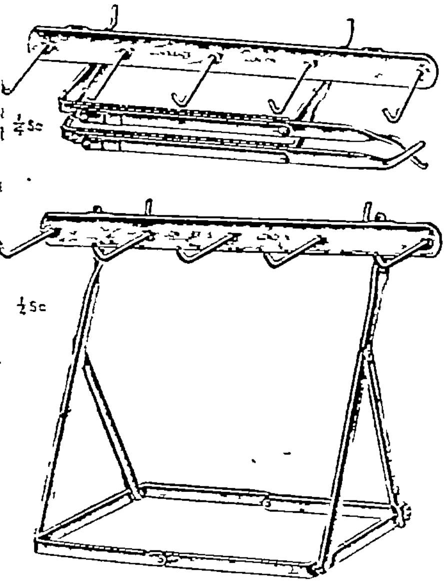

Fig. 21—Instrument rack.

The shape of a needle concerns the surgeon. The diameter affects the tissues through which it passes and the suture material that passes through it. A fat needle is the tool of a fat-head; it makes big holes and is no stronger than a thin one made of good steel. Needle makers seem to work on a scale of gradations, their needles of any particular pattern increasing in thickness as they do in length, so that the larger sizes are quite needlessly coarse. The correct diameter of a needle is that which will carry an eye that is an easy fit for the thickest suture material to be used with it. An eye that is only just large enough makes the suture stand out on each side and tear the tissues; one that is too large allows it to drop out.

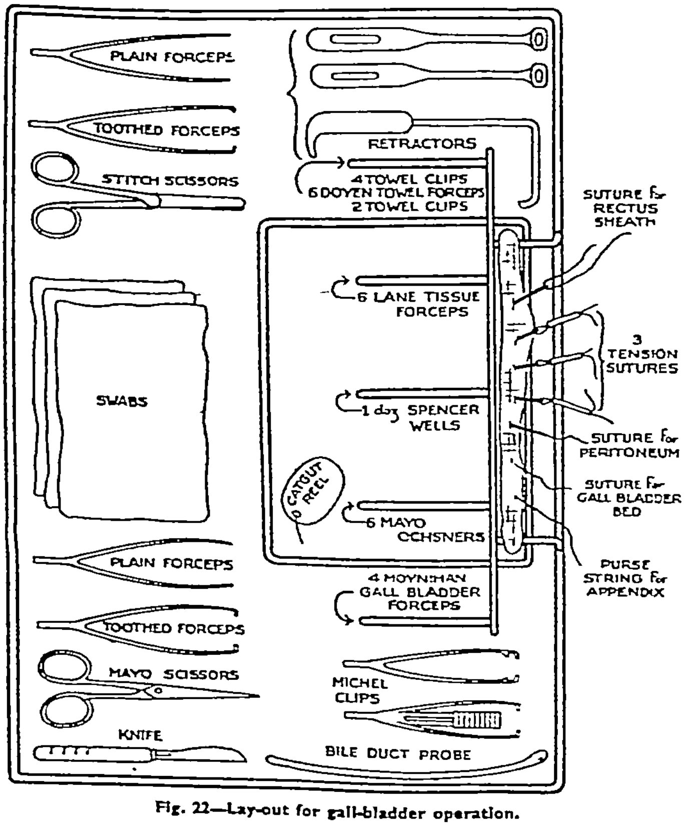

Fig. 22—Lay-out for gall-bladder operation.

A needle must be long enough to take a reasonable bite of tissue, while at the same time enough of the eye end remains behind to be held, and enough of the point projects beyond to be grasped. If a reasonable bite of tissue is assumed to be $^{1}/_{4}$ in., a needle for use with a holder requires at least another $^{1}/_{4}$ in. proximally and distally to be grasped with the needle-holder, whereas one worked with the fingers requires $1^{1}/_{4}$ in. proximally to allow the three-finger grip (fig. 13) which is necessary for accurate control, and 1 in. distally to be seized with the fingers. A needle for use with a needle-holder has therefore a minimal length of $^{3}/_{4}$ in., and one used for hand sewing a length of $2^{1}/_{2}$ in.

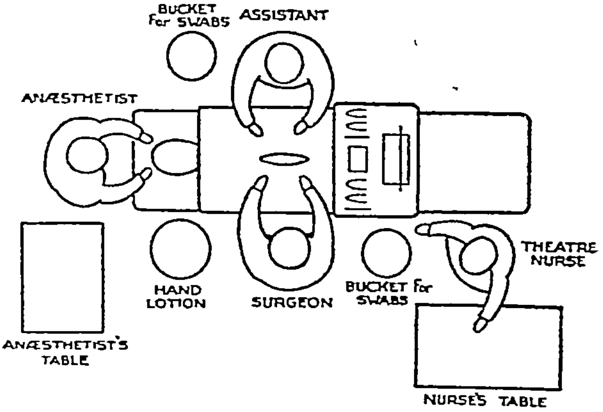

Fig. 23—Arrangement of theatre.

I decided many years ago that for hand sewing a $^{3}/_{8}$ circle was best, a compromise between the straight and the curved: straight enough for control, curved enough for use in a deep wound. I required three needles all having the same length and curve: no. 1 triangular pointed to take stout silkworm gut; no. 2 round-bodied to take no. 1 catgut for peritoneum, aponeuroses, and soft tissues; and no. 3 to take 00 catgut for intestinal suture. All standard needles (fig. 14) of this length and curve were absurdly stout, and the patterns I required had to be specially made. For use with a needle-holder I chose three half-circle needles: no. 4 to take no. 1 catgut: no. 5 to take 00 catgut: and no. 6 a cutting needle for use with gossamer silkworm gut. The small needles have a flattened shank beyond the eye, so that they do not turn in the needle-holder. These six needles have now been standardised for ten years and are sold by the Medical Supply Association Ltd. as Ogilvie needles 1 to 6.

Having elected to work with needles of two shapes only, I found that the two groups of three, each roughly of the same length and curve, tended to confuse sisters unaccustomed to working with me. To solve this difficulty I ordered a small plated frame with numbered compartments that can be dropped into any needle-box (fig. 15). Each needle lies in its own compartment, and now, when I ask for no. 3 needle in Southwark or Somaliland, I get the exact curve and diameter I have been using since 1930.

Retractors.—A lesser difficulty, but one that must be faced, is the selection of retractors. An operation that is difficult without adequate retraction becomes simple if the right retractors are available. The right retractor is one exactly suited in width and depth to the tissues to be retracted. To provide all the retractors that may be wanted for every stage of every operation is almost beyond the resources of the average hospital, and to have the right one available just when it is wanted will tax the ingenuity of even the best theatre sister. The answer lies in a graded set that can be nested together. Nine years ago I designed a set of retractors with detachable blades and handles (fig. 16). This set is nested in a tray and can be sterilised and kept on a corner of the instrument table, ready to make up any retractor that is demanded. This year I have produced a simpler set of retractors of the curved shape usually known as Deavers (fig. 17). This is easier to make and therefore cheaper than the detachable set, and it provides twelve retractors: the largest suitable for resections of the rectum; the intermediate for gall-bladder or stomach surgery; and the smallest for operations in the neck or on the limbs.

LAY-OUT

The craftsman has the job on hand on his bench. Two or three tools with which he is working at the time are in his hand or beside him; the remainder are in shelves, trays, or racks close at hand, each with its own labelled place to which it is returned after use.

The surgeon's work-bench is his operating-table, and his material the body of the customer who has brought him the job to do. For tidy work, the table with the patient on it should be divided into three zones: the operation field, the reserve of instruments, and the dump (fig. 18). The first should contain only those instruments in use at the time; the second corresponds to the carpenter's tool rack and carries all the instruments and materials that may be wanted; the third is for soiled or discarded implements. The instrument zone is further subdivided into six areas: one side belongs to the surgeon, one to the assistant, and the middle is common ground, while each of these territories has a front half for things in constant use, and a back half for reserve instruments.

The technical problems involved are the provision of a stable platform for the instrument zone, and the arrangement on that platform of all the different things that may be required. They have been solved in my workshop by the stand, the tray, and the instrument rack. The stand (fig. 19) is a simple tubular frame that folds flat for transport and lies under the rubber mattress of the operating-table, with the sides hanging down when not in use. It can be put at any part of the table suited to the operation, and when erected forms a rigid support for the tray (fig. 20). The tray is an aluminium rectangle with sides 1 in. high, carrying underneath four angle-pieces to fit the sides of the stand. The instrument rack (fig. 21) consists of a horizontal bar carrying five pegs facing forwards and two short ones facing backwards. This bar is supported on trestles springing from a rectangular frame which serves as a base. The whole folds up for sterilising but is rigid when put together. The instrument rack serves as a magazine for multiple instruments, towel-clips, tissue-forceps, hæmostats, and so on, whose proper place is in the back half of the intermediate zone. The back pegs are intended to take a strip of gauze in which threaded needles can be placed ready for the surgeon. The exact arrangement of materials on the tray and of instruments on the rack is a matter for individual preference, and the diagram (fig. 22) of my own arrangement for a gall-bladder operation is merely intended to show the equipment in use.

In practice the system allows the team to have in the operation area only the tools actually being used and one clean swab apiece. When an instrument is finished with, it is laid in its place on the tray if a "first-line" instrument (knife, scissors, dissecting forceps, ligature reel), and given to the nurse if it is a multiple instrument or dirty. The nurse's duties are merely to see that the stock of swabs and ligatures in the intermediate zone is replenished, to wash instruments given to her and return them to their appropriate place or peg, and to have threaded needles ready (fig. 23). The surgeon used to the system gets precisely the same service wherever and with whomsoever he works. He comes to know the place of everything by instinct and, without taking his eyes off the wound, can reach out and get the exact instrument he wants.

ENVOI

These are the materials and the tools of our craft. We shall undertake more ambitious tasks as new discoveries bring better tools and methods to our workshop, and we shall do them better as craftsmen from all countries pool their designs and their experience. But our aims must remain the same: to treat each customer as if he were the most important man in the world, and to do the job he entrusts to us as well as we can; to divide tissues cleanly and gently, so far as possible along anatomical planes; to forestall hæmorrhage by seizing every vessel as it is encountered and by ligaturing it with the finest material; and to close the wound by anatomical reconstruction and to obliterate all dead space without tension or strangulation of living tissue by tight sutures. Our patients should return to bed showing no more than the normal physiological reaction to trauma, a reaction from which they will recover in a few hours. Our wounds should heal without incident. Our scars should be a pink hair-line in ten days and should be invisible in three months. Gentleness should be instinctive in one who is fitted for the craft of surgery, for the gentle surgeon is a gentle man; he treats tissues kindly because he feels instinctively for their suffering.

SURVIVAL OF VARIOLA VIRUS IN DRIED EXUDATE AND CRUSTS FROM SMALLPOX PATIENTS

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THE dried crusts from the skin lesions of smallpox patients are usually regarded as an important source of infective material in the dissemination of smallpox (Ker 1909, Rosenau 1922, Stallybrass 1931). Blaxall (1930) states that the separating crusts remain potentially infective for years. It has been shown experimentally that the closely related animal pock viruses are relatively resistant to drying, but the evidence for the survival of variola virus in crusts from human lesions rests largely on epidemiological observations. Until recently, experimental work with variola virus taken directly from human sources was limited in scope, because monkeys were the only highly susceptible animals available.

Since it has been shown that variola virus can readily infect the chorio-allantois of developing hens' eggs (Lazarus et al. 1937), and that it produces in this tissue highly characteristic lesions (Downie and Dumbell 1947), the technique of egg inoculation appeared to afford a ready means for determining directly the infectivity of variola virus in material from human cases. In the observations recorded here egg inoculation has been used to determine the period of survival of variola virus in crusts and exudates kept under ordinary atmospheric conditions at room temperature (18°–20° C).

BLE I—LESIONS PRODUCED ON EGG MEMBRANES FROM VARIOLA-VESICLE FLUID DRIED ON GLASS SLIDES AND KEPT AT ROOM TEMPERATURE (CASE 1)

Days at room temperature	Slides exposed to daylight	Slides kept in dark
0	C, C, C	
4	70, 50	C
8	C, C, C	19, 50
16	200, 33	SC, SC
30	0, 0	2, 0
35	6, 33, 46	9, 5, D
50	0, 0	0, D
62	0, 0, 0	0, 0, 0
84	0, 0	1, 2

C, confluent lesions; SC, semiconfluent lesions.
Figures indicate number of specific lesions on individual membranes.
D, embryo dead at time of examination and no lesions visible.

MATERIAL AND METHODS

These observations on survival of virus in crusts were begun in the spring of 1946, when several outbreaks of smallpox occurred in England, the infection being introduced from abroad, mostly by Service men who developed the disease, often in atypical form, on the way home.

Most of our material was derived from the cases which occurred in the 1946 outbreak on Merseyside (see Peirce 1947). We also had available in the laboratory samples of crusts from one of the cases in the Middlesex outbreak of 1944 (Bradley et al. 1946) and from two cases which occurred at different times in 1945.

Diagnostic complement-fixation tests had been made with extracts from the crusts at the time they were received, and the rest of these samples were kept in a desiccator in the refrigerator at a temperature of 2°–4° C until they were tested for the presence of virus in 1946.

In the 1946 outbreaks specimens of crusts were received from patients at various stages after the onset of illness (see table IV). The crusts were usually kept in the refrigerator without desiccation for some days and then were left at room temperature in the laboratory and tested at intervals thereafter.

Where the specimens were sufficiently large they were divided into two lots: one lot was placed in a test-tube or wide-mouthed bottle loosely stoppered with cotton-wool and kept in a cupboard; the other was placed in a similar container and exposed to diffuse daylight on the sill of a window facing north-west.

At intervals, from three to ten crusts were removed, thoroughly broken up in a sterile test-tube with a glass rod, and 1·0 ml. of sterile buffered distilled water was added. This suspension of crust material was left to extract, with stirring at intervals, for two hours at room temperature and then in the refrigerator overnight.

Next day the suspension was centrifuged for one minute at low speed in an angle centrifuge, and the supernatant fluid was mixed with an equal volume of penicillin solution, 300 units per ml. to suppress bacterial contaminants before inoculation on the chorio-allantois of two or three fertile hens' eggs.

In diagnostic tests reported elsewhere (Downie and Dumbell 1947) we had found that living virus could be recovered by egg inoculation from smallpox-vesicle fluid which had been smeared on glass slides and sent to the laboratory for microscopical examination. We made further tests on one sample of fluid dried in this way. This specimen had been taken with a capillary pipette from the skin lesions in a patient with hæmorrhagic smallpox on the seventh day of disease, one day before death.

The specimen was small, measuring about 0·05 c.cm. and was diluted to 0·5 c.cm. in broth on receipt at the laboratory. The diluted fluid was kept in the refrigerator for 17 days in a small screw-capped bottle. Human serum from a healthy young adult who had never been vaccinated was then added to make 20% by volume. The fluid was dropped from a pipette on a series of sterile glass slides and, after the drops had dried in air, the slides were placed in sterile petri dishes, some of which were placed in a cupboard and the others on the window sill.

At intervals afterwards the material from the drops was taken up in distilled water and after admixture with an equal volume of penicillin solution, 300 units per ml., the fluid was inoculated on the chorio-allantois of developing hens' eggs, as with the crust extracts.

The technique of inoculation on the chorio-allantois was that commonly used (Beveridge and Burnet 1946). Before inoculation the eggs were incubated at 37° C for 12 days. The inoculum was in each case about 0·1 ml. in volume, and the inoculated eggs were examined after two or three days' further incubation at 36° C.

When infection with variola virus occurred, the appearances on the membranes were typical and have been described elsewhere (Downie and Dumbell 1947): when the amount of virus in the inoculum was large, there was usually a spreading area of thickening and opacity which often covered most of the exposed chorio-allantois (confluent lesions); in other membranes a small central area of inflammatory thickening was surrounded by numerous discrete lesions (semiconfluent lesions); and in less heavily infected membranes the specific lesions were discrete and variable in number.

We have considered the number of such discrete lesions as proportional to the amount of living virus in the inoculum, and have recorded the number of lesions in such tests below. Where the lesions were few, or any doubt about their nature was entertained, the membranes were excised and ground up with glass, and after suspension in broth the supernatant fluid was inoculated on further eggs.

In only one instance, where two isolated lesions were present, did we fail to confirm the presence of virus in membranes which appeared to show typical variola lesions. Nor did we ever recover virus by further inoculation from membranes which did not show typical lesions after inoculation with crust extracts or resuspended dried vesicle fluid.

Where previous tests on a particular lot of crusts showed that very little living virus appeared to remain, several samples were taken and tested in parallel. This seemed more likely to lead to the detection of small amounts of residual virus than would the testing of a single extract from a larger sample of crusts.

RESULTS

Survival of Virus from Vesicle Fluid

The results of the tests on the vesicle fluid taken from one patient and dried on glass slides are shown in table I. The number of eggs inoculated with the resuspended dried vesicle fluid varied at different examinations according to the number of eggs available; and, though there was some irregularity in the results, table I indicates that the amount of virus surviving in the dried material diminished progressively up to 30 days, when very little remained. At subsequent examinations two drops were used, except in the last test, when the remaining four drops were used in each case. Though only one and two lesions developed on two membranes inoculated with the material kept in the dark for 84 days, passage to further eggs gave typical confluent infections, demonstrating the specific character of these lesions.

TABLE II—RECOVERY OF VARIOLA VIRUS FROM CRUSTS COLLECTED ON TENTH DAY OF ILLNESS AND KEPT AT ROOM TEMPERATURE IN DARK (CASE 2)

Days after which crusts were tested		Lesions on egg membranes	Lesions on passage
28		SC, SC	Not passed
68		200, 20	,, ,,
90		16, 5, 6	,, ,,
111		0, 0, 0	,, ,,
122		0, 0, 1	SC, SC, SC
162		8, D	C, C, C
202	*a*	0, 2, 0	21, 14, D
	b	0, 0, 0	0, 0
	c	0, 0, 3	26, 7
	d	0, 0	0, 0

a, *b*, *c*, *d*, different samples taken after 202 days.

TABLE III—INFECTION OF EGG MEMBRANES WITH VARIOLA VIRUS FROM CRUSTS COLLECTED ON 24TH DAY OF ILLNESS AND KEPT AT ROOM TEMPERATURE (CASE 6). CRUSTS HAD BEEN KEPT IN REFRIGERATOR 145 DAYS BEFORE EXPERIMENT

Days exposure at room temperature		Exposed to daylight	Kept in dark
0		SC, 70	
41		SC, D	SC, SC
77		*25, 12, 9*	*80, 120, 1**
112		6, 0	7, 17, 0
140		2, 0, 0	2, 24, D
196	*a*	5, D	0, 0
	b	0, 1	1, 0
	c	19	7, 2

* Membrane torn at time of inoculation.

Survival of Virus in Crusts

Specimens of crusts from five cases of smallpox were kept at room temperature for periodic examination. Table II shows the results with a specimen which was kept at room temperature in the dark for more than six months. These findings indicate a gradual diminution in the amount of living virus during the first 100 days of observation, and on subsequent examinations the amount of virus demonstrated was very small. At this stage the results, as might be expected, were rather irregular. The negative finding on the sample removed after 111 days may have been due to chance selection of negative crusts, to insufficient trituration of the crusts, or to some other minor variation in technique. No further tests were made on this specimen after 202 days.

The crusts from one case taken on the 24th day of illness had been kept in a screw-capped bottle in the refrigerator for 145 days before observations were begun. The specimen was then examined in the usual way for virus and divided into two portions, which were placed at room temperature, one exposed to light, and the other in the dark. The results are shown in table III. The last test made on these crusts after 196 days again shows, as in table II, the variation which may occur with different samples taken at the same time from one specimen. There appears to be little difference in the time of survival between crusts kept in the dark and those exposed to diffuse daylight in a glass container.

The day on which virus was last recovered from the other three specimens of crusts are shown in table IV, which summarises all the results. The specimens from case 5 were tested after they had been kept 138 days and again after 167 days (three samples from each), but virus was not recovered. These crusts were lighter and softer in texture than the others, and this may explain the shorter period of survival of the virus as determined by our technique. Extracts from the crusts from case 3 did not produce lesions on three eggs after 141 days; but after 152 days the remaining crusts were divided into six lots; and, of the extracts prepared from these, three produced specific lesions on eggs, while three did not. The crusts of case 4, which showed the longest period of survival, had been kept in a dark cupboard throughout. After 328 days four samples each gave a few discrete lesions; after 396 days two samples were positive, and two negative; after 417 days one large sample of 24 crusts, which had been very finely ground before extraction, produced after 3 days 57, 26, and 51 discrete lesions on three membranes. No further tests have been made on this specimen.

Survival of Virus at Low Temperature

Although we made no experiments designed to test the period of survival of virus in crusts and vesicle fluid at low temperatures, it seems a priori highly probable that the period of survival at lower temperature would be longer than at room temperature. Such observations as we have made in the course of our work support this belief. Three specimens of crusts which had been stored in vacuo over calcium chloride were tested for virus after 202 days, 1 year and 43 days, and 2 years and 52 days. The third specimen, from a case in the Middlesex outbreak in 1944, gave confluent infections on egg membranes, and the others showed numerous discrete lesions. Part of the sample of vesicle fluid from case 1 (table I), which had been diluted in broth and kept in the refrigerator in a screw-capped bottle, gave confluent infections on egg membranes after nine months. A saline extract had been made from the crusts of case 4 (table IV) for serological tests soon after the crusts were received in the laboratory. Part of the saline extract which had been kept in a rubber-stoppered tube in the refrigerator for 1 year and 67 days produced 10, 31, and 87 specific lesions on three egg membranes. This result did not surprise us, as we had in December, 1945, recovered by culture on the chorio-allantois two strains of cowpox virus which had been stored in the form of concentrated elementary body suspensions in dilute buffer solution at a temperature of 4°–10° C since April, 1938, and February, 1939, when they had been prepared from dermal infections in the rabbit. Buddingh (1938) has noted that vesicle fluid from a case of smallpox was infective for the chorio-allantois after 5 weeks at 0° C, and North et al. (1944) record the recovery of virus by egg culture from smallpox crusts which had been kept at −8° C for one year.

DISCUSSION

In general our results show that in crusts and dried vesicle fluid kept at room temperature the amount of virus recoverable by infection of the chorio-allantois of developing hens' eggs diminishes at first fairly rapidly, but that virus can be detected many months after this initial period. The results in tables I, II, and III indicate some irregularity in our findings during the later periods, when the virus was less readily detected. This irregularity was evident especially when several samples were tested from the same specimen at one time, and may have been due to the irregular distribution of residual virus among crusts and to variation in the fineness of dispersion and degree of extraction of individual samples. It seems likely that repeated further examinations of our specimens using larger numbers of eggs would have shown the survival of variola virus for longer periods than those shown in table IV. The virus did not apparently survive so long in the diluted vesicle fluid which had been dried as thin films on glass slides as in crusts, and the nature and character of the crusts may be important in determining the period of survival of virus. It has been

TABLE IV—SURVIVAL OF VARIOLA VIRUS IN DRIED VESICLE FLUID AND CRUSTS AT ROOM TEMPERATURE

Case no.	Vesicle fluid or crusts	Day of illness on which specimen collected	Specimen exposed to	Time of survival of virus (days)
1	Vesicle fluid	7th	Daylight Dark	35 84
2	Crusts	10th	Dark	202*
3	,,	13th	Dark	152*
4	,,	14th	Dark	417*
5		15th	{Dark + Daylight}	34 + 63
			Dark	97
6	,,	24th	Daylight Dark	196* 106*

* Not tested later.

ted above that the crusts of case 5 were large, lighter, d softer than the others; the specimens from cases 4 d 6 both consisted of rather smaller, harder, and denser seeds," which may offer better conditions for the eservation of living virus.

There appears to be little relation between the virus ontent of crusts and the stage of the disease at which ey were collected; at least our findings showed that e crusts of case 6, collected on the 24th day of illness, pparently contained virus in amount comparable to at in crusts removed from other patients on the 10th–5th day of illness. Virus therefore survives in the skin sions of these patients after the immune state has ecome established.

Exposure to daylight seemed to have little influence n shortening the period of survival of virus in crusts tables III and IV); but in these tests the virus was rotected by tissue protein and shielded from ultraviolet adiation by the glass containers.

Though we have no information about the relationship between the infective dose of virus for the chorio-allantois and that for susceptible human beings, our findings confirm what has long been believed, that the material from the skin lesions in smallpox patients is infective. That such material has been responsible for the spread of smallpox there can be no doubt, and Stallybrass (1931) has recorded several instances of outbreaks among laundry workers where the infective material was conveyed on bedclothes. We have, by the egg technique, isolated virus from the sweepings from the ward floor near a bed in which a child was convalescing from smallpox. Such infective "dust" is a potential source of infection. We cannot regard the skin lesions as the only source of infective virus, for patients may spread infection before the skin lesions have developed; at this stage, and probably also later, the upper respiratory tract must be regarded as an infected region from which virus is disseminated.

SUMMARY

The chorio-allantoic membranes of developing hens' eggs, which are susceptible to infection with variola virus, have been used to detect the presence of virus in vesicle fluid and crusts from smallpox patients.

By this means virus was found to survive in diluted vesicle fluid dried on glass slides for 35 days when exposed to daylight, and for 84 days when kept in the dark at room temperature.

Virus was recovered from different samples of crusts kept at room temperature for several months, and from one specimen kept thus for over a year.

In crusts exposed to daylight virus survived as well as in crusts kept in the dark.

The bearing of these observations on the spread of smallpox is briefly discussed.

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SONNE DYSENTERY AND NON-SPECIFIC GASTRO-ENTERITIS IN A HOSPITAL

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AN epidemic of Sonne dysentery broke out among the nurses and domestic staff of a large general hospital and its war-time annexe in the second week of January, 1945. The main epidemic had abated by mid-March, but sporadic cases occurred during April and August. Intermingled with the Sonne-positive cases were others presenting a similar clinical picture from which neither *Bact. sonnei* nor other pathogenic organisms could be isolated despite repeated bacteriological examinations. The non-specific cases continued throughout the period January to mid-November and, although most numerous in January, when the Sonne epidemic was at its peak, occurred at an average rate of 2 a fortnight. In the first fortnight of November, however, 6 cases occurred when there were no cases of Sonne dysentery.

The purpose of this paper is to compare the clinical findings and epidemiology of the cases of Sonne dysentery with those of the non-specific gastro-enteritis and to consider the possible ætiology of the latter.

Material.—In the community of about 400 nurses and hospital domestics 49 attacks of Sonne dysentery were observed in 48 persons, and 45 attacks of non-specific gastro-enteritis in 38 persons. Eleven persons had both diseases or two attacks of one of them. Thus 4 had Sonne dysentery preceding the non-specific gastro-enteritis by intervals of 1–9 months, and 1 had an attack of non-specific gastro-enteritis before an attack of Sonne dysentery; 5 persons had two attacks of non-specific gastro-enteritis, and 1 had two attacks of Sonne dysentery.

LABORATORY FINDINGS

Fæces or rectal swabs from all cases were plated within a few hours on Leifson's desoxycholate citrate agar; some were also cultured on Wilson and Blair plates and in tetrathionate broth. Leifson plates were examined after 16–24 hours' incubation, and suspicious colonies were tested by slide-agglutination and picked off to sugar media. A presumptive report of *Bact. sonnei* could thus be given in most positive cases within 24 hours. Negative Leifson plates were then incubated for a further 24 hours and examined again for missed Sonne colonies. All Sonne organisms were confirmed by biochemical reactions and tube agglutinations.

Bact. sonnei was isolated from the first fæcal specimen or rectal swab in the great majority of positive cases. Frequent specimens (3 to 12 or more) were examined from the non-specific cases while symptoms persisted, but no organisms of the dysentery, food-poisoning, or enteric groups were found.

Agglutination Reactions.—Sera were taken from 5 Sonne-positive cases and 5 non-specific cases at intervals varying from a few days to several weeks after the onset of symptoms. None showed any agglutination of *Bact. sonnei* at a dilution of 1/20.

CLINICAL FINDINGS

Onset.—The onsets of both Sonne dysentery and the non-specific gastro-enteritis were abrupt; sudden diarrhœa and/or vomiting, often in the early hours of the morning, being the rule. A few cases of both diseases had a premonitory phase of malaise with headache, giddiness, colic, nausea, or fever before the onset of diarrhœa or vomiting:

Mode of onset	*Sonne-positive attacks*	*Non-specific attacks*
Premonitory malaise ..	12	6
Diarrhœa	29	23
Vomiting	1	8
Diarrhœa and vomiting ..	4	8
Asymptomatic carriers ..	3	..
Total ..	49	45

The occurrence of initial pyrexia could not be correlated with either disease or with any particular mode of onset. Thus, in 18 of the 46 Sonne attacks (excluding the 3 asymptomatic carriers) and in 23 of the 45 non-specific attacks the patients were afebrile despite different modes of onset. No preceding or coincident upper respiratory infections were recorded in either disease. The degree of malaise and prostration was similar in both diseases but more severe in those patients who had high fever. It was impossible to predict from clinical observations whether a given patient would be Sonne-positive or not.

Stools.—All the Sonne-positive cases had frank diarrhœa, but some of the non-specific cases passed only one fluid motion daily. In 6 non-specific cases the patients did not have true diarrhœa at all after admission to hospital, though they had abdominal discomfort and rather loose motions.

The diarrhœa stools were fluid in both types of disease, and blood was never observed; mucus was often found in the Sonne-positive stools but only rarely in those from the non-specific cases. The number of stools averaged 7–8 during the first 48 hours of both diseases. The duration of diarrhœa could not be recorded in the Sonne-positive cases, because they were transferred to an infectious-diseases hospital as soon as the bacteriological diagnosis had been made. In the non-specific cases diarrhœa was usually of short duration and had almost always ceased by the fourth day. In 3 non-specific cases, however, diarrhœa continued for about 15 days, accompanied by a low intermittent fever, which never exceeded 99·4° F. In these cases the diarrhœa was uninfluenced by sulphaguanidine and sulphasuccidine, in contradistinction to the relief usually afforded by these drugs in Sonne dysentery.

Main Symptoms.—The main symptoms in the courses of 43 attacks of Sonne dysentery and of 36 attacks of non-specific gastro-enteritis are analysed as follows:

Symptom	*Sonne-positive (43 attacks)*	*Non-specific gastro-enteritis (36 attacks)*
Malaise	34	32
Nausea and/or vomiting	31	31
Headache	17	13
Vertigo or fainting	5	7
Tachycardia (90 +)	24	24
Pyrexia	24	22
Colic	30	29
Diarrhœa	43	30
Average no. of stools in first 48 hours	7–8	7–8

These numbers are smaller than the total number of attacks, because detailed information was not obtained in every instance.

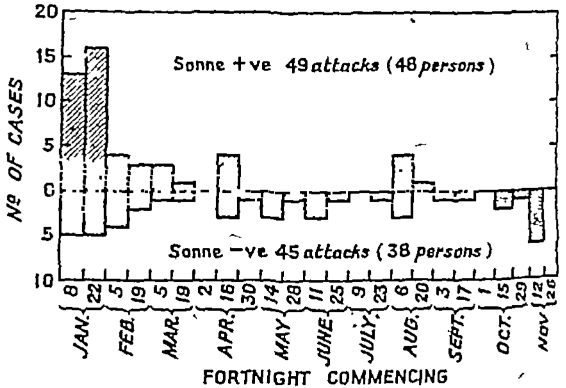
Fever.—The only clinical feature which, in retrospect, offered any distinction between the Sonne-positive and non-specific cases was the character of the pyrexia. The incidence of pyrexia was about 50% in cases of both diseases, but further analysis of the temperature charts showed a difference in character:

	Afebrile	*Low intermittent*	*High with quick fall*	*Total*
Sonne-positive ..	11	5	16	32
Non-specific ..	17	12	7	36

Charts of sufficient length were available in 32 attacks of Sonne dysentery and in 36 attacks of non-specific gastro-enteritis. Some patients were afebrile, others had a low intermittent fever—never exceeding 99·4° F, but which might last for 7–14 days—and a third group had an initial fever of 100–103° F which fell to normal during the first 48 hours and did not recur. We are satisfied that the occasional administration of sulphaguanidine did not affect the pyrexia during the first 48 hours.

Thus there was an initial high fever in 50% of the Sonne-positive cases but in only 20% of the non-specific cases. Half of the non-specific and a third of the Sonne-positive cases were afebrile, and the low intermittent fever was twice as common in the non-specific cases. Unfortunately this difference in character of the pyrexia is not sufficiently constant to be of use in differential diagnosis.

Course.—We cannot compare the duration of Sonne dysentery in our cases with that of the non-specific gastro-enteritis, because bacteriological cure was demanded for the former, whereas clinical cure was accepted for the latter. For the non-specific cases the average stay in hospital per attack was 7·4 days. In the 3 cases of continued non-specific diarrhœa mentioned above, stay in hospital was prolonged to 27, 27, and 20 days.



Fortnightly incidence of Sonne dysentery and non-specific gastro-enteritis.

To sum up the clinical aspect, the two diseases appeared, for all practical purposes, to be identical, and no obvious or constant means for their differentiation has emerged from this study.

EPIDEMIOLOGY

The fortnightly incidence of Sonne dysentery and non-specific gastro-enteritis is shown in the accompanying chart. The cases of Sonne dysentery occurred in three outbreaks. The first outbreak was due mainly to the presence of 6 infected persons in the kitchens of the hospital annexe: 3 had dysentery and 3 were asymptomatic carriers. After identification and removal of these persons the epidemic rapidly waned. Possibly a few nurses were infected in the wards by patients with Sonne dysentery. The two further minor outbreaks in April and August could not be traced to any source. Cases of Sonne dysentery were occurring in the district throughout the period of study, and nurses may have been infected outside the hospital.

The explosive character of the Sonne outbreaks was in contrast to the endemicity of non-specific gastro-enteritis, cases of which occurred in all but four of the fortnightly periods from January to mid-November. It is possible that more cases were detected in January and February than later owing to measures taken in these months to ensure reporting of any gastro-intestinal upsets. The occurrence of non-specific cases could not be correlated with any factors such as dormitory arrangements, wards in which the staff had worked, or infection by food or milk.

The nurses fed communally in dining-halls in the main hospital and in the annexe, and the domestics had imilar separate feeding arrangements. In the hospital oth nurses and domestics had separate bedrooms, but n the annexe they were housed in small dormitories. The Sonne dysentery cases were largely confined to the taff of the hospital annexe because of the infected kitchen personnel, but non-specific cases occurred equally in the main hospital and annexe.

DISCUSSION

Two forms of gastro-enteritis with indistinguishable clinical pictures were prevalent at the beginning of this study. One was an explosive outbreak of Sonne dysentery, emanating from infected kitchen staff, which quickly subsided, and the other was a gastro-enteritis of unknown cause which was endemic throughout the period under review and had not entirely ceased when the investigation closed.

Our non-specific cases did not exactly resemble hyperemesis hiemis—the winter vomiting disease—epidemics of which were described in America by Zahorsky (1929, 1940) as affecting children but rarely adults. Diarrhœa often occurred, but the stools were thin, light-coloured, and offensive, and not considered to be due to a true enteritis.

Nor did our cases correspond to the epidemic nausea and vomiting described in this country by Miller and Raven (1936), Gray (1939), and Bradley (1943), in which diarrhœa was always a minor symptom, pyrexia was infrequent, and the disease assumed an epidemic form. In our cases, although nausea and vomiting were frequent, diarrhœa was the most prominent symptom, and the cases occurred as a smouldering endemic. Epidemiologically our non-specific cases most resembled those reported by Brown et al. (1945), in which diarrhœa was the main symptom, and those recorded by Reimann et al. (1945a). The latter described "a mild widespread epidemic disease characterised by anorexia, malaise, diarrhœa, nausea, and vomiting" and noted its spread over several months without peaking. In later work Reimann et al. (1945b) brought forward evidence that a gastro-enteritis, attributed to a virus, could be transferred to human volunteers by nasal inhalations of (but not by swallowing) stool filtrates and filtered garglings from patients. This evidence certainly supported an airborne infection and favoured a filter-passing virus as the infective agent. The association of non-specific enteritis with Sonne dysentery was noted by Barnard (1945), who observed an outbreak of Sonne-negative diarrhœa, associated with vomiting, which lasted 3 or 4 days and followed a wave of Sonne dysentery.

We offer the following considerations about the nature of our cases of non-specific gastro-enteritis:

(1) The least unlikely possibility is that they were due to a virus, because the bacteriological investigations practically excluded their being due to infection with *Bact. sonnei* or other organism known to cause enteritis.

(2) The clinical features differed from those recorded in hyperemesis hiemis and in epidemic nausea and vomiting, because diarrhœa was the most prominent symptom.

(3) Their endemicity excluded mass infection of food and metallic poisoning, and suggested a spread by contact. Our observations provided no evidence to show whether transmission was effected by droplets or from fæces. It seems probable that carriers were present in the community but, because no bacterial agent could be incriminated, they could not be identified.

SUMMARY

The coincident occurrence of epidemic Sonne dysentery and endemic gastro-enteritis of unknown origin among nurses and domestics in a large hospital is described.

The salient features of the non-specific gastro-enteritis were its sparse but widespread distribution in the community, its smouldering character, and its close clinical similarity to Sonne dysentery.

It appeared to differ from "epidemic nausea and vomiting" and from "the winter vomiting disease" in having diarrhœa as its salient feature.

Its ætiology is discussed.

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DIAGNOSIS OF EPILEPSY IN SERVICE CASES

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ONE of the most difficult problems of war medicine is to decide the nature of alleged epileptic attacks in serving soldiers. Accurate and rapid diagnosis is desirable for three reasons. First, since the Army authorities have laid down that virtually all epileptics should be discharged from the Service, the time and money spent in training a man will be entirely wasted if he later proves to have epilepsy. Secondly, it is clearly unfair to discharge a man to civil life with the label of epilepsy, and the stigma that this entails, without definite proof that the diagnosis is correct. Thirdly, the fact that there may be a conscious or subconscious desire to evade service must always be borne in mind.

Since 1941 nearly 500 cases of major epilepsy or suspected major epilepsy have been admitted to the Medical Neurological Unit at Winwick. The cases under consideration in this paper were those in which the diagnosis depended on an unsubstantiated history, there being no abnormal physical signs, no reliable accounts of attacks, and no evidence of trauma, tumour, syphilis, or cysticercosis.

In the first 164 cases of this group each case was provisionally diagnosed on the history alone as definite, probable, or improbable epilepsy.

ELECTRO-ENCEPHALOGRAM

The next procedure was to obtain an electro-encephalogram (E.E.G.). This was taken and interpreted by Mrs. E. M. Stewart-Gibb and Mr. Michael Saunders in the department of electro-encephalography at Manchester Royal Infirmary. The criteria of abnormality used in assessing these tracings were those laid down by the British E.E.G. Society. Except in a very few of the early cases all the patients were fasting, and all without exception were hyperventilated; none was on any form of therapy.

The E.E.G. tracings were assessed and placed in one of four groups: (1) "negative," being within normal limits; (2) "non-specific," showing a non-specific abnormality of rhythm of a type seen in a tenth of the normal population and in a higher proportion of neurotics and psychopaths, as well as in other neurological conditions; and (3) "very suggestive," presenting paroxysmal rhythms suggestive of epilepsy.

No tracings could be included in the fourth group—i.e., none showed the classical spike and wave or variant which is regarded as pathognomonic of epilepsy.

WATER PITRESSIN TEST

A water pitressin test was next performed on each case. McQuarrie and Peeler (1931), Jacobsen (1934), and others have shown that typical major epileptic seizures can be produced in many epileptic subjects by inducing a positive water balance in the body for a comparatively short period. The most rapid and effective way of attaining this positive water balance is by utilising the antidiuretic action of pitressin. In performing the test the method we adopted was substantially the same as that used by Clegg and Thorpe (1935), $^1/_2$ pint of water being given every two hours, and an injection of pitressin 0·25 c.cm. (5 units) followed by 0·5 c.cm. (10 units) every four hours, for forty hours. With the production of a major epileptic fit by this means the patient was regarded as having epilepsy. This test is not wholly devoid of unpleasant effects, and a small proportion of men refused to complete it, or even to undergo it at all.

McQuarrie and Peeler (1931), Clegg and Thorpe (1935), and others have done a control séries of water pitressin tests on normal people. In no case was a fit produced in a non-epileptic. Garland et al. (1943) state that they have been unable to find in the literature any record of a positive water pitressin test in a person not subject to epilepsy.

RESULTS

The total number of cases assessed was 164. In 142 the water pitressin test was completed. In 22 cases this test was not completed, for reasons other than the occurrence of an epileptic fit.

From a *clinical examination* 58 patients were considered to be definitely epileptic, 48 probably epileptic, and 58 improbably epileptic.

The *water pitressin test* gave 37 positive results and 83 negative, the remainder not being completed, often because of vomiting or severe headache.

"Very suggestive" E.E.G. numbered 8.

Though 250 cases were investigated in this way, the results of only the first 164 have been used in this paper, as it has not yet been possible to follow up the rest.

The *age* of the patients in this group is fairly evenly spread between 18 and 45. There appeared to be no correlation between the E.E.G. findings or the water pitressin findings and the age of the patient.

It should be emphasised once again that, in grouping the cases as "definitely epileptic," "probably epileptic," and "improbably epileptic," the diagnosis was made merely on the history and the general impression of the case from a clinical point of view. The rest of the investigation had not been carried out, and the diagnosis was merely provisional.

TABLE I—DETAILED RESULTS IN 164 CASES

Clinical diagnosis	Water pitressin test	E.E.G.	No. of cases
Definitely epilepsy	Positive	Negative	18
		Non-specific	7
		Very suggestive	2
	Negative	Negative	18
		Non-specific	11
		Very suggestive	2
Probably epilepsy	Positive	Negative	6
		Non-specific	1
		Very suggestive	1
	Negative	Negative	31
		Non-specific	7
		Very suggestive	2
Improbably epilepsy	Positive	Negative	0
		Non-specific	1
		Very suggestive	1
	Negative	Negative	46
		Non-specific	10
		Very suggestive	0

The detailed results are given in table I. There were 18 cases of clinical "definitely epilepsy" which had a positive water pitressin test and yet a normal E.E.G. On the other hand, there were in this group 2 "very suggestive" E.E.G. associated with a negative water pitressin test. Of the 2 "improbably epilepsy" cases with a positive water pitressin test, 1 had a "very suggestive" E.E.G. There is no reason to believe that a positive water pitressin test was obtained in a non-epileptic in either of these cases; the provisional diagno in both of them had been hysteria.

TABLE II—FOLLOW-UP RESULTS ON 164 CASES

Clinical diagnosis	No. of cases	Epilepsy confirmed	Total in which either E.E.G. or water pitressin or both were positive	Total still serving
Definitely epilepsy	58	51 (50*)	29 {W.P. .. 27 E.E.G. .. 4	7
Probably epilepsy	48	16 (12*)	10 {W.P. .. 8 E.E.G. .. 3	21
Improbably epilepsy	58	5 (3*)	2 {W.P. .. 2 E.E.G. .. 1	41

* Confirmed in hospital.

The *comparative results* were as follows:

Clinical diagnosis "definitely epilepsy" (58 *cases*)

Water pitressin test positive in	47%
E.E.G. very suggestive in	7%
E.E.G. non-specific in	31%

(6 water pitressin tests unfinished, patients refusing to continue

Clinical diagnosis "probably epilepsy" (48 *cases*)

Water pitressin test positive in	17%
E.E.G. very suggestive in	6%
E.E.G. non-specific in	17%

(5 water pitressin tests not completed, patients refusing to continue

Clinical diagnosis "improbably epilepsy" (58 *cases*)

Water pitressin test positive in	3%
E.E.G. very suggestive in	2%
E.E.G. non-specific in	19%

(11 water pitressin tests not completed, patients refusing to continue

The first 164 cases were followed up at least six month after the patient had left hospital. Confirmation o *a diagnosis of epilepsy means that a fit was* observe by a reliable witness, or the patient was subsequentl discharged from the Army as an epileptic by some othe neurological unit. The results are given in table II.

DISCUSSION

On the basis of these results, the water pitressin tes appears to be of more value than the E.E.G., and th *clinical evaluation of the patient* more important tha either of these tests in reaching a rapid and accurat diagnosis. It must be remembered, however, that a E.E.G. was obtained only once in each case. No doub if several tracings had been taken in each case, more woul have shown patterns suggesting epilepsy, but unfortunately this was impracticable. It should be remembere that those who interpreted the E.E.G. knew little of th clinical assessment beyond having a summary of th case-history. It has been suggested that more coul have been made of the interpretation of these tracing had a person skilled in both the clinical aspects and i electro-encephalography been in charge of the case though it is only fair to state that the electro-encephalographers concerned kept rigidly to the criteria laid dow by the British E.E.G. Society. Whether or not suc criticisms are valid, there is no doubt that the E.E.G. i often used merely as an *isolated test, and that* th limitations of this procedure are not perhaps wholl appreciated.

If the E.E.G. was of a non-specific type, *it was* considered by *the clinicians to be of* little or no value i assessing the diagnosis. Interseizure abnormaliti are often non-specific and of a type seen in at least 10% of the normal population (Gibbs et al. 1943). An eve higher proportion of neurotics (Williams 1941) an psychopaths (Hill and Watterston 1942) show simila abnormalities. Williams (1944) has sought to show tha episodic outbursts in these non-specific patterns are of considerable significance and strongly indicate epilepsy. Episodic outbursts were not accepted in this series as confirmatory evidence, but episodic outbursts of abnormal activity not amounting to larval attacks were accepted.

Gibbs et al. (1943) state that, in their experience, 42% of tracings were of little or no value in confirming a diagnosis of epilepsy.

Often the only confirmatory evidence of epilepsy was a non-specific pattern in the E.E.G. Bearing in mind what has already been said about the occurrence of these tracings in the normal population, in neurotics, and in psychopaths I feel that to know that a man has a non-specific dysrhythmia of this type is of little value in weighting the scales in favour of a diagnosis of epilepsy. But it must be admitted that, if the views put forward by Williams (1944) are accepted as correct, so-called non-specific abnormalities may now be of considerably more diagnostic value.

According to Finley and Dynes (1942), Jasper (1941), Hill (1944), and others tracings strongly suggesting epilepsy were found not uncommonly in conditions regarded as non-epileptic. It seems reasonable to regard such a tracing as strong confirmatory evidence of this diagnosis if the history also supports it; but when there is considerable clinical doubt about the exact diagnosis, even the finding of such a tracing should make one hesitate before discharging a man with the stigma of epilepsy.

I have found that a considerable number of medical officers seem to assume that all that is necessary to confirm or exclude a diagnosis of epilepsy is one E.E.G. This unfortunate tendency to substitute an E.E.G. report for a careful history and an examination is entirely unwarranted.

My view is that the E.E.G. used as a diagnostic aid as I have used it, and as I believe it is quite widely used by others, has only a limited value in the diagnosis of major epilepsy, and is less useful in this respect than is the water pitressin test. I believe that a careful clinical assessment is a more reliable means of reaching a correct diagnosis than is either the water pitressin test or the E.E.G., used either alone or together.

SUMMARY

In 164 cases of suspected epilepsy a routine investigation has been carried out, a provisional diagnosis being made in each case on the history alone Electro-encephalography and a water pitressin test were later performed on each case. A follow-up has been made, at least six months after the patient had left hospital, to reach a final and exact diagnosis if possible.

As a result of this investigation it appears that clinical evaluation of the case is the most reliable single factor in reaching an accurate diagnosis of major epilepsy; the water pitressin and the E.E.G. are both important as ancillary aids to this end, the water pitressin being the more useful of the two.

I have to thank Dr. Fergus R. Ferguson for arranging the encephalographic investigation of these patients; Drs. Fergus R. Ferguson, Gordon Holmes, and Joly Dixon for their help and advice in the preparation of this paper; and Dr. Michael Saunders and Mrs. E. M Stewart-Gibb for their coöperation in interpreting the E.E.G.

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THERAPEUTIC USES OF KHELLIN

METHOD OF STANDARDISATION

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EXTRACTS of seeds of *Ammi visnaga* Lam. (Arabic khella), an umbelliferous plant growing wild in the Eastern Mediterranean regions, have been used by the local population since ancient times as an anti-spasmodic in renal colic and ureteral spasm.

Chemical analyses made in Cairo and Vienna have shown the active principle to be a di-methoxy-methyl-furano-chromone and thus to belong to the same group as coumarines and possibly flavones. Some workers call it visammin. but we prefer to use the original name khellin.

Khellin causes a conspicuous and long relaxation of all the visceral smooth muscle—the intestines, uterus, bile-ducts, bronchi, and especially ureters. In 1934 preparations of *Ammi visnaga*, in the form of the 1 in 10 tincture and the 1 in 40 decoction, were introduced into the Egyptian Pharmacopœia and recommended as an antispasmodic in renal colic.

ANGINA

In 1945 a fresh interest in khellin arose as the result of the discovery that it acts as an extremely potent coronary vasodilator which, in doses used, has no effect on the general blood-pressure and does not increase the oxygen requirements of the heart (Anrep and Misrahy 1945). This action of khellin lasts many hours. Khellin has now been tried in over 150 cases of angina. With single or repeated doses of 100 mg. for intramuscular injections, or 50–100 mg. by mouth, three times daily, the results were extremely encouraging. Some of our early observations have already been published (Kenawy and Barsoum 1945).

BRONCHIAL ASTHMA

In view of the fact that khellin has been shown experimentally to dilate the respiratory passages (Samaan 1932), it has also been tried in severe bronchial asthma. A complete and prolonged relief was obtained in 41 out of 45 cases after a single intramuscular injection of 200–300 mg. In 3 cases the relief was obtained after repeating the injection after an hour. In 1 case relief was not obtained; this case was complicated by bilateral pulmonary tuberculosis, double phrenic evulsion. and thoracoplasty. Complete relief is given 5–15 min. after the injection and usually lasts about 24 hours. Repeated daily administrations of khellin by injection or by mouth conspicuously reduce the number and severity of the attacks. In obstinate cases of severe status asthmaticus a second and sometimes a third dose has to be given at intervals of one or two hours to produce relief.

The action of khellin in bronchial asthma is not so prompt as that of adrenaline or of ephedrine. but it is more lasting. and, since it has no effect on the general blood-pressure, it can be safely administered even in hypertensive patients. Spirometric records made in asthmatic patients show that under the influence of khellin their vital capacity increases by 600–1000 c.cm., and that the speed of expiration becomes appreciably faster. Khellin relieved attacks in some cases resistant to adrenaline or to aminophylline. It is also safer than aminophylline to administer. Deaths due to aminophylline have been recorded.

In the doses recommended above khellin is not toxic. The only fairly constant effect of its administration was a general sensation of warmth without actual flushing. One patient complained of vertigo and slight nausea which, however, soon disappeared. Control injections free from khellin were occasionally given to our patients to exclude any psychological effect. No relief was ever obtained with these injections. We wish to emphasise that the dose of khellin suitable for the asthmatic is much greater than that used for angina.

STANDARDISATION

Since the publication of our observations a considerable number of preparations of *Ammi visnaga* are being offered to the public without proper control or standardisation. We wish to issue a warning that crude extracts of *Ammi visnaga* may cause undesirable effects, especially when used for intramuscular injections in concentrated solutions. In animals such extracts may cause long-continued oliguria. Taken by mouth crude extracts and decoctions often cause severe gastric irritation and nausea, and sometimes diarrhœa. Therefore all preparations of *Ammi visnaga* to be used by mouth or by injection should be freed from injurious impurities, and the final concentration of the active principle (khellin) should be standardised. Extracts for oral or intramuscular administration should contain not less than 50 mg. per c.cm.

Fahmy and El Keiy (1931) discovered that khellin in contact with solid $NaOH$ gave a characteristic pink colour. No other known extract in therapeutic use gives this reaction. Standardisation by the use of this reaction requires a progressive dilution of the extract until no more coloration is obtained with $NaOH$. Besides being rather laborious, this method entirely depends on the subjective factor of determining something which just fails to appear. In our experience the method gave, in duplicate determinations by two different observers, errors as high as 100%. We were therefore obliged to discard the method in its original form and to adopt the following modification, which proved to be satisfactory for rapid standardisation of pharmaceutical preparations containing the active principle.

Method.—A standard stock solution is prepared by dissolving 25 mg. of chemically pure khellin (melting point 154° C) in 100 c.cm. of distilled water. This solution keeps without deterioration for several months. For the standardisation, five flat-bottomed sampling-tubes, labelled from 1 to 5 and containing 5 c.cm. each of a saturated solution of KOH, are prepared: 0·05, 0·10, 0·15, 0·20, and 0·25 c.cm. of the stock solution of khellin are then added to the tubes in ascending order from no. 1 to no. 5. After a few minutes the characteristic pink colour of different intensities develops in the tubes. The coloration reaches a maximum in about 10 min. and remains unchanged for several hours, after which it gradually fades. The amount of khellin in each tube was thus 12·5, 25·0, 37·5, 50·0, and 62·5 µg.

1 c.cm. of the extract to be standardised is diluted with 200 c.cm. of water, and 0·20 c.cm. of this dilution is added to a sixth tube also containing 5 c.cm. of saturated solution of KOH. The developed colour is then matched in a colorimeter or by naked eye against the set of the standard dilutions. The difference in the depth of colour of the standards is so obvious that it is easy to find an exact match or to place the colour of the unknown between two neighbouring standard dilutions. In this way a standardisation of an extract with an accuracy of about 6 mg. per c.cm. can be rapidly made. When the unknown matches tube no. 4 containing 50 µg. of khellin the extract is of the required strength of 50 mg. per c.cm. No greater accuracy is required for pharmaceutical preparations of *Ammi visnaga*. However, if greater precision is desired, new dilutions of the standard must be prepared, each of the tubes to contain 0·10, 0·11, 0·12 c.cm., &c., of the stock solution. The degree of dilution of the unknown must in this case also be increased.

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Penicillin in Neurology

THE first session of a joint meeting of the section of neurology with the Société de Neurologie de Paris was held on April 15, with Dr. DOUGLAS MCALPINE, the president, in the chair.

SUPPURATIVE CONDITIONS OF THE BRAIN AND MENINGES

Sir HUGH CAIRNS said that with the early preparations of penicillin (50–100 units per mg.) it had been necessary to work out minimal effective doses; and these have to some extent survived, even though the present-day penicillin II, containing 1650 units per mg., is an almost pure crystalline preparation. Early successes were obtained with accessible infections such as pyæmia and septicæmia; later it was found that larger foci of infection, such as bacterial endocarditis and pyogenic meningitis with macroscopic areas of fibrino-purulent material, are less easily treated; foci flare up when the penicillin concentration falls below the bacteriostatic level. With gunshot wounds it is not enough to instil penicillin in the hope that infection will be quenched, all macroscopic areas of necrotic and infective material must be removed.

Penicillin in the cerebrospinal fluid (C.S.F.) must be assayed when a method of chemotherapy is being elaborated, or in the absence of expected improvement It may be given by the lumbar or cisternal route, or into the lateral ventricle; unless there is blockage it will spread freely. Normally, 12,000 units will maintain a bacteriostatic level for 24 hours; but occasionally, for example early in the treatment of pyogenic meningitis, this dose may be given every 12 hours. The upper limit of tolerance for the crystalline penicillin has not yet been worked out; but heavy doses of 50,000–100,000 units may cause severe meningeal reactions. Such large doses can do no good and may do harm; and there is never occasion to exceed 20,000 units in one day. Intrathecal penicillin, if continued for some weeks, causes depression of the ankle-jerks, suggesting damage to the cauda equina; but this change is reversible.

Normally, penicillin is given by the lumbar route, if there is a block (of which the most important sign is difficulty in obtaining C.S.F. by lumbar puncture), then the cisternal approach may be adopted; but with head retraction this may not be easy, and blocks sometimes occur above the cisterna magna, so that there should be no hesitation about injecting into the lateral ventricle.

For pachymeningitis and subdural abscess penicillin is given into the subdural space, from which it passes about as rapidly as from muscle; usually 8000–10,000 units are injected every four hours.

Penicillin given systemically does not pass in appreciable amounts into the C.S.F. Nevertheless, systemic penicillin has its value in pyogenic meningitis, for these reasons: (1) it helps to combat the primary focus and the septicæmia from the primary focus or a relapsing meningitis; (2) it helps to overcome infection of the cerebral blood-vessels; and (3) it is probable, though not certain, that penicillin can pass from the blood-stream into the perivascular spaces of the brain, and it may thus be valuable in acute pyogenic meningitis (which is more correctly a meningo-encephalitis), also in limiting the spread of brain abscess. Penicillin appears to pass freely from the blood-stream into the subdural space; though here further evidence is needed.

Crystalline penicillin II seems to be non-toxic when iven systemically; one patient has received 300 million nits without reaction. The sulphonamides should be iven along with penicillin; they are especially valuable hen intrathecal penicillin is stopped.

Until the diagnosis of meningitis is established bacteriologically treatment should be confined to systemic enicillin and sulphonamides. Intrathecal injections of enicillin should only exceptionally be given in general ractice, owing to the risks of aggravating the pressure ffects of an inconspicuous brain abscess and of ntroducing an insusceptible organism.

With cerebral abscess penicillin has made complete xtirpation the rule, except where it is due to a missile wound and in the rare deep-seated abscesses, which are better treated conservatively.

After all major neurosurgical operations a powder of penicillin and sulphamethazine has been used as a routine, with significant reduction in the incidence of postoperative infections.

In infections due to susceptible organisms results with penicillin are good so long as the concentration remains sufficient; precise planning of treatment is even more essential than with less powerful remedies.

MENINGITIS

Dr. **Honor Smith** described the treatment of a series of cases of pyogenic meningitis, mostly pneumococcal. Penicillin, made up in a solution of 2000 units per ml., was given intrathecally once or twice daily for at least five days, in doses of 8000–16,000 units. Though the other routes must be used where necessary, as with spinal block, the lumbar route is normally safe, convenient, and effective.

Sulphonamides are also given in full doses; sulphadiazine is the preparation of choice. Sulphonamides, by preventing or delaying the deposition of fibrino-pus, help to keep the pathways clear for the circulation of penicillin in the C.S.F. They should be given as soon as the diagnosis is made, to tide the patient over the interval before penicillin is begun; they also serve to cover the period in which intrathecal penicillin is withheld.

Penicillin is given not only intrathecally but also systemically, to control any septicæmia as well as to attack the primary focus; and it is now considered that operation on the ear, where this is the focus, should not be undertaken during the acute stage.

The most common complications are spinal block and relapse. The treatment for relapse is the same as that for the original attack, and the prognosis is good provided that the relapse is promptly recognised and energetically treated.

Of 50 unselected cases of pneumococcal meningitis, 11 died, 2 of causes other than meningitis: of the remaining 9, 4 were virtually moribund on admission. Thus delay in instituting treatment, due usually to delay in diagnosis, was the commonest cause of failure.

Treatment follows the same lines in streptococcal and staphylococcal meningitis. Intracranial abscess is a relatively common complication of streptococcal meningitis; and in the presence of an abscess it is essential to give penicillin by the ventricular route. With meningococcal meningitis penicillin is rarely required, except where the response to sulphonamides is disappointing, or where the patient shows signs of intolerance, is vomiting persistently, or is severely dehydrated.

NEUROSYPHILIS

Dr. C. C. **Worster-Drought** recalled that for early syphilis a "standard" course of penicillin was originally evolved; this consisted in altogether 2,400,000 units, given in doses of 40,000 units every four hours over 7½ days, and the relapse-rate averaged about 15%. Experience of penicillin in neurosyphilis is based mainly on this "standard" course. The present tendency is, however, towards larger total amounts—4–5 million units, given three-hourly in doses of 40,000 units. Penicillin should be given intramuscularly: there is little to commend intravenous administration: continuous administration calls for cumbersome apparatus, and even repeated single intravenous injections carry the risk of thrombophlebitis.

More recently a single daily dose of 300,000–500,000 units for 14 days has been reported as giving just as good results; and Dr. Worster-Drought has found 500,000 units daily for 14 days fairly effective against meningovascular syphilis. Further time must elapse, however, before the results can be finally assessed. In view of the relapses with penicillin alone, he has never abandoned arsenic and bismuth; there may possibly be a synergistic action between the two types of treatment.

In neurosyphilis, is it necessary for penicillin to pass the blood-brain barrier? Probably not, since the state of the C.S.F. improves in meningovascular infection treated with parenteral penicillin only; and the same is true of parenchymatous syphilis. Whether or not it passes the barrier, parenteral penicillin exerts a definite influence on the meninges and the central nervous system. Dr. Worster-Drought used to give penicillin intrathecally, but he now uses the intramuscular route, except in tabes with severe and frequent lightning pains. It is inadvisable to use the cisternal route. Though only slight and transient symptoms have been observed by him after the initial doses of penicillin, he now gives 4–6 injections of bismuth before starting penicillin, in view of the known risk of Herxheimer reactions.

With meningovascular syphilis penicillin produces a striking improvement both clinically and in the C.S.F., in which the Wassermann reaction may become negative in 2–4 months. It is doubtful whether neurosyphilis continues to improve beyond four months after the end of penicillin treatment. Further improvement with repeated courses is not conspicuous.

The blood Wassermann reaction, especially in the parenchymatous forms of neurosyphilis, is little affected by treatment with penicillin. Usually the blood reaction remains positive after the C.S.F. reaction has become negative: this is a strong argument for following up penicillin with the usual arsenic and bismuth treatment.

In many cases of general paresis treated with penicillin alone the cells and protein of the C.S.F. become normal in four weeks and the Wassermann reaction negative in two months; but after a further six months the Wassermann reaction may again be positive, and consequently malaria therapy is still advisable: "I know of no case of general paresis which has maintained clinical improvement, with negative serological reactions, on penicillin treatment alone."

Again in tabes dorsalis, administration of penicillin leads to improvement in the C.S.F.; and if this is followed by protracted treatment with arsenic and bismuth the disease in most cases, and especially the early ones, can be arrested. Dr. Worster-Drought gives penicillin initially up to a total dosage of 4–5 million units, and then the usual courses of arsenic and bismuth up to three years. With severe lightning pains, slightly better results are obtained by intrathecal injection: 10,000 units are given in 10 ml. of saline daily for 10 days.

Penicillin has been said to be effective in the treatment of primary optic atrophy; but as this condition may progress slowly for five years before blindness ensues it is difficult so far to assess results: initial penicillin is advisable but full malaria treatment is essential.

Early asymptomatic neurosyphilis occurs as a meningovascular reaction in the secondary stage, when it is readily treatable: but the late form, occurring long after infection, often resists treatment and may terminate in general paresis. Penicillin is fully effective against the first type, and it is of value in treating the second, where the best method is first to give bismuth, which is followed by 4–5 million units of penicillin, and then by full malaria therapy.

Erb's paraplegia has unfortunately proved as resistant to penicillin as to other forms of treatment.

GENERAL PARALYSIS

Dr. W. D. **Nicol** reported, jointly with Dr. M. Whel experience of penicillin in 57 cases of neurosyphilis whom 42 were general paralytics. Of these, 14 treated with penicillin only, while the remainder re also malaria therapy. The patients given penicill were carefully selected: their physical condit poor, and the risk of malaria treatment high. T of penicillin was 300,000 units daily for 14 day of 4·2 mega units.

In the doses recommended above khellin is not toxic. The only fairly constant effect of its administration was a general sensation of warmth without actual flushing. One patient complained of vertigo and slight nausea which, however, soon disappeared. Control injections free from khellin were occasionally given to our patients to exclude any psychological effect. No relief was ever obtained with these injections. We wish to emphasise that the dose of khellin suitable for the asthmatic is much greater than that used for angina.

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SUPPURATIVE CONDITIONS OF THE BRAIN AND MENINGES

Sir **HUGH CAIRNS** said that with the early preparations of penicillin (50–100 units per mg.) it had been necessary to work out minimal effective doses; and these have to some extent survived, even though the present-day penicillin II, containing 1650 units per mg., is an almost pure crystalline preparation. Early successes were obtained with accessible infections such as pyæmia and septicæmia; later it was found that larger foci of infection, such as bacterial endocarditis and pyogenic meningitis with macroscopic areas of fibrino-purulent material, are less easily treated; foci flare up when the penicillin concentration falls below the bacteriostatic level. With gunshot wounds it is not enough to instil penicillin in the hope that infection will be quenched; all macroscopic areas of necrotic and infective material must be removed.

Penicillin in the cerebrospinal fluid (C.S.F.) must be assayed when a method of chemotherapy is being elaborated, or in the absence of expected improvement. It may be given by the lumbar or cisternal route, or into the lateral ventricle; unless there is blockage it will spread freely. Normally, 12,000 units will maintain a bacteriostatic level for 24 hours; but occasionally, for example early in the treatment of pyogenic meningitis, this dose may be given every 12 hours. The upper limit of tolerance for the crystalline penicillin has not yet been worked out; but heavy doses of 50,000–100,000 units may cause severe meningeal reactions. Such large doses can do no good and may do harm; and there is never occasion to exceed 20,000 units in one day. Intrathecal penicillin, if continued for some weeks, causes depression of the ankle-jerks, suggesting damage to the cauda equina; but this change is reversible.

Normally, penicillin is given by the lumbar route; if there is a block (of which the most important sign is difficulty in obtaining C.S.F. by lumbar puncture), then the cisternal approach may be adopted; but with head retraction this may not be easy, and blocks sometimes occur above the cisterna magna, so that there should be no hesitation about injecting into the lateral ventricle.

For pachymeningitis and subdural abscess penicillin is given into the subdural space, from which it passes about as rapidly as from muscle; usually 8000–10,000 units are injected every four hours.

Penicillin given systemically does not pass in appreciable amounts into the C.S.F. Nevertheless, systemic penicillin has its value in pyogenic meningitis, for these reasons: (1) it helps to combat the primary focus and the septicæmia from the primary focus or a relapsing meningitis; (2) it helps to overcome infection of the cerebral blood-vessels; and (3) it is probable, though not certain, that penicillin can pass from the blood-stream into the perivascular spaces of the brain, and it may thus be valuable in acute pyogenic meningitis (which is more correctly a meningo-encephalitis), also in limiting the spread of brain abscess. Penicillin appears to pass freely from the blood-stream into the subdural space, though here further evidence is needed.

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* A copy of The Nupercaine Handbook, Part II, Ciba Handbook No. 2, second edition, a 32 page survey of the special advantages of Nupercaine for surface, infiltration and regional anaesthesia, will be sent free to members of the Medical Profession on request.

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The interval since this series was treated has been too short for serological assessment. No Herxheimer reaction was observed in any case; results were best in patients who were mentally confused or physically in poor condition; and improvement during the actual course of treatment was remarkable, rendering some patients fit for subsequent malaria therapy. Penicillin failed, however, to save the lives of 1 patient with fulminating general paralysis and of 2 very advanced cases; so, in this respect, it is apparently no more successful than older forms of treatment. Penicillin will prove a useful adjunct to malaria, but the optimum dosage has yet to be determined.

Reviews of Books

Diseases of the Adrenals

LOUIS J. SOFFER, M.D., adjunct attending physician, Mount Sinai Hospital, New York. London: H. Kimpton. Pp. 304. 28*s.*

FOR some years the interest of physicians has been shifting from the attack to the defence—to the mechanism by which the constancy of the internal environment is maintained. Until recently knowledge of the adrenal glands was confined to that of Addison's disease, and little had been added to Addison's century-old description. Even now adrenal diseases may seem unimportant because they are so rare. Yet in the last 25 years a great deal has been learnt about the functions of the adrenals which closely concerns the practising physician and surgeon. Their place in the control of mineral metabolism and of water-balance would alone warrant this interest, but modern work has disclosed much about their relationship to shock, resistance to infection, and the response of the body to every form of insult.

This is the second book on the topic lately published, and it covers well the whole ground of adrenal physiology and pathology. Much smaller than Goldzieher's standard work, it bears comparison in accuracy and completeness, and by reason of its small size should perhaps prove even more useful to the general practitioner who tries to be up to date.

L'Électro-choc, et la psychophysiologie

JEAN DELAY, professeur agrégé à la Faculté de Médecine, Paris. Paris: Masson. Pp. 170. Frs. 230.

Professor Delay holds that since electrical convulsions benefit melancholia—and other mental syndromes—irrespective of the cause of the illness, they presumably act on the mechanism of the disorders and thus provide opportunity for further study of their pathology. The diencephalon, he believes, plays an important part in regulating instincts, mood, and consciousness: it is through action on the diencephalon that electrical convulsions bring about recovery from mental illness. The first part of the monograph deals with the relation of epilepsy to the diencephalon; Delay insists that the generalised classical convulsion (as opposed to the Jacksonian) is of diencephalic origin, and that the phenomena which have been observed to accompany the electrically induced fit are mainly such as excitation of the diencephalon could produce. The next section, on disorders of mood, similarly examines the controlling influence of the diencephalon, emphasising that it stands at the cross-roads of the extrapyramidal motor system and the endocrine system and is, by its connexions, peculiarly fitted to regulate the relation between emotion and intellect. In the final section, disorders of consciousness, which the author has previously investigated in his studies of memory, are likewise referred to the diencephalon: the obnubilation and the dreamlike condition found in twilight states are in Delay's experience remarkably responsive to electrical convulsive therapy. He reviews the evidence relating the diencephalon to sleep and waking, and concludes once more that in this group of confused cases it is through diencephalic excitation that the patient is aroused and restored to healthy vigilance. The extensive observations which the author and his collaborators have carried out on patients under convulsive treatment, and his skilful marshalling of the relevant data concerning the hypothalamus and its connexions and functions entitle his monograph to be regarded [illegible] valuable contribution, but it becomes evident repetition that he has stretched his thesis when the diencephalon is made accountable for much, it explains very little.

Skin Diseases in Children

(2nd ed.) GEORGE M. MACKEE, M.D., professor of dermatology and syphilology, New York Post-G Medical School, Columbia University, New York, ANTHONY C. CIPOLLARO, M.D., *associate in dermat* and syphilology at the school. London: Hamish Hamilton Medical Books. Pp. 448. 37*s.* 6*d.*

WHETHER or not a textbook on skin diseases confined to children is carrying specialisation too far is debatable: certainly many diseases cannot be presented in perspective. For example, it becomes irrelevant to say, that the commonest cause of rosacea is "the ingestion of stimulants, especially tea and alcohol." Dr. M remarks that children with acne feel inferior, humiliated, and sensitive; this is often true, but the usual reason is that the parents feel that a spotty-faced child is reflection on themselves—and do not conceal the feeling. The reader, coming to the statement that "faulty sex habits," whatever that may mean, "should be corrected" as part of the treatment of acne, will probably look back to make quite sure that the book really was published in 1946: actually no date of publication is given. This practice must be roundly condemned; no medical work of any sort should be published without a date. However, there is much valuable information in the book, and the sections on ringworm, congenital anomalies, and syphilis are particularly good.

Further Studies in Encephalography

E. GRAEME ROBERTSON, M.D., F.R.C.P., neurologist, Royal Melbourne Hospital and Children's Hospital, Melbourne. London: Macmillan. Pp. 103. 42*s.*

THIS short monograph is based on Dr. Graeme Robertson's investigations into the physics and radiology of encephalography. He observed that replacement of cerebrospinal fluid in the ventricles by gas introduced into the lumbar subarachnoid space was not achieved by flotation of the gas in the fluid alone. One of the factors responsible is elastic recoil of the brain, as a result of which gas can enter ventricular cavities which are at a lower level than the introduced gas. He therefore studied the passage of gas from the lumbar sac to the ventricles in living and dead subjects and in reconstructed models, and then applied his findings to altering the technique of radiology. Thus far his monograph is mainly of interest to the experts, but the illustration of his results will fascinate everyone. His radiographs of the pons and medulla, of the cerebellum, and of the third ventricle and its structures, including the infundibulum, are convincing and clearly valuable. Line diagrams with which he explains many of his plates might well have been extended to all.

The Irish Medical Directory and Hospital Year Book for 1946-47 (Dublin: Parkside Press, pp. 358, 15*s.* 6*d.*) fulfils the promise of its title and gives information about the doctors, hospitals, and public-health officers of all Ireland. It also contains an article on penicillin by Mr. Ian Fraser, surgeon to the Royal Victoria Hospital, Belfast, and a review of recent literature on the sulphonamides in surgery by Mr. William Doolin, editor of the *Irish Journal of Medical Science.*

Desirable Factors in Surgical Sutures, by Mr. E. J. Holder, B.PHARM. (obtainable from the author, 42, Lauder Road, Edinburgh, 9, pp. 56), deals chiefly with the effect of methods of preparation and of sterilisation on the durability and strength of catgut in the tissues. It seems careful work. The effects of chromic acid and iodine are clearly demonstrated. Like other investigators the author thinks that little is gained by using any but the thinnest strands of catgut. His conclusion that non-absorbable sutures cause considerable reaction in the tissues will be doubted by observers who have gone more carefully into the matter: the histological aspect must be taken into consideration as well as the naked-eye appearances on which alone he has relied. An interesting chapter on the chemical constitution of various types of catgut is included.

THE LANCET

LONDON: SATURDAY, APRIL 26, 1947

Food for Convalescence

EVERYONE is well aware that an acute illness, of whatever cause, will lead to loss of weight and strength; but the accompanying metabolic changes were not examined until recent years. It is now recognised that any acutely adverse circumstance, such as trauma, operation, hæmorrhage, or infection, is associated with an immediate outpouring of nitrogen in the urine, with the result that the patient passes into a phase of negative nitrogen balance. Though this tells us little more than we already knew, it shows that, partly at least, the weight-loss seen in acute illness is due to accelerated destruction of protein. From this little extra information new ideas have emerged which may improve the therapy of convalescence and lessen the risks of surgery.

As to the immediate origin of the excess of nitrogen which appears in urine after injury two views are held: (1) that it arises from an increase in katabolism of tissue protein or labile storage protein, and (2) that the tissues fail to utilise ingested protein and amino-acids. While both these sources may contribute to the total nitrogen loss, it is probable that destruction of endogenous protein is the more important. MADDEN and CLAY[1] have shown that a negative nitrogen balance develops in normally fed dogs in which a sterile abscess has been induced by the injection of turpentine, whereas in dogs whose labile protein stores have been depleted by a low protein intake such an abscess causes little or no increase in nitrogen loss. In both groups of animals the loss of protein can be made good by liberal protein feeding. CROFT and PETERS[2] suggest that the protein katabolic phase following trauma is a defensive response to injury, whereby protein is broken down in order to make available to the organism amino-acids essential for defence against the noxious agent at the height of its attack. In support of this hypothesis, they found that the addition of methionine to the diet of patients suffering from burns abolishes the negative nitrogen balance. LEVENSON et al.[3] have observed an early increase in the level of amino-acids in the plasma of burned patients, and attribute it to an increase in the rate of amino-acid production in the tissues. MAN et al.,[4] on the other hand, could see no correlation between the level of plasma amino-acids and the degree of nitrogen loss in patients after operation.

Whatever the fundamental cause and biological significance of the post-traumatic loss of protein, it is likely, if severe and long continued, to have certain harmful effects on the patient: apart from delaying recovery, it has been thought to diminish resistance to infection and to delay the healing of wounds. MAYCOCK et al.,[5] endeavouring to estimate the state of the circulation and cardiac output from the ballistocardiogram in patients before and after severe surgical operation, found that in patients who were kept in positive nitrogen balance by extra feeding the operation led to less disturbance of the circulation than in those who were losing protein: both objectively and subjectively, patients in whom protein destruction was compensated by extra feeding withstood surgery better than those in whom no special attempt was made to maintain nitrogen equilibrium. Similar findings are reported by KOOP et al.,[6] who draw attention, however, to the practical difficulty of getting the postoperative patient to take a high-protein diet. These workers tried to build up a high protein reserve by giving an excess of protein—if necessary as protein hydrolysate—for five days before operation, and they formed the impression that patients prepared for operation in this way did better than others

While the last word has not yet been said on protein metabolism in acute disease, and while we remain ignorant of the mechanisms involved in protein destruction, we cannot be certain that post-traumatic protein katabolism is in fact harmful enough to warrant inflicting unpalatable high-powered protein mixtures and digests on the sick. The work so far done has served, however, to focus attention on the dietetic aspect of hospital treatment, which has too often been overshadowed by the more dramatically urgent therapeutic measures which a given illness may necessitate. The organisation of hospital dietetics calls for a degree of integration and coordination of skills which is hard to achieve unless a positive effort is directed to a specific end. The work done in the Canadian army hospitals, which is reported elsewhere in this issue, illustrates the possible inadequacy of hospital diets, both for the severely ill and for the convalescent, and indicates the effort of organisation which is in fact necessary to ensure a daily intake of 2700–3500 calories with a protein ration of 100–170 grammes. In the hospitals of this country, no matter how complete the organisation for the dietetic care of patients may become, we have the additional difficulty of providing the dietetic machine with suitable material on which to work: as things now stand, it would be all but impossible to find a daily ration of 170 grammes of palatable protein for each patient who could be judged in need of it. Moreover, it can be difficult to induce convalescent patients to consume such diets, without recourse to force-feeding techniques. Again, it is one thing to see that protein is swallowed, but quite another to ensure that it is fully utilised; and for the invalid there is point in the Shakespearian toast "Now, Good Digestion wait on Appetite, and Health on both." None the less, the Canadian experience emphasises once more the deficiencies both in what we achieve and in what we attempt. Neither food shortages nor anything else excuse our hospitals from providing, to the best of their ability, the kind of food most likely to induce appetite and restore the patient's strength

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3. Levenson, S. M., Adams, M. A., Green, R. W., Lund, C. C, Taylor, F. H. L. *New Engl. J. Med* 1946, 235, 467.
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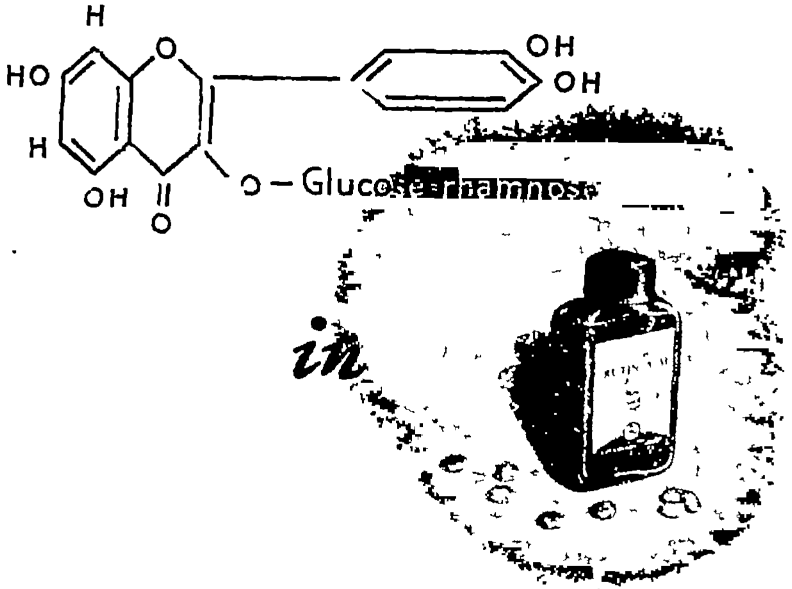

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THE LANCET

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Persistence of Smallpox Virus

IN former days, studies of the mode of spread of smallpox taught us much about the transmission of infectious disease in general. Such studies, made in the field, were chiefly observations on the natural course of events. At first, when smallpox was widespread, it was often difficult to discover how any particular person had acquired his infection; but when the incidence was reduced to a few sporadic cases, or to imported infections, the manner of spread became more frequently and more clearly evident. In this way we learnt that contagion, direct or indirect, was the ordinary means of transmission; and in outbreaks of variola minor in 1921 and 1925 J. J. BUTTERWORTH in Lancashire was able to find the source of infection of almost every patient. In major smallpox the striking distance seemed to be somewhat greater, and in some of the hæmorrhagic outbreaks there has been evidence of droplet infection. It became clear, too, that for a time the patient's body remains infective after death; in Hamilton, Ontario, for example, a number of people contracted the disease after attending the funeral of the mayor, who died from an unrecognised hæmorrhagic attack.

It was also fairly certain that smallpox infection could persist in the patient's bedding and clothing. This was shown by cases in disinfecting staffs handling fomites, and by outbreaks in laundries (as at Wallasey early this century) where it was found that ability to infect might even survive the process of washing. An even longer persistence of infection was assumed when smallpox broke out at Oldham, in mills where Egyptian cotton was spun, at a time when the disease was prevalent in Alexandria. The analogy of vaccinia virus, which resists dehydration by glycerin, led to a firm belief that the variola virus strongly resists drying. Actually, as long ago as the early 18th century, physicians in this country were familiar with a method of immunisation by dried crusts kept for the purpose by the Chinese—

> "who take the skins of some of the dried pustules which have fallen from the body, and put them into a porcelain bottle, stopping the mouth of it very closely with wax. When they have a mind to infect any one, they make up three or four of these skins (inserting between them one grain of musk) into a tent with cotton, which they put up the nostrils."[1]

Any doubts that may have remained about the viability of the virus will be finally dispelled by the laboratory experiments of Professor DOWNIE and Dr. DUMBELL which we publish this week. They find that virus from vesicle fluid will grow on the chorio-allantois of the chick after being kept in the dark for as long as 84 days: and even this is by no means the limit; for crusts from healing lesions, kept in the dark at room temperature, yielded virus after 417 days, and crusts kept in vacuo over calcium chloride were still infective after more than two years.

Evidently, therefore, unless they are properly disinfected, articles used by a smallpox patient may long remain capable of transmitting the disease. Indeed, in the light of DOWNIE and DUMBELL's findings, there is probably no further need to invoke aerial convection to explain the vagaries of smallpox spread. We now have an adequate explanation of recent cases in which smallpox has occurred in houses to which presents of leather goods, or the like, had been brought back from the East—the disease even being confined to the recipient of the present. Prudence, however, dictates that, before accepting such an explanation in any particular case all possible care should be taken to discover a human source of the infection who has been somehow overlooked.

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[1] Munk, W. The Gold-headed Cane, London, 1884.

Absorbable Hæmostatics

THE history of surgery is reflected in the development of the methods of hæmostasis. "The confidence gradually acquired from masterfulness in controlling hæmorrhage gives to the surgeon the calm which is so essential for clear thinking and orderly procedure at the operating-table."[1] It has been a long road from the pre-Hippocratic tenaculum to the modern artery forceps; and no less arduous a one from HEWSON's and JONES's classical experiments on the "coagulable lymph" of blood, dating from 1771, to our present understanding of the intricate biochemistry of hæmostasis.

Attempts to encourage clotting at the site of blood-vessel rupture have an extensive history. AMBROISE PARÉ dressed bleeding wounds with a mixture containing white of egg ("étoupe trempée dans une sorte de pâté faite de blanc d'œuf."[2]). PERTHES[3] applied defibrinated blood of the rabbit to the wound and injected it under the bleeding surface; BROCA[4] recommended local applications of human serum; others[5] favoured proteins, such as gelatin. These empirical techniques led up to the clearer conception of hæmostasis by locally applied absorbable agents which is developing today. Absorbable hæmostatics are intended for application to sites of hæmorrhage which cannot be readily controlled by a hæmostat and when the removal of mechanical pressure or a temporary plug may lead to recurrence of bleeding; when the hæmorrhage is arrested they are absorbed by the tissues. HARVEY CUSHING and VICTOR HORSLEY were the first to propose striated muscle for this purpose, and such "muscle-stamps" well illustrate the principles of an absorbable hæmostatic—they transmit pressure, contain clot-promoting substances, and are absorbed. They have been widely used in neurosurgery, but the risk of infection and the impossibility of sterilisation have limited their value. It was CUSHING also who pointed the way to the use of fibrin as an absorbable hæmostatic—". . . the fibrin from whipped blood might be so prepared that it could be immediately plastered on bleeding surfaces, just as cotton is now used, and thus obviate the necessity for any subsequent replacement."[6] There is little to add to this definition. An ideal absorbable hæmostatic must be as simple to use as cotton-wool or gauze; it must be absorbed at the right speed, so that neither replacement nor removal is necessary; it must be safe—i.e., sterilisable by recognised practical methods.

The late war stimulated many advances in this field. In close succession fibrin foam, oxidised cellulose, and gelatin sponge have been developed in America: calcium alginate in England. The American materials, used in conjunction with thrombin (and also without) have already proved their value. Experimentally they show much the same absorbability in tissue. Fibrin foam, the earliest material to reach the clinical stage, is absorbed from the liver, peritoneal cavity, abdominal wall, kidney and lung in about five weeks[7]; in animals only a minimal amount of fibrous tissue is found at the site of implantation after this time. Soon after the foam has been applied polymorphs invade the implant area, and a tissue reaction characterised by many mononuclears and a few lymphocytes is elicited. About three weeks after implantation there is a well-marked giant-cell reaction. But the tissue reaction produced is far less than to a "muscle-stamp" of the same size. The safety and efficacy of fibrin foam were established by extensive trials in neurosurgery, and experience gained in 240 general surgical operations, including some on hæmophiliacs, corroborated the earlier results at Harvard. Perhaps the sole drawback to fibrin foam is the slightly complicated method of use, involving the "mixing in" of freshly prepared thrombin; sterilisation also requires a special procedure.

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[3] Perthes, G. C. *Münch. med. Wschr.* 1905. Quoted by Lexer (ref. 5).
[4] Broca, *J. med. Chir.* 1907. Quoted by Lexer.
[5] Lexer, E. Chirurgie, Stuttgart, 1922.
[6] Cushing, H. *Ann. Surg.* 1911, 54, 1.

Oxidised cellulose (oxycellulose), developed by **Frantz** and her co-workers at Columbia University, New York, is prepared as a gauze and is easier to use than fibrin foam. The tissue reactions to the two are much the same. There is said to be an actual chemical combination between oxidised cellulose and hæmoglobin, and it seems best to apply it without thrombin. In staunching bleeding a sticky gelatinous mass forms, not a clot; this can be lifted away twenty-four hours later leaving a thin film of fluid between the material and the raw surface, without restarting the bleeding. Whereas fibrin foam can be applied in the presence of penicillin, oxidised cellulose inactivates the drug and is thus contra-indicated where penicillin is essential; it apparently delays bone repair and its sterilisation has to be effected by chemical methods. Clinical reports on well over 100 cases[8] have proved it to be efficacious in a variety of operative procedures. The third substance developed in the United States—gelatin sponge ('Gelfoam') is whipped or foamed gelatin. This is sterilisable by dry heat (autoclaving destroys its physical properties) and can be satisfactorily used with or without thrombin. It does not inactivate penicillin. **Jenkins** and **Clarke**[9] noted that there was sometimes a sharp inflammatory reaction to the sponge, which brought about its early liquefaction; where the early tissue response was slight the sponge became encapsulated by fibrous tissue and was subsequently removed by the phagocytosis of macrophages. After a clinical study in which gelatin sponge was used in 272 neurosurgical operations and fibrin foam in 115 similar cases, **Pilcher** and **Meacham**[10] preferred gelatin sponge, which was easier to apply; it can be cut with scissors and retains its tensile strength on wetting.

Hard on the heels of these American developments **Blaine** et al,[11] in England, have reported on yet another absorbable hæmostatic—calcium alginate—which is derived from Scottish seaweed and is increasingly utilised in British industry, to which must go the credit for its development. When sodium alginate solution reacts with a calcium salt coagulation immediately takes place, making it possible to prepare hæmostatic foams, filaments, cloth, gauze, wool, or a film resembling 'Cellophane' which can be prepared in situ. Calcium alginate can be autoclaved without serious loss of physical properties, and it can carry penicillin without inactivating it. Its versatility makes it easily adaptable for special purposes. Of the recently developed materials calcium alginate alone awaits clinical trial.

The absorption-rate of all these hæmostatics depends on their bulk and on the reaction of the tissue or organ in which they are placed. An experimental study of the effect of different pH levels in various sites of implantation might shed further light on absorption-rates; it would be of interest to establish graded absorption-rates best suited to diverse purposes. Apart from fibrin and thrombin, which play a direct part in blood-coagulation, they probably owe their hæmostatic effect to the great surface they offer to extravasated blood. Calcium alginate may also aid hæmostasis by enhancing prothrombin formation by releasing calcium.

Annotations

AN AMERICAN HOSPITAL SURVEY

The Michigan Hospital Survey,[1] undertaken as a pilot study of a single State, covers the whole range of hospital provision for urban and rural communities. While much of it goes over the same sort of ground as the recent hospital surveys in this country, the report does not always take the same line. For example, it recommends that the general hospital should not exceed 750 beds in size: "when an institution becomes too large, the administrative procedures of the service may become too impersonal and cumbersome, and this will be reflected in the quality of care given to the patient." As we said last week, we hope the regional boards will give due weight to this consideration when they come to set up their hospital management committees.

How many beds are needed in a given community? The Michigan surveyors reject the arbitrary method of assuming so many beds per thousand of the population, and have attempted what seems to be an entirely fresh approach to the problem. "It is now thought," they say, "that the number of general hospital beds for any community is directly proportioned to the crude birth and death rates." Hospital and vital statistics show that the public use about 250 days of general hospital care for each death and correlated sickness in a general hospital, and the number of beds needed can be deduced from an estimate of the number of deaths that will take place in hospital. The proportion of people dying in hospital is nearly 38% in Michigan, and as high as 50% in some other States. "We should strive," the survey suggests, "for an average level of hospitalisation whereby at least 50% of all deaths and correlated sickness occur in general hospitals, whilst some 8%–10% would occur in other types of hospitals and institutions." The surveyors evidently believe that, used with discretion, their "bed-death ratio" represents a real advance on

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7. Bailey, O. T., et al. *Surgery*, 1945, 18, 347.
8. Frantz, V. K. *Surg. Clin. N. Amer.* 1945, 25, 2.
9. Jenkins, H. P., Clarke, J. S. *Arch Surg., Chicago*, 1945, 51, 4.
10. Pilcher, C., Meacham, W. F. *Surg. Gynec. Obstet.* 1945, 81, 4.
11. Blaine, G., Dollar, J. M., Sorsby, A. *Trans. ophthal. Soc. U.K.* 1945, 64, 187; Blaine, G. *Lancet*, 1946, ii, 525; *Ann. Surg.* 1947, 125, 1; *Med. Pr.* (in the press).

[1] The survey was undertaken by the staff of the American Hospital Association's Commission on Hospital Care, with Dr. A. C. Bachmeyer as director of study. It was financed by the W. K. Kellogg Foundation, of Battle Creek, Michigan, which publishes the report.

existing methods of estimating needs, and it would be useful to the Ministry of Health if statisticians over here would work out its possible application in this country. Bed-occupancy rates are also discussed, in relation to hospitals of different sizes and different degrees of segregation: "the smaller communities need more beds per thousand people because they must depend on smaller hospitals." Nothing, however, is said about costs, beyond a casual observation that "if hospitals could be constructed at $8000 per bed, approximately $90 million would be required to provide all the first class general hospital facilities that the State now needs." When, one may ask, is the curve of hospital provision going to level out, if not begin to fall?

This Michigan report emphasises, as our own hospital surveys can scarcely be said to have done, the educational aspect of nursing, and its recommendations for training schools resemble those lately made in these columns.[2] Hospitals which conduct schools of nursing should, it says, maintain separate budgets for the hospital nursing service and the nursing school, and "the value of services rendered by student nurses should be reflected in the accounts as a charge against the hospital, and a credit to the school." The school must have adequate financial support, which can be drawn from "endowment income, tuition and fees, taxation, and payment to the school by the associated hospitals for the nursing service rendered to the patients." An integrated system of hospitals would make it possible for the nurses' training schools to develop their curricula to the point where they could provide students with a varied experience of nursing in the hospitals, in the medical service centres, and in the field of public health.

ANTIBIOTICS IN BILIARY DISEASE

CHEMOTHERAPEUTIC drugs which were active against the coli-typhoid organisms and were excreted and concentrated in the bile would have considerable value as a substitute for or adjunct to surgery in cholangitis, cholecystitis, and empyema of the gall-bladder, and they might cure those chronic typhoid carriers in whom the gall-bladder has proved to be the reservoir of the organism. The sulphonamides, penicillin, and streptomycin are excreted in the bile of healthy men and animals, but it does not necessarily follow that these substances will be similarly excreted if the liver or the biliary tract is diseased or functioning poorly. Thus, Zaslow et al.[3] have shown that where there is clinical or laboratory evidence of liver disease and dysfunction, excretion of penicillin and streptomycin in the bile may be absent or reduced, whereas if the biliary tract is returning to normal function after surgical drainage these drugs are excreted in the bile. These American workers agree with Mr. E. G. Tuckwell, who reported his findings at the Royal Society of Medicine on March 5, in finding that, with normal liver function, the level of penicillin is usually higher in the bile than that in the blood within the first 2 hours after parenteral injection, whereas streptomycin is usually less concentrated in bile than in blood and reaches its peak rather later than does penicillin. Indeed, Zaslow et al. suggest that a biliary level below 0·5 unit of penicillin per c.cm. after an intramuscular dose of 15,000 units, or below 1·5 units of streptomycin after the injection of 100,000 units, is an indication of impaired liver function.

These drugs may reach the gall-bladder bile either by aspiration through the cystic duct or by passage through the blood-vessels in the wall of the gall-bladder. Normally, as Tuckwell showed, penicillin is present in the gall-bladder bile and may reach higher levels there than in the hepatic ducts, probably through concentration of the bile by fluid absorption. However, when the cysti duct is obstructed, penicillin is not found in gall-bladde bile, showing that the drug enters the gall-bladde through the biliary ducts and not through the bloodstream. Thus, in a group of 25 patients who were t undergo cholecystectomy, Zaslow et al.[4] found n penicillin in the gall-bladder of 8 cases; in 7 of thes the cystic duct was obstructed by stones while in th eighth no penicillin was being excreted in the hepati ducts. Unfortunately, cholecystography, using th iodophthalein dyes, may not indicate correctly whethe the cystic duct is patent. In the group in which penicilli was present in the gall-bladder and 4–14 hours elapsed between administration of the drug and cholecystectomy, the findings showed that the drug was neither much concentrated nor rapidly absorbed or excreted. The same applied to streptomycin.

The prospect of cure by chemotherapy in acute or chronic infections of the biliary tract is therefore not very bright, since neither penicillin nor streptomycin, nor presumably sulphonamides, will be excreted in the bile in significant amount if there is intrahepatic or extrahepatic biliary disease. Moreover, concentration in the gall-bladder will depend on patency of the cystic duct, which cannot be relied on in the type of patients among whom chronic typhoid carriers are usually found.

BLOOD-PRESSURE AND AGE

A YEAR or two ago we suggested that "few would now rely on the old dictum that the normal systolic blood-pressure, expressed in mm. Hg equals 100 plus the patient's age expressed in years."[5] Now we have American workers expressing the opinion that "the old maxim '100 plus the age' may actually be a fair index of normal systolic blood-pressure."[6] This conclusion is based on a series of 5331 white men between the ages of 40 and 95, some of whom have previously been reported on.[7, 8]

Analysis of the average systolic and diastolic pressures showed that though both rise with increasing age, the rise in the former is much greater. Thus the average systolic pressure increased from 133·3 mm. Hg in the 40–44 age-group to 164 in the 85–95 group, while the corresponding figures for the diastolic pressure were 84·8 and 90. This change with age is shown even more clearly by a comparison of the proportion in each age-group with "normal" blood-pressure (145/95 or less), systolic hypertension (150 or more /95 or less), and diastolic hypertension (diastolic pressure of 96 or more). The percentage with "normal" blood-pressure fell progressively with age from 87·2 at 40–44 to 27·8 at 85–95, while there was an equally striking increase in the incidence of systolic hypertension—from 4·2% to 45·2%. The rise in incidence of diastolic hypertension was less marked—from 8·5% at 40–44 to 27% at 85–95. The trends of "normal" systolic and diastolic pressures showed a progressive rise: the systolic rose from 129·6 at 40–49 to 134·1 at 80–95, the corresponding diastolic figures being 80·9 and 74·5. With advancing years there was no significant change in the incidence of pressures of 120/80 or less, but there was a biggish rise in the frequency of systolic pressures between 140 and 149 (from 18·6% at 40–49 to 40·9% at 80–95). Diastolic pressures below 70 rose from 3·6% at 40–49 to 21·2% at 80–95. The fact that diastolic pressure tended to fall rather than rise as age increased is adduced in answer to any suggestion that the series is vitiated by the inclusion of people with latent or potential hypertension.

If, as these observations indicate, the systolic pressure rises with age, what is the mechanism? Two factors

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2. *Lancet*, Feb. 8, p. 227.
3. Zaslow, J., Counseller, V. S., Hellman, F. R. *Surg. Gynec. Obstet.* 1947, 84, 16.
4. *Ibid.* p. 140.
5. *Lancet*, 1943, ii, 549.
6. Russek, H. I., Rath, M. M., Zohman, B. L., Miller I. *Amer. Heart J.* 1946, 32, 468.
7. *Ibid*, 1943, 26, 11; see *Lancet*, 1943, ii, 549.
8. Miller, I. *N. Y. St. J. Med.* 1941, 41, 1631.

are probably involved—a neurogenic and a vascular. Russek and his associates [9, 10] have already shown that the reactibility of the blood-pressure, as judged by the cold pressor test, increases with age; and Dock [11] believes that this increase is related to trophic loss of neurones with ageing. The vascular factor, however, is probably more important, consisting of a progressive diminution of elasticity of the aorta and its larger branches. This change results in a higher systolic and lower diastolic pressure, whereas the neurogenic factor raises both systolic and diastolic. In other words, the neurogenic and vascular factors have a summating effect on the systolic pressure, but opposing effects on the diastolic pressure.

Two practical implications emerge from this study: (1) the upper limit of normality for the systolic pressure in the elderly must be accepted as considerably above 140 mm. Hg; and (2) in identifying essential hypertension emphasis must be laid on the diastolic rather than the systolic pressure. This latter view has been gaining ground in recent years; Hines,[12] for instance, suggested that only the diastolic pressure is of value in predicting the subsequent development of hypertension. It has also been generally accepted for many years that the prognosis in the elderly is much better with systolic hypertension than with diastolic hypertension. What is only now being elucidated is the "normal" blood-pressure for that increasingly large section of the community over the age of 50 years.

THE WHEELS TURN

THIRTEEN days at Geneva, from March 31 to April 12, were barely sufficient to dispatch the business of the third session of the Interim Commission of the World Health Organisation. The terminal scramble was partly due to the commission's failure to recognise that they had undertaken more than the secretariat could manage and partly to an inveterate tendency among some members to reopen questions already decided. Much good work, however, was done, and some important decisions taken in a most cordial atmosphere, to which the member from the U.S.S.R., Dr. C. A. Kolesnikov, was a notable contributor. As the chairman, Dr. A. Stampar, remarked in his closing speech, no serious differences of opinion were revealed and no voting was necessary. Of the 18 members 16 attended, Dr. I. Medved of the Ukraine and Dr. J. Togba of Liberia being unavoidably absent—the former because of his recent elevation to the post of minister of health. Sir Wilson Jameson was present during the first week of the session. Observers attended from the United Nations, F.A.O., the International Children's Fund, the International Refugee Organisation, the International Civil Aviation Organisation, the Paris Office, the Pan-American Sanitary Bureau, Unesco, and Unrra.

The most important task before the commission was to balance the budget, since the decisions taken at the second session last November [13] called for an excess of expenditure over income of some 300,000 dollars. By careful pruning this was achieved, even with the inclusion of some new items, except for a necessary reserve of 200,000 dollars, for which a further loan from the United Nations may be required. Among the new items an omission was repaired by providing for an expert committee on tuberculosis, and experts on child welfare and nutrition, venereal diseases, infant mortality, and influenza are to be appointed. The commission approved the allocations of funds for field services, derived from Unrra, according to the requests from countries for missions, fellowships, visiting lecturers, and medical literature, and also approved the agreements concluded with the governments of Greece and Ethiopia for field missions.

The commission did not see entirely eye to eye with the observer from Unesco, Mr. J. Needham, F.R.S., on the apparent encroachments of that body into the territory of health, but it was decided to set up a joint committee on the organisational level to define the boundaries. A joint committee on nutrition with F.A.O. will also be set up, to which the International Children's Fund may be conjoined. The negotiating subcommittee on relations with the Pan-American Sanitary Bureau reported considerable progress, which, as it failed to satisfy some members and went too far for others, was probably the best practicable mean.

Technical matters were chiefly dealt with by the committee on epidemiology and quarantine and by the new committee on priorities. Studies are to be undertaken by the secretariat on postvaccinal encephalitis, the "immune reaction" in vaccination, and immunisation against influenza. A meeting of a technical committee of the Interim Commission is now taking place in Cairo to consider revision of the clauses of the 1926 and 1938 conventions dealing with the Mecca pilgrimage, and on April 21 the expert committee on malaria met in Geneva. The expert committee on lists of causes of death and morbidity met in Ottawa last month.

If we look back over the twelve months since the technical preparatory committee met in Paris in March, 1946, the progress made is seen to be gratifying and unprecedented. A constitution for a World Health Organisation has been signed by 63 nations. An interim commission to carry on the urgent and statutory duties pertaining to world health has been working effectively for the past six months. The Paris Office, the Health Organisation of the League of Nations, and the Health Division of Unrra have been in practice absorbed, and their work carried on without serious interruption. Considerable progress has been made with the integration with the Pan-American Sanitary Bureau. Ten States-members of the United Nations and 3 non-members have ratified the constitution, and the progress reported of other ratifications is such that the necessary 26 will almost certainly be obtained before the end of the year.

A PIONEER OF SOCIAL DYNAMICS

ONE of the clearest and simplest formulations of Kurt Lewin, whose obituary we publish this week, was his distinction between the scientific concepts of Aristotle and Galileo. In dynamics Aristotle emphasised the nature of the object: he held that a stone fell to the ground because it was "earth" and had therefore to go towards the earth. Galileo, on the other hand, made physicists pay more attention to the object's relation to its environment. According to Aristotelian thought the environment played a part by "disturbing" the processes which follow from the nature of the object concerned; but in Galileian thought it is the concrete whole, which comprises the object *and* the situation, that determines the dynamics of the event defined: that is to say, an object is always in and part of its environment—an obvious notion but one with far-reaching implications if taken literally and always applied.

Its application to medicine is plain. We cannot isolate a person from his environment. When we examine an individual we are also examining a part of a genetic and a social field at the same time, if our ways of thought are thorough. When a patient comes to us our training leads us to see an object with an extension in time: it begins as a speck smaller than a pin's head, and ends some day as a life-size corpse. That speck grows by reason of forces in the cell and in the tissues in which it is embedded; that embryo, that child, develops through adolescence to adulthood and withers in old age: we see on examination at any one time a small slice in that

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9. Russek, H. I. *Amer. Heart J.* 1943, 26, 398.
10. — Zohman, B. L. *Ibid*, 1945, 29, 113.
11. Dock, W. *N. Y. St. J. Med.* 1945, 45, 983.
12. Hines, E. A. jun. *J. Amer. med. Ass.* 1940, 115, 271.
13. *Lancet*, 1946, ii, 799.

long history, but we also see one event which displays the interaction of forces within the organism and of those outside it—and knowledge of both are necessary for the understanding of that event before us, the patient in the *consulting-room.*

Our work requires that we "take a history," but in making our investigation, in so far as we use the methods of science, our mode of thought is a-historical: in other words, *we consider exhaustively what is happening here* and now, what is observable here and now, how we might by laboratory or other techniques extend our knowledge of the events occurring here and now. We do not, in so far as we are scientists, think of the patient as belonging to a "type," as Aristotle would have done, but as a product of forces operating in an interconnected set of fields, which (to use Lewin's term) is to employ a Galileian mode of thought. This does not deny us the right to use intuition, or "hunches," or any other process of thought, including a "feeling for" those historical developments which lead to present events; but the Galileian mode of approach does impel us to check our hunches a-historically—i.e., by the fullest observation of events occurring here and now.

The point of entry into a problem does not necessarily determine its point of emergence. As doctors we know this in our dealing with patients; they come to us for relief from pain (physical and mental), and that is our point of entry into their private world. Our treatment of them, however, is essentially an effort to improve their internal stability and external adaptability—which includes relief from the pain. Lewin applied the same principles to social problems. Here the point of entry was some symptom of social unrest, and from that starting-point he made a study of social dynamics with the aim of bringing about a stability in the social organisation he was advising. In yielding thus to the demands of "applied science" he did not feel that he was any the less a "pure scientist," for science is a method of thought and of testing ideas, and not an activity that can take place only in a region of social isolation. For Lewin, moreover, there could be no research without therapy, nor therapy without research, and his searching mind has given great help to those who try to assess the forces acting within the individual and within social groups.

DIETARY DEFICIENCIES IN HONG-KONG

THE period of the Japanese occupation was the blackest in the history of Hong-Kong; the exodus to the mainland and starvation with its attendant diseases reduced the population from its pre-war 1,500,000 to 500,000; many buildings were destroyed in the fighting in 1941 and later through bombing.

Dr. Selwyn-Clarke,[1] who remained on the island during the occupation as director of medical services, describes how most of the Europeans, Americans, and Indians were housed in Stanley internment camp. The 2500 *inmates included 40 doctors, 6 dentists, and 100 nurses,* so there was no shortage of trained medical staff. A hospital of 74 beds was set up at Tweedy Bay, but the extreme shortage of drugs and surgical material made the turnover very rapid. From the beginning the diet was poor, often consisting of half a pound of polished rice daily (sometimes deteriorating), with occasional beans, peanut-oil, and chrysanthemum leaves in place of green vegetables. Deficiency diseases soon appeared, the commonest being nutritional œdema (338 cases in 1942); this was closely followed by beriberi (the second commonest cause of death in Hong-Kong before the occupation), pellagra, and "central nerve blindness." The optic atrophy was an example of the "nutritional neuropathies" mentioned by Clarke and Sneddon[2] and others,[3] which also affected the tracts of the spinal cord, the peripheral and auditory nerves, and those supplying the vocal cords. This syndrome progressed from swelling round the ankles to weakness and paræsthesia of the limbs with difficulty in walking, seeing, and hearing. Lastly, the condition called "electric feet" was commonly seen, the sufferers finding that keeping their feet cool was the only effective treatment. The deficiency syndrome was *found in prisoners coming from all parts of the East,* but not in Europeans (however badly they were fed), though it was noted in Italian prisoners by Spillane and Scott[4] from the Near East, the common factor appearing to be a monotonous diet deficient in the vitamin-B complex. It responded poorly to vitamin therapy, suggesting that it is something more than a deficiency disease per se but is associated with an upset in carbohydrate metabolism and the formation of pyruvic acid. Harrison[5] has described a similar condition among Hong-Kong prisoners which he calls "painful feet"; this responded fairly well to vasodilators, suggesting that the immediate cause is vascular spasm.

Fehily,[6] who has compared the nutrition of Hong-Kong before and after the occupation, notes that signs of dietary deficiencies were unexpectedly mild when the island was reoccupied—in particular the widespread beriberi and pellagra foreseen did not materialise, though there were signs of general malnutrition. The relative freedom from gross deficiencies must have resulted mainly from the disappearance of highly milled rice and the necessity of eating whatever food was obtainable; in this one respect the Japanese occupation had a beneficial effect by breaking down many of the age-old food prejudices, some of which unfortunately tended to return when it again became possible to "corner" cereals or oranges and sell them at an exorbitant price. Nevertheless, thanks to the efforts of the relief workers, by a year after the liberation the infant mortality had fallen to 100 per 1000 live births, compared with the 327 per *1000 of 1940.*

THE ESKIMO'S TEETH

THE Eskimo was once held to be happily immune from the caries which ravages the teeth of other peoples; but he is immune no longer. In Greenland, it seems, we can study caries as a "new" disease, attacking a population with previously healthy teeth; and advantage has been taken of this opportunity by Dr. P. O. Pedersen, associate professor of dentistry at Copenhagen. Last week, speaking to the odontology section of the Royal Society of Medicine, he said that though caries is seen chiefly among the young, the older men and women, "whose teeth developed under Stone Age conditions," are not infrequently affected when they are brought into contact with civilised ways. The incidence is highest among those Eskimos employed by Europeans in the trading stations; thus at Julianehaab about 90% have one or more carious teeth. In East Greenland villages, where civilisation has made less headway, only about 5% are affected. The rise in incidence from nil, or almost nil (during the past fifty years in the west and still more recently in the east), has been associated with parallel changes in food habits. Formerly living on meat and fish, the Eskimo who adopts the white man's habits becomes a heavy consumer of carbohydrate; and "from whatever angle these principal results of the gigantic nutritional experiment forced upon the population of Greenland are surveyed it is beyond discussion that the natives who give up, more or less, the dietary habits of their ancestors and adopt white men's industrialised food are the ones who become afflicted with caries."

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1. Selwyn-Clarke, P. S. Report on Medical and Health Conditions in Hong-Kong for the Period Jan. 1, 1942, to August 31, 1945. H.M. Stationery Office 1946.
2. Clarke, C. A., Sneddon, I. B. *Lancet,* 1946, i, 734
3. Scott-MacGregor, R. G. *Ibid,* p. 852, Walters, J. H., et al. *Ibid,* Feb 8, p 205.
4. Spillane, J. D., Scott, G I. *Ibid,* 1945, ii, 261.
5. Harrison, G. F. *Ibid,* 1946, i, 961.
6. Fehily, L. *Brit. med. J.* Feb. 8, p. 320.

Some may be quick to draw their own conclusions; but Dr. Pedersen enjoins caution: "In my opinion we are not entitled to draw far-reaching conclusions from these studies as to whether the tooth structure or the carbohydrate factor plays the greater part. . . . I do not think either that field studies of this kind will definitely solve the caries problem. In all probability the final effort will have to depend on the pure experiment."

A VERSATILE REMEDY

AMPHETAMINE or β-phenyl-iso-propylamine, better known as 'Benzedrine,' has been put to many uses since it was introduced in 1935. It was first applied to the treatment of narcolepsy,[1] for which it has proved unfailingly successful.[2] Though popular in Britain, the drug has received still more attention abroad, particularly in the United States; and reports testify to its value in such diverse conditions as depression, fatigue, postural hypotension, alcoholism, postencephalitic parkinsonism, epilepsy, obesity, sea-sickness, and behaviour disorders of children. It was soon apparent that this sympathomimetic amine was a central nervous stimulant, producing delay in the desire for sleep and subjective improvement in mood; and since one of its side-effects is to decrease appetite it has naturally found favour in the treatment of obesity. It has also been commended as a remedy for the postalcoholic "hangover." In some disorders, however, its value is still imperfectly defined, as was shown by the correspondence following an account in these columns of its use in pulmonary tuberculosis.[3]

Amphetamine's place in the treatment of adult psychopaths was discussed last week before the Society for the Study of Addiction by Dr. Denis Hill and Dr. H. J. Shorvon. Bradley and Bowen,[4] and Cutts and Jasper[5] have shown that amphetamine improves emotional control in children with hyperkinesis, temper tantrums, and enuresis. Many of these have an abnormal electroencephalogram, characterised by excess theta rhythm; and Hill, postulating the same constitutional background, has treated with amphetamine adult aggressive psychopaths with a "theta-persistent" E.E.G. Among 8 patients studied for four years he has observed improvement in the predominantly aggressive, bad-tempered, intolerant, easily frustrated, irresponsible psychopaths who are yet capable of warm interpersonal relationships. The effect is particularly impressive in a smaller but well-defined subgroup of aggressive psychopaths with the stigmata of very deep sleep, late cessation of nocturnal enuresis, excessive or morbidly excitable sexual appetite, and immature E.E.G. Shorvon, unlike Hill, has also found the drug of value in some inadequate psychopaths. Both emphasise the amazing tolerance of the predominantly aggressive psychopath to large doses; even such amounts as 45–60 mg. daily do not disturb sleep; during treatment libido is reduced and tempers are better controlled. Hill makes the interesting suggestion that there may be a link between Myerson's[6] anhedonic neurosis, with its "diminution, even to the point of disappearance, of the satisfactions normally obtained from life's activities and loss or distortion of the appetites and desires," and the beneficial effect of amphetamine in reducing libido, appetite, and aggression—that is, "the appetitive drives." Mann and Quastel[7] have shown by in-vitro experiments that amphetamine stimulates by neutralising the inhibitory action of amines during cerebral respiration; the E.E.G. of the aggressive psychopath shows cerebral immaturity, and amphetamine may produce a more mature expression of the primary appetitive drives by its effect on cortical oxidation.

In the late war enormous quantities of amphetamine were supplied to the Allied Forces, mainly for use in emergencies when it might be necessary to diminish fatigue and to postpone sleep. At last week's meeting, Prof. R. C. Browne reported that, while it combated some of the deterioration in the anoxæmic airman's performance and had a statistically significant action on sleeplessness, it caused no consistent improvement in the fatigued pilot's performance; with it, skilled function was, if anything, rather less good. Dr. H. Crichton-Miller and Dr. G. R. Rudolf agreed that amphetamine's effectiveness against fatigue is enhanced by glucose; but Crichton-Miller's view that its main action "is associated with the mobilisation of blood-sugar" is not endorsed by other workers,[8] most of whom have found little or no rise in blood-sugar. Rudolf recommends that the glucose should be taken six or seven hours after amphetamine, to counteract the postponed fatigue.

With judicious use, signs of idiosyncrasy or other reactions are rarely seen. Acute hallucinosis[9] and a paranoid or toxic psychosis have very rarely been recorded after continued large doses; but most patients, such as narcoleptics and psychopaths, who take it continuously for years, display neither toxic signs nor increased tolerance. They can, moreover, discontinue the drug abruptly without craving or other withdrawal symptoms.

METHYL ALCOHOL POISONING

THE war in Norway provided ample opportunities for the clinical study of poisoning by methanol, and a monograph by Röe[10] is based on 82 cases treated in various hospitals in or near Oslo. Though methanol does not as a rule provoke acidosis in experimental animals, Röe's observations lead him to believe that in man the outcome in cases of poisoning hinges entirely on the degree of acidosis, and in treatment he puts much emphasis on bicarbonate. Another of his conclusions is that ethyl alcohol counters the effects of methanol: his case-records show that the patients who suffered least were those who had mixed their drinks. In this connexion he writes: "It has been ascertained that when methanol alone is consumed, the latent period for the appearance of signs of poisoning is from 12 to 24 hours, usually 18 hours. Prolongation of the latent period beyond 24 hours is always due to the consumption of ethyl alcohol." Also he has a tilt at the teaching that individual predisposition is a factor of great importance.

G.M.C. ELECTION

OWING to the death of Sir Kaye Le Fleming there is a vacancy on the General Medical Council for a direct representative of the medical profession in England. The following have offered themselves as candidates:

Dr. JAMES BROWN, of Birmingham, member of the council of the British Medical Association.

Dr. J. E. OUTHWAITE, of Leeds, barrister-at-law, who stood at the election last June as a nominee of the Medical Practitioners Union.

Dr. ISAAC ROSE, of Leeds, medical officer at St. Helen Municipal Hospital.

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Dr. P. S. Selwyn-Clarke, director of medical services, Hong-Kong, since 1938, has been appointed governor and commander-in-chief of the Seychelles. He has been a member of the executive and legislative councils of Hong-Kong.

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Special Articles

NEW CONCEPTS OF HOSPITAL FEEDING

HOSPITAL NUTRITION PROGRAMME OF THE CANADIAN ARMY OVERSEAS

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ADVISERS IN NUTRITION TO THE CANADIAN ARMY OVERSEAS, 1942–46 *

DURING the late war the Canadian Army Overseas undertook an extensive programme based on the results of recent investigations of metabolism in injury and disease and designed to provide adequate nutrition for patients in its hospitals in the United Kingdom and Europe. This programme, outlined here, can be applied to civilian as well as military medicine.

The need for such a nutritional programme in hospitals was made obvious by the frequency with which weight-loss, representing tissue destruction, had been observed after injury and in disease (Taylor et al. 1943a, Elman 1944, Lund and Levenson 1945). Surveys of weight changes in military patients in hospital revealed that losses of 10–60 lb. were common (Lyons 1943, Stevenson et al. 1945a and b, 1946). Loss of weight in hospital patients is so common that it is usually considered an inevitable and unimportant accompaniment of injury and disease. However, recent investigations of metabolism following injury and in disease have shown that this loss of weight is due to malnutrition, which may seriously interfere with recovery; it is therefore neither inevitable nor unimportant.

BASIS OF NUTRITION PROGRAMME

Protein metabolism is disturbed after fractures, burns, infarctions, surgical operations, wounds, and various infections with or without fever (Cuthbertson 1942, Taylor et al. 1943b, Browne et al. 1944a and b, Peters 1944, Stevenson et al. 1945a, Grossman et al. 1945. There is increased catabolism of body protein, with excretion of large quantities of nitrogen in the urine, followed, after a variable period, by a tendency to increased anabolism of protein and replenishment of lost tissue. The first period of breakdown of protein tissue has been called by Browne et al. (1944b), Stevenson et al. (1945a) the protein catabolic period, and the second period of rebuilding of body protein tissue the protein anabolic period.

The loss of protein in the catabolic period cannot be explained by local-tissue destruction at the site of the pathological process, or even by loss of protein in its vicinity—e.g., muscular atrophy in a fractured limb (Cuthbertson 1942, Howard et al. 1944, Howard 1945). The catabolism of protein is increased throughout the body.

The increased catabolism of protein usually begins immediately after the onset of the damage, reaches its maximum during the first week, and, though gradually declining, persists for several weeks in serious injuries, when the patient gradually passes into the protein anabolic period. With moderate or severe injuries the duration and intensity of the protein catabolism are sufficient to cause appreciable weight-loss. Thus, in six cases of fracture the average total loss of protein amounted to 1400 g., equivalent to a loss of about 15 lb. of protein tissue (Howard et al. 1944).

The significance of the increased protein catabolism following damage is unknown. It is generally assumed that it is part of the response of the organism to damage and fulfils some useful purpose. It seems probable that the increased breakdown of protein makes available to the organism amino-acids and glucose, which may be useful in tissue repair or in furnishing energy for the body at a time when intake of food is apt to be low. There seems to be no reason to doubt that the significance of the subsequent anabolic period is replacement of body protein lost in the catabolic period.

Regardless of the significance of the increased catabolism of protein following damage, there is evidence that it may have deleterious effects, particularly if replenishment of tissue protein in the subsequent anabolic period is prevented or delayed by a low food intake, leading to loss of weight, involving protein tissues, such as liver and muscle, and to weakness. In some instances the loss of protein is further increased through transudates and exudates, as in burns, chest or bowel lesions, and any draining wounds (Taylor et al. 1943a, Hirshfeld et al. 1944, Co Tui et al. 1945, Lund and Levenson 1945). It is obvious that the greater the loss of weight and weakness the longer will be the convalescence, if death from inanition does not intervene (Elman 1944). There is also evidence that depletion of protein may interfere with wound healing and resistance to infection, and predispose to disturbances of gastro-intestinal function, liver damage, and shock (Mulholland et al. 1943b, Whipple and Madden 1944, Cannon 1945, Lund and Levenson 1945).

The obvious method of preventing or correcting depletion of protein in cases following damage and during convalescence is to increase the protein intake. At the same time the caloric intake must be increased; otherwise protein will be used to furnish energy, for energy requirements are known to be increased after damage. Daily intakes of 3500–4000 calories and 130 g. or more of protein are often required to prevent or correct rapidly the protein depletion (Mulholland et al. 1943a, Taylor 1944, Browne et al. 1944b, Stevenson et al. 1945a, Lund and Levenson 1945), even though the patient is confined to bed; and a daily intake of 2700 calories and 100 g. of protein should be regarded as the *minimum* required by convalescent patients.

These levels can be reached only by attention to all details necessary to ensure attractive and palatable meals of high nutritive value and by the use of supplementary feeds. Intravenous protein hydrolysates or tube feeding may be required in some cases. Though anorexia may make administration of a high diet difficult at first, feeding at a high level for a few days often leads to improvement in appetite (Elman and Akin 1945, Stevenson et al. 1945a).

If patients are fed at this level the net loss of protein from the body in the catabolic period may sometimes be reduced, and certainly restoration of body protein proceeds more rapidly in the anabolic period. Weight-losses, involving vital protein tissues, and associated weakness are thus prevented or reduced, and convalescence is shortened; there may also be a favourable effect on other consequences of protein depletion, such as delayed wound healing and lowered resistance to infection.

THE NUTRITION PROGRAMME

The nutrition programme, undertaken in hospitals of the Canadian Army Overseas, may be divided into four parts: (1) general educational measures; (2) surveys of food intakes of patients; (3) rules for three-meal diets, to obtain daily intakes of 100 g. of protein and 2700 calories; and (4) use of supplementary feeds to raise the total daily intake to any level necessary up to 130–170 g. of protein and 3200–3800 calories.

General Educational Measures.—Detailed information about the scientific basis of the programme, as outlined above, was disseminated among all medical officers, dietitians, and other hospital personnel by lectures, conferences, circular letters, and pamphlets. In this way a thorough understanding of the need for the programme was provided, and its importance, as part of the medical care of the patient, was emphasised.

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* This appointment was held by E. H. B. in 1942–45 and by J. A. F. S. in 1945–46.

Surveys of Food Intakes of Patients.—To determine quantitatively the level of food intake of patients and the extent to which this must be increased to be adequate, surveys were made in three Canadian Army hospitals in the United Kingdom (X, Y, and Z), chosen at random. Convalescent surgical patients, free from gastro-intestinal disturbances and receiving ordinary diets, were chosen at random in each hospital. The foods offered to each of these patients at meals, and those portions returned uneaten, were weighed over a three-day period. The plates served were chosen at random so that the servings would represent those usually given by the nursing sister. The patients kept accurate lists of the food they ate between meals, such as supplementary feeds, canteen purchases, and items of parcels sent from Canada.

From these observations the protein, fat, carbohydrate, and calorie value of the food eaten each day by each patient was calculated with the tables of McCance and Widdowson (1942).

The average daily intakes of protein and calories of each patient, of each hospital group, and of the group as a whole are shown in table I. The results are broken down to show (A) the amount eaten from the three meals, (B) the amount eaten from supplementary (between-meal) feeds supplied by the hospital, (C) the total amount eaten from hospital sources (A+B), (D) the amount eaten from personal sources (not supplied by the hospital), and (E) the total amount eaten during the day (C+D).

The average results of the individual hospital groups, and of the group as a whole, indicated that feeding of patients in Canadian general hospitals in the United Kingdom was adequate, if judged on the basis of the nutritional requirements generally accepted until that time. It may also be said that the results compared very favourably with those of surveys carried out in civilian and military hospitals in Great Britain and North America (King Edward's Hospital Fund for London 1943, Stevenson et al. 1945b). However, satisfactory as the results were in this regard, they fell far short of what is now considered optimal for these patients and were even below the minimal requirement of 2700 calories and 100 g. of protein per day.

TABLE I—DAILY INTAKES OF CONVALESCENT SURGICAL PATIENTS RECEIVING ORDINARY DIETS

Case	A		B		C		D		E	
	Meals		Supplements		Hosp. total		Extras		Grand total	
	Pr.	Cals.	Pr.	Cals.	Pr.	Cals.	Pr.	Cals.	Pr.	Cals.
Hosp. X:	(g.)		(g.)		(g.)		(g.)		(g.)	
1 ..	77	2059	19	428	96	2487	5	310	101	2797
2 ..	84	2102	17	446	101	2548	8	611	109	3159
3 ..	67	1860	20	560	87	2420	9	772	96	3193
4 ..	81	2191	35	838	116	3029	12	564	128	3593
5 ..	25	832	28	570	53	1402	—	—	53	1402
6 ..	74	2028	17	537	91	2565	3	175	94	2740
7 ..	63	1599	18	472	81	2071	6	430	87	2501
8 ..	64	1653	18	471	82	2123	6	382	88	2505
Average ..	67	1791	21	540	88	2331	6	406	94	2736
Hosp. Y:										
1 ..	73	1993	5	115	78	2108	—	—	78	2108
2 ..	75	1956	12	268	87	2224	1	32	88	2256
3 ..	60	2080	13	267	73	2347	1	32	74	2379
4 ..	89	2545	14	306	103	2851	4	257	107	3108
5 ..	84	2527	13	267	97	2794	1	52	98	2846
6 ..	56	1711	17	370	73	2081	3	377	76	2456
7 ..	60	1772	16	462	76	2234	22	740	98	2974
Average ..	71	2083	13	294	84	2377	5	213	88	2590
Hosp. Z:										
1 ..	28	1002	17	378	45	1380	1	32	46	1412
2 ..	82	2312	13	250	95	2562	15	1197	110	3759
3 ..	89	2603	—	15	89	2618	—	—	89	2618
4 ..	64	1773	1	30	65	1803	5	288	70	2091
5 ..	75	2338	12	256	87	2594	17	661	104	3255
6 ..	72	1990	13	559	84	2549	3	150	87	2699
7 ..	49	1503	—	15	49	1518	3	175	52	1693
8 ..	80	2274	13	570	93	2844	2	66	95	2910
9 ..	87	2483	9	250	96	2733	2	295	98	3028
10 ..	67	2211	—	—	67	2211	—	—	67	2211
Average ..	69	2049	8	232	77	2281	5	286	82	2568
Average of three hospitals ..	69	1976	14	348	83	2324	5	304	88	2628

Pr.=proteins; Cals.=calories. A, B, C, D, E, see text.

TABLE II—DAILY INTAKES OF TWO CONVALESCENT SURGICAL PATIENTS ON SPECIAL HIGH DIETS

Case	A		B		C		D		E	
	Meals		Supplements		Hosp. total		Extras		Grand total	
	Pr.	Cals.	Pr.	Cals.	Pr.	Cals.	Pr.	Cals.	Pr.	Cals.
	(g.)		(g.)		(g.)		(g.)		(g.)	
1	65	2097	17	338	82	2435	4	255	86	2690
2	56	1882	7	162	63	2044	4	213	67	2257

The figures for individual intakes emphasised the lack of nutritional care of the individual patient. Only one of the patients (case 4, hospital X) had an intake approaching that now recognised as optimal. In many instances the intakes were below even the older standards of food requirements.

The average daily intake derived from the three meals for the group as a whole amounted to 69 g. of protein and 1976 calories only. Experience with high diets has shown that the desired intakes cannot readily be attained, even with special supplementary feeds, unless the three meals alone supply at least 100 g. of protein and 2700 calories daily.

The average daily intake derived from supplementary (between-meal) feeds for the group as a whole amounted to 14 g. of protein and 348 calories only. This is much lower than can be obtained by the properly regulated use of special supplementary feeds.

These data concern patients on ordinary diets only, but no better results were being achieved with patients for whom special "high" diets had been ordered. Thus, the food intake of two such patients, shown in table II, was much less than the prescribed diet, and in case 2 was less than the average intake of patients on ordinary diet. In fact, in this case the prescription of a high-protein low-fat diet led to the consumption by the patient of 67 g. of protein and 90 g. of fat a day!

The most serious and most common fault revealed by these investigations was the low food intake of most hospital patients, *even when well along in convalescence.* At this time, when a good appetite was the rule and the protein anabolic tendency predominated, the food intake was often so low, owing to poor quality, quantity, variety, preparation, and serving of food, and lack of education of the patient with regard to his nutritional requirements, that there could be no expectation that the protein deficit of the catabolic period would be rapidly replenished.

It was concluded from these surveys that steps must be taken to increase the protein and calorie intakes from the three meals, and to provide special high-protein high-calorie supplementary feeds, with detailed instructions concerning their use, if intakes of about 130–170 g. of protein and 3200–3800 calories were to be achieved where such levels were necessary to prevent or correct weight-loss.

The report of these surveys was distributed to all Canadian Army hospitals overseas. At the same time detailed instructions were issued about the means by which adequate food intakes of patients could be attained. These instructions were divided into two parts: those relating to the three meals, and those relating to supplementary feeds.

Rules for Three-meal Diets.—To obtain daily intakes of 100 g. of protein and 2700 calories from the three meals alone, the following instructions were issued:

(1) *Provision of diets:* the dietitian will provide ordinary diets planned so that the three meals will contain at least 100 g. of protein and 2700 calories a day.

Protein and calorie intake will be further increased, when necessary, by special supplementary feeds and not by changing the content of the three meals. High diets will therefore consist of these improved three meals of the ordinary diet plus special supplementary feeds served between meals.

Most of the items now served as supplementary feeds are to be included in the meals. Specifically, milk should be served as the beverage with meals rather than between meals. The between-meal periods will then be left free for special high-protein high-calorie supplementary feeds.

However, patients already at ideal weight, not seriously ill or injured, and therefore not requiring special supplementary feeds, may be given ordinary between-meal feeds, such as tea, cocoa, biscuits, and fruit juices.

(2) *Serving in wards:* dietitians will demonstrate to the nursing sisters the proper quantities per helping of each food to provide each patient with at least 100 g. of protein and 2700 calories in the three meals each day.

(3) *Supervision of feeding of patients:* no improvement in food intakes can be accomplished unless the doctor assumes his responsibility for the nutrition of his patients.

The doctor should personally explain to each patient the necessity of eating all the food offered him, and tell him that his failure to do so only prolongs his convalescence. Most patients think that, because they are in bed, their food requirements are small, whereas usually the opposite is true; this must be explained to the patient.

The doctor should visit his wards at mealtimes often, to observe the serving and consumption of the meals. Special attention should be paid to the amount of food left by the patient, and the causes of failure to eat all the food offered should be determined and eliminated.

Feeding problems should be discussed by the medical officer with the dietitian, nursing sister, and senior cook.

It is the special responsibility of the officers in charge of the medical and surgical divisions to ensure that their ward medical officers are fully aware of the importance of this nutritional supervision.

The level of food intake required in any case is judged on the basis of the severity of the injury or illness, and the maintenance or restoration of ideal weight. Changes in weight and tissue mass are best measured by regular weighing of the patient. In the many cases where this is impossible the nutrition can be fairly accurately judged by observation of the general appearance of the patient, the tenseness of the skin over the underlying tissues, the tightness of plaster-casts, or measurements of limb circumferences.

The success of this programme to improve the nutrition of patients depends entirely on the support it receives from the doctors; the desired increase in food intakes cannot be effected merely by sending more food from the kitchen to the wards, or by the haphazard ordering of supplementary feeds or special diets.

(4) *Responsibilities of nursing sisters:* attention must be paid to supervision of food intakes. Plate wastage must not be ignored or eliminated by reducing the amount served, but should be overcome by determining and correcting the cause—e.g., failure to report to the dietitian individual food dislikes of the seriously ill patient, failure to provide feeding aids and other assistance to patients unable to feed themselves easily, and delay in serving owing to poor discipline of ward help.

Use of supplementary feeds to raise the total daily intake to any level necessary up to 130–170 g. of protein and 3200–3800 calories.—In investigations of nutrition in convalescence carried out for the associate committee on Army medical research of the National Research Council of Canada, supplementary feeds composed of milk, milk powders, ice-cream, eggs, and flavourings had been found most useful in attaining high food intakes (Stevenson et al. 1945a). In view of the scarcity of these foodstuffs in the United Kingdom and Europe the Canadian Army in Canada and the Canadian National Research Council developed a powdered high-protein milk-shake mix and syrup flavourings suitable for shipment and use overseas (Stevenson et al. 1946). This powdered mix, obtained from milk, had the following food value per oz.:

Calories	123
Protein	9·0 g.
Fat	4·0 g.
Carbohydrate	12·7 g.

Five syrup flavourings (chocolate, vanilla, maple, strawberry, and pineapple) were provided. When reconstituted in the proportions of 4 oz. of powdered mix, 12 oz. of water, and 1 oz. of flavouring, the product had a volume of 16 oz. and furnished 36 g. of protein and 570 calories.† (The ordinary egg nog made with two eggs provides about 20 g. of protein and 200 calories only.) The powder was easily reconstituted with water, in bulk quantities if necessary, and, after refrigeration for at least an hour, yielded a very palatable drink. Flavourings were varied each day to avoid monotony. Further dilution with water usually overcame the objection of the occasional patient who found the regular recipe too rich.

The indication for the therapeutic use of the milk-shakes as supplementary feeds was a food requirement exceeding that supplied by the three meals. With the three meals providing a daily intake of at least 100 g. of protein and 2700 calories the total intake could readily be raised to about 170 g. of protein and 3800 calories by the use of 32 fluid oz. of reconstituted milk-shake. Clinical trial demonstrated that it was best to divide this into two feeds of 8 oz. each, given in the mid-morning and mid-afternoon, and one of 16 oz. given at bedtime.

These feeds were also very satisfactory as one of the major items in liquid diets. For this purpose they were often given in a more dilute form. They were also well suited to tube feeding.

CATERING PROGRAMME

It is useless to make demands for improved feeding of patients unless the catering organisation and equipment of the hospital are first made adequate to meet those demands. The nutritional programme described above was preceded and accompanied by a catering programme under the direction of the chief inspector of catering and the adviser in nutrition of the Canadian Army Overseas. The catering programme, which had been begun in early 1943, included the clarification of the duties and responsibilities of all hospital personnel concerned with the feeding of patients; the selection, training, and qualification of cooks; the provision, organisation, and discipline of kitchen help; the planning of menus; the standardisation and proper supervision of methods of storage, preparation, transport, and serving of food; the construction of kitchens; and the provision of kitchen, transport, and serving equipment. The main object of this catering programme was to ensure the provision of meals not only adequate in amount but also palatable and attractively served.‡

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† A mixture of about the same composition can be prepared by mixing high-quality spray-dried skimmed-milk powder and fresh whole milk in suitable proportions, and adding flavouring to taste. Care must be taken in the selection of suitable skimmed-milk powder preparations and flavourings; products of inferior grade produce an unpalatable drink. Feeds could not be prepared on any large scale overseas during the war in this way, because supplies of these commodities were not available in the quantities required.

‡ *Civilian hospital catering* in U.K. was made the subject of a study in 1945 by the committee on hospital diet of the King Edward's Hospital Fund for London.

Each hospital carried on its staff a lieutenant-dietitian who was a university graduate and met the qualifications of the Canadian Dietetic Association. As the officer in charge of the patients' kitchen, she was responsible for drawing up menus, ordering foodstuffs from the steward, supervising their preparation, transport, and serving, and for the administration and further training of cooks. The dietitian must have full authority in all these fields if the catering is to be efficient. She must also have direct contact with patients, doctors, nurses, and the administrative head of the hospital. The importance of a well-trained and experienced dietitian, alive to the fact that patients must be "sold" their food in the same way as restaurant customers, and with complete authority over catering for patients, cannot be too strongly emphasised.

In most hospitals maintenance of a low cost of food and catering is regarded as a sign of efficiency. This attitude, which was prevalent in the Canadian Army as elsewhere, is not compatible with a high standard of medical care. Every effort was therefore made to substitute for it the concept that efficiency should be judged on the basis of the provision of adequate nutritional care for the patients.

The value of such a catering programme, under the supervision of an experienced caterer and a medical nutritionist, can be demonstrated by comparing the results of surveys of food intakes of patients reported here with the results of those made in military hospitals in Canada (Stevenson et al. 1945b). The overseas surveys reported here were done after the catering programme was well under way, whereas no special emphasis had been laid on hospital catering in Canada before the surveys conducted there. Though rations in Canada were much more liberal, both in quantity and variety, than those available in the United Kingdom, the food intakes in Canadian Army hospitals in Canada were actually lower than food intakes in Canadian Army hospitals in Britain. Thus, in Canada the average daily intake from hospital sources amounted to 64 g. of protein and 2064 calories (Stevenson et al. 1945b),[§] whereas the corresponding figures for the United Kingdom were 83 g. of protein and 2324 calories (table I).

SUMMARY

An outline is given of the nutritional programme undertaken in the hospitals of the Canadian Army Overseas during the late war.

The purpose of this programme was to raise the standard of nutritional care of patients to that considered optimal in the light of recent investigations of metabolism in injury and disease.

The scientific basis of the programme, the results of surveys of food intakes of patients, the measures used to attain the standards required, and the associated catering programme are described.

The investigations revealed that the food intake of most hospital patients was far too low, even when patients had recovered sufficiently to regain their appetite.

It seemed necessary to increase the protein and calorie intakes from the main meals, and to provide supplementary feeds of high-protein and high-calorie content, such as the milk-shakes described.

The value of similar programmes in most civilian hospitals is obvious, but they require supervision by an experienced caterer and a medical nutritionist, and involve a reorientation and reorganisation of the professional and technical staff of the hospital, in so far as the feeding of patients is concerned.

[§] A second survey of food intakes in Canadian Army hospitals in Canada, done nine months later, following implementation of an intensive nutritional and catering programme, showed a well-marked improvement (Stevenson et al. 1946).

References at foot of next column

Medicine and the Law

A Name Misheard

THE newspapers have lately described a case in which confusion between the words "procaine" and "cocaine" led to a fatal accident and raised questions of liability for negligence. Mr. Justice Hilbery dealt with the facts in deciding the case of Collins *v.* Hertfordshire County Council and King last month. The circumstances, he said, were so extraordinary that he could not believe they were ever likely to occur again. Hospital managements, it may be added, will be alert to see that they do not.

A patient entered the Wellhouse Hospital at Barnet for an operation on his jaw. Arranging to give an injection before operating, the surgeon telephoned an instruction to have ready 100 ml. of 1% procaine and 1/200,000 adrenaline. The message was taken by a student (not then qualified) acting as student house-surgeon; she misheard the instruction and asked the hospital pharmacist to prepare a solution containing 1% cocaine. The operating surgeon injected 80 ml. of this solution—some four times the lethal dose—and the patient died. The widow claimed damages both from the county council (as the owners of the hospital) and from the surgeon who gave the injection.

The defendant surgeon stated in evidence that he himself always called the drug "procaine." The term 'Novocain,' adopted by German manufacturers as its trade name, had been commonly employed; but at the beginning of the late war the medical profession had been asked not to use it. He had never known of cocaine being given by injection, and he had no idea that he had injected it. He could not understand an experienced pharmacist dispensing so large a quantity of a dangerous drug; the amount of adrenaline was unusual, and the pharmacist should have queried it. The regulations, said the surgeon, require that dangerous drugs be dispensed only on the written instructions of a qualified medical practitioner; the pharmacist had dispensed this solution to an unqualified person without referring the matter back to himself or insisting on the signature of a qualified practitioner.

The judge found that the surgeon who gave the instructions by telephone and who made the injection was negligent. The surgeon had expected the student house-surgeon who took the message to use her knowledge and reason and to apply her mind to what he was saying; but still the surgeon himself was responsible for not making sure that he was getting what he had ordered. The student house-surgeon, continued the judge, was

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negligent; she knew that the solution was required for an injection and she knew that the solution as prepared was lethal; she had not used reasonable skill or care. Further, the pharmacist was negligent. He had accepted an oral demand for an exceptional dosage of cocaine and adrenaline for injection and had not required the order to be initialled by a qualified person; he had not checked the demand with the surgeon; and he had disregarded all the prescribed safeguards, including the cautionary instruction in the *British Pharmacopœia* that when an unusually large dose of a drug appears to have been prescribed the pharmacist or dispenser should satisfy himself that the prescriber's intention has been correctly interpreted. Finally the judge found the hospital responsible. It was liable for the negligence of its two employees (the student house-surgeon and the pharmacist), and it had failed to establish a proper system and to insist upon obedience to the rules about dangerous drugs. "If the hospital had had a proper system, this solution could not have arrived at the operating-theatre, let alone the body of the unfortunate patient." The judge awarded £2500 damages and directed that payment be borne equally by the county council (as owners of the hospital) and the surgeon.

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WEEK ENDED APRIL 12

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Deaths.—In 126 great towns there were no deaths from enteric fever or scarlet fever, 1 (0) from diphtheria, 12 (1) from measles, 26 (4) from whooping-cough, 85 (14) from diarrhœa and enteritis under two years, and

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33 (7) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 246 (corresponding to a rate of 23 per thousand total births), including 35 in London.

Parliament

ON THE FLOOR OF THE HOUSE

THE Chancellor's Budget was in some ways better than was expected, and the income-tax concessions are of value to many people. The solar-plexus blow of the increase in the duty on tobacco took Members' breath away, but one financial authority was heard to mutter—not loud enough to get into *Hansard*—that the income-tax concessions would just about pay his tobacco and cigarette account. We shall have to wait a year to find out how many people in fact will reduce their consumption. Smoking increased sharply during the war, and the psychology of the war years has not changed back to normal. The Chancellor hopes that smokers will cut down their consumption by a quarter. But psychological estimates are not made so accurately as financial ones, and if he is wrong we shall increase the proportion of our income we spend on tobacco and save no dollars. To save dollars is the Chancellor's professed aim, and many Members are asking, in the lobbies, if not in the House, whether it would not have been simpler to cut down tobacco imports by a half or a quarter, and (if practicable without undue waste of man-power) ration cigarettes and tobacco just as we ration sweets. The severe winter has made it even more important to save dollars; for many sheep and cattle have died, many clamps of potatoes have been destroyed, the sowing season was postponed, and our food-supplies not only for next winter but for 1949 are seriously depleted. If we spend too many dollars on tobacco—and incidentally on American films—we shall not have enough to buy food in dollar markets. There is need of the greatest care and economy to avoid actual food shortage in the near future.

Sir John Anderson, who was Chancellor under the Coalition Government, criticised Mr. Dalton severely and drew attention to the large sum of £425 million which is being spent on subsidies to keep price-levels stable—largely price-levels of food. But the proof of this pudding is definitely in the eating. A comparison of our costs of living, plus the subsidies, with costs of living in the many countries of the world where inflation rages like an acute pyrexia, is in our favour.

MEDICUS, M.P.

FROM THE PRESS GALLERY

Third Reading of Scottish Bill

On April 21 the House of Commons considered the amendments made to the National Health Service (Scotland) Bill in committee, and then passed directly to the third reading, which was completed before the House rose.

The finishing touches made in committee included a new clause permitting a local health authority to make provision for research relating to their functions. As examples of the kind of research the clause would cover, Mr. J. J. WESTWOOD cited studies into the effectiveness of forms of care given at child-welfare centres and inquiries into the effects of environment on health. A further new clause gave local health authorities power to contribute to expenditure on coördination of services. This clause was inserted to encourage the formation of non-statutory local committees in which representatives of the three divisions of the new service would take part.

An amendment to clause 5 laid down that the accommodation set aside in hospitals for private patients must not reduce the number of beds available free of charge immediately before the new service came into operation. An amendment was also inserted in clause 8 ruling that hospital endowments must be used with due regard to—

> "the spirit of the intention of the founder or donor of the endowment to which the scheme relates and in particular to conditions intended to preserve the memory of any person or class of persons;
>
> "the extent to which the original purpose of the endowment is sufficiently provided for by a public service or otherwise; and
>
> "the interests of the hospital and specialist services."

Mr. Westwood, moving the third reading, said the Bill achieved a major reform, and this inevitably had meant the displacement of both the voluntary and local-authority hospital systems, but he believed that both retained a proper place in the hospital organisation of the future. The Bill made it easy for the biggest number of hospitals to come within the teaching field and to share in the advantages which that work conferred, and without trespassing on their responsibilities it brought the teaching and licensing authorities into the administration of the hospital service. Building on the foundation that the duty of the local authorities was to watch over the incidence of disease, the Bill gave them power for important developments in the prevention of disease and the treatment of health in the community life. It also enabled the Minister to arrange for everyone to have the care and attention of the family doctor of their choice without need to count the cost. But it gave the Minister no power to direct individual doctors to work in particular localities at particular jobs. The Bill would not produce more doctors overnight, but Mr. Westwood believed that the new system of remuneration, and abolition of the sale and purchase of practices, would improve the attraction of general medical practice as a career, and that the measure to bring further education within the reach of all would produce at no distant date an adequate number of doctors.

Colonel WALTER ELLIOT moved an amendment criticising the Bill for its centralisation of control. Such a change, he declared, would only be justified if the medical system of Scotland had been a signal failure instead of admittedly one of the great scientific and practising successes of the world. The people of Scotland did not lack medical advice, but they had the greatest difficulty in carrying out that advice, and the Bill did not take a single sensible step towards remedying this. The principles on which it was based would threaten not only the practice of medicine but the research upon which this practice depended. Mr. HENDERSON STEWART recognised that the State had great functions to perform, but they did not include, he suggested, the intimate day-to-day control of detailed services of this kind. While Mr. J. RANKIN applauded the training given to medical students, he asserted that the young doctor emerged into the world to face complete anarchy. Neither his medical school nor the British Medical Association took the slightest interest in placing that young lad in any post. The Bill would absorb at once into active useful work every young doctor who left the universities.

Lady GRANT suggested that the Bill gave us a rigidity of administration unsuited to the living human art of caring for the sick, and Commander T. D. GALBRAITH feared that over-centralisation would bring in its train uniformity and standardisation. Dr. H. B. MORGAN thought the Bill better than the English one. Mr. G. BUCHANAN, in summing up, said at present we only had a partial service, but the Bill would offer everyone a modern service without restriction.

QUESTION TIME

Panel Dentistry

Mr. G. C. TOUCHE asked the Minister of National Insurance if he was aware of the inconvenience caused to panel patients by their inability to get dental treatment owing to the prolonged dispute about dentists' fees; and if he would make a statement on the subject.—Mr. T. STEELE replied: As the House was informed at the time, agreement on the payments to be made for National Health Insurance work was reached with the Joint Advisory Dental Council of the profession towards the end of last year. In accordance with that agreement the council advised, and continues to advise, members of the profession generally to resume the practice of accepting insured persons for treatment in accordance with the Dental Benefit regulations. The Minister is aware that a number of dentists who have given treatment under the regulations in the past have not yet followed this advice of their negotiating body and he is sorry that because of this insured persons in some areas are still having difficulty in obtaining dental benefit. But the general position is improving steadily and he thinks he must leave it to the council to continue their efforts to secure a satisfactory service for insured persons in all areas under the terms of the agreed settlement.

negligent; she knew that the solution was required for an injection and she knew that the solution as prepared was lethal; she had not used reasonable skill or care. Further, the pharmacist was negligent. He had accepted an oral demand for an exceptional dosage of cocaine and adrenaline for injection and had not required the order to be initialled by a qualified person; he had not checked the demand with the surgeon; and he had disregarded all the prescribed safeguards, including the cautionary instruction in the *British Pharmacopœia* that when an unusually large dose of a drug appears to have been prescribed the pharmacist or dispenser should satisfy himself that the prescriber's intention has been correctly interpreted. Finally the judge found the hospital responsible. It was liable for the negligence of its two employees (the student house-surgeon and the pharmacist), and it had failed to establish a proper system and to insist upon obedience to the rules about dangerous drugs. "If the hospital had had a proper system, this solution could not have arrived at the operating-theatre, let alone the body of the unfortunate patient." The judge awarded £2500 damages and directed that payment be borne equally by the county council (as owners of the hospital) and the surgeon.

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Letters to the Editor

TUBERCULOSIS AND THE NATIONAL HEALTH SERVICE ACT

SIR,—The names of the members of the regional boards may be published at any moment, and as soon as appointed they will have to get to work on the new organisation due to operate from next April. We also see that on July 8 the Minister of Health himself is to address the Commonwealth and Empire Health and Tuberculosis Conference (arranged by the National Association for the Prevention of Tuberculosis) on the National Health Service Act and its Effect on Tuberculosis Schemes.

Tuberculosis, because of its effect not only on the patient but on the community, presents special problems and difficulties, as is generally admitted: we note that the Minister of Health and the Minister of National Insurance have accepted the position that pulmonary cases will qualify for extra benefits, and the Ministry of Labour are planning special workshops for the tuberculous. No scheme for the prevention and treatment of tuberculosis can ever be efficient and effective unless the family is regarded as the unit. If separate medical staffs undertake separate parts of what should be a unified tuberculosis scheme, then we shall surely see return a state comparable with the days before the Astor report.

Leading officials of the Ministry of Health have stated that it is the full intention to continue the best features of efficient tuberculosis schemes. How, then, can we ensure within the framework of the new Act the greatest possible integration of the several components which ought to constitute a workable and successful regional organisation? I would like to make the following suggestions.

(1) The Minister of Health, after consultation with the Central Health Services Council, should have a Tuberculosis Advisory Committee to advise on policy and to provide technical guidance on tuberculosis, such course being permissible by section 2 (3) of the Act.

(2) For the control and direction of the day-to-day tuberculosis work of diagnosis and treatment each regional board should appoint a tuberculosis committee to be assisted by a regional tuberculosis officer and staff. The committee could take the form of (*a*) selected members of the regional hospital board with coöpted persons of experience in tuberculosis, or (*b*) an advisory technical body of mainly tuberculosis officers and medical officers of health, or (*c*) in large regions, both (*a*) and (*b*)—that is, a tuberculosis committee aided by a technical body.

(3) The tuberculosis medical staff for each region should consist of one or more graded medical *teams* with clerical assistance and tuberculosis health visitors who would assist in the dispensary work and bring a first-hand knowledge of the family circumstances and conditions and contacts—so important in a scheme based on persuasion. Each team could be given responsibility for an area containing several hundred thousand population and preferably coextensive with one or two hospital management committee areas. The teams should perform both dispensary and sanatorium duties, work in the closest relation with the general practitioners, examine contacts, and be given the definite duty to assist the medical officers of health of county and county-borough councils in care work and in preventing the spread of infection. Each team should have a register of all the tuberculosis cases in their area and generally hold the tuberculosis service together so that they would always know what is happening to the patients, both pulmonary and non-pulmonary.

(4) Throughout the country there are many small tuberculosis institutions; it is the intention gradually to eliminate these as separate units and to provide equivalent accommodation as part of the large and improved general hospitals. This may take a long time. Meanwhile how should the day-to-day management of the existing sanatoria be effected? I suggest that they and the tuberculosis dispensaries be taken as a group in each region and administered by the regional tuberculosis committee, who could and should coöperate where advantageous with hospital management committees in the region.

The proposed transfer of the whole hospital and specialist services on April 1, 1948, will involve (along with general medical, dental, pharmaceutical, and ophthalmic services) a considerable feat of organisation. In the event of delay, and if the date fixed cannot be amended, I suggest that the county councils and county boroughs be asked to continue by contract the tuberculosis service on behalf of the regional boards until the transfer can be made on a well-planned basis.

Church Stretton, Salop. G. LISSANT COX.

SAND-FLY FEVER

SIR,—In their article of April 5, Dr. Fleming and his colleagues state that since sand-flies were difficult to find in the Naples area they were not able to confirm their clinical diagnosis. This was not the experience of our American colleagues, who carried out extensive searches and satisfied themselves on this point in both the Naples and Caserta areas.

The high incidence in the summer of 1945 was probably due to the increase in the number of troops billeted in towns and villages which had been damaged in the previous year. It was noted in the Middle East that this illness was more common in Service people living in towns and villages than in troops engaged in active warfare in the open.

From my personal experience, I am sure that the preicteric fever, when it occurs, heralds the onset of jaundice by four or five days at the most, and that during the latter part of this time the earliest gastrointestinal symptoms of nausea and anorexia manifest themselves. In the autumn of 1940 it was quite commonly found that men evacuated from the Western Desert 48 hours previously with a diagnosis of sand-fly fever, and with all the symptoms of this condition, arrived in hospital apyrexial but with an increasing jaundice.

It would be interesting to know whether any of Dr. Fleming's volunteers developed jaundice within 3–4 weeks of the inoculation of the serum of patients with sand-fly fever, because one feels that there may possibly be some similarity between the virus of sand-fly fever and that of infective hepatitis.

Children's Hospital, Birmingham. GEORGE KOMROWER.

SOCIAL PATHOLOGY

SIR,—After reading your admirable leader and Prof. Perrin H. Long's fine factual and philosophical address, many physicians will ponder again and further over the subject of social pathology.

Many will agree that social medicine should be a development in clinical medicine. This is a fundamental idea which should be in the minds of the teachers of medicine, whichever age-group of patients may be their particular concern. The tendency to geographical divorcement of the patients and wards from the realities of the outside world has not been conducive to a complete study of the individual and his environment. It is increasingly apparent, however, that clinical teachers are making headway towards a better synthesis of the factors related to a person's health or sickness. Moreover the added interest to physician, student, and nurse in knowing as fully as possible "what sort of a person is he?" rather than the brief material approach of "what has he got?" gives a warmer climate to one's work and enhances understanding of the all-round treatment required to make a patient better and happier. When a careful, tactful, yet comprehensive survey is made of their way of life, many patients gratefully recognise that something more than mere treatment of their particular disease is being attempted.

One might argue that clinical medicine has always aimed at understanding the "whole man": and of course many practitioners daily practise the principle, even so far as, on occasion, to treat the person rather than the disease. It may well be that the hospital physician has been at a disadvantage in his assessment of a patient, in so far as he seldom possesses detailed knowledge of a patient's home, work, and leisure. In the present better-regulated outpatient departments, which afford more time for inquiry, a full and purposive social history should form an essential part of the clinical approach.

In England Now

A Running Commentary by Peripatetic Correspondents

TOBACCONISTS must be lonely men these days; not that some of them haven't asked for it. I'm disappointed in my chap; on the morning after the Chancellor's fateful speech I found my way to him barred by a closed door: "Back in Ten Minutes," said the notice. But twenty minutes later the door was still locked, and quite a lot of angry customers were trying to lure the wretched fellow out of his hiding-place, where he was presumably counting his excess profits when the prices went up next day. At lunch-time "Back in Ten Minutes" had given way to "Closed All Day for Stocktaking." The next morning it was invitingly "Push," but no-one did.

These are testing days; indeed for those with a mind for the finer things they are critical days. Some of us are moved to philosophy: "Just look," said the man in the station buffet, indicating the unclaimed piles of yellow, blue, and red packets, "just look; in the war we could pay for 'em but couldn't get 'em, and now we can get 'em but can't pay for 'em. It makes you think." It does indeed. But what most of us want to know is how we are to face our plight. Well, of course, you can give up smoking altogether; I did yesterday, but after three hours I modified my ideas along more rational lines. (It was only for a moment that I felt like the drunk who, being taxed with failure to stay on the water-cart, explained: "I just put one foot down to steady myself.") Now I ration myself to a pipe after every meal, plus any additional ones needed to keep my fingers steady enough to hold a pen or lift a knife and fork. Not everyone, I appreciate, is strong enough to stick to such a scheme as this. These weaker brethren could do no better than attend my course for tobacco addicts next week. Naturally patients must on arrival hand over to me all tobacco in their possession; but I attach great importance to keeping these subjects alive to the temptation they will be exposed to on return to the outside world; so they must be prepared to sit and watch me smoke. It's a great idea, really. Success guaranteed, or money back. But not the tobacco. That is expendable by me on the treatment sessions.

* * *

It is a peculiarly irritating phenomenon (irritating is the operative word) that whenever my oldest son's school term starts I get threadworms again. There is no snob association about it; it has happened regularly at his prep. school, private school, nursery school, and council school. (Yes: we *have* moved about a bit.) Nor does there appear to be any sectarian bias; all institutions act in the same way, whether C. of E., R.C., free-for-all, or frankly atheistic. Before he handed it on to me I used to take a detached and tolerant view of the boy's infection—"You can find them in every child if you look long enough"; "Lot of rot about causing general debility"—that sort of thing—but I well recall the shattering experience of discovering at midnight with a pocket mirror, a torch, and a good deal of general contortion that my own pruritus was due to the same invader. The moment when one first discovers oneself to be harbouring a living parasite is disintegrating and humiliating, to say the least. To make matters worse, when I fled to my spouse, who is a hard-hearted pathologist, for comfort and consolation, I was met with laughter and gentian-violet pills. (The trick of swallowing these whole is to keep your tongue glued to the back of your lower teeth.) However, a week later I noticed she wasn't quite so ready to snort when I remarked that there was much to be said for a private tutor, or even a nice governess.

* * *

The other day I heard of someone who was alleged to be able to recite 114 causes of albuminuria. Such a combination of analytical gymnastics and mnemonic virtuosity should appeal to those who recommend the intensive study of Latin in schools "as a mental discipline." But this trifle of knowledge was being looked on as a handy weapon for an approaching grapple with the Censors, so I wondered whether the M.R.C.P. examination was worthy of this implied slight. I was somewhat reassured by the latest papers, which do not seem to favour an approach by preformed "lists of causes." But the membership is a "higher exam."; can we be sure that, in the final M.B. or Conjoint, the man with a music-hall memory will not be at an undue advantage in his finals, compared with the man who thinks of disease in terms of a comparatively small number of physiological mechanisms which can be disturbed in different ways? It is unfortunate that questions of the type "Give the causes and symptoms of . . ." are easier to correct than questions which demand some selection and synthesis on the part of the candidate. Yet our ultimate progress in medical wisdom is largely along the path of selection and synthesis; we learn what diseases are common, and how they are related, while at the same time we preserve our sanity by forgetting a good many of the polysyllabic syndromes which Dame Nature has once or twice been caught scattering from her malign cornucopia of ill health. In natural history, the taxonomic approach is regarded as subsidiary to an understanding of evolutionary trends. Is it not time that we in medicine tried to free ourselves from the crossword-puzzle fascinations of multiplying syndrome; and should not this attitude be reflected in the examination papers set?

* * *

While I was on holiday a patient with sciatica, whom I had been treating (with success) on the assumption that his pain was due to gluteal fibrositis, was examined by a colleague who referred him as a prolapsed disk to a neurosurgeon. The surgeon confirmed this diagnosis, but, considering the man's symptoms to be partly hysterical, refused to operate until the patient had seen a psychiatrist. On my return a nurse told me that the diagnosis had been changed to "introverted disk." Touché!

* * *

There's been a lot of talk lately about choosing people suitable for various careers, especially for medicine. Everyone agrees that intelligence tests alone are not enough. I believe the following additional quotients are necessary, and I await suggestions how to measure them. Taken together with the I.Q. they would give a very fair measurement of personality.

The *Bee-in-bonnet Quotient* (B.I.B.Q.) assesses the prejudice coefficient of a man. A doctor with a high B.I.B.Q. will hold one belief to the exclusion of all others, and will find some diagnosis in his particular specialty to fit every complaint. Nevertheless, his constancy of purpose and unflagging application may bring him success where others have failed. Research-workers should have low B.I.B.Q.'s, or they will discover only what they believe. Reformers should have high B.I.B.Q.'s, lest they get bored with repetition or dismayed by repeated failure. The bee-in-bonnet type of man is liable to be tedious and unpopular in community life, but he is useful because he gets things done.

The *Goat-getting Quotient* (G.G.Q.) is highly important, for it measures the degree to which the candidate gets other people's goats. It depends on thick skinnedness, lack of tact, the possession of irritating personal habits, and so on. Intelligent people surprisingly often have a high G.G.Q., and less able people may be preferable for a post because others can work with them. It isn't always easy to see how these remarkable goat-getting properties arise, but everyone knows the type that though free from major defects manages to rub others up the wrong way.

Then there is the *Goose-booing Quotient* (G.B.Q.), expressing ability to say boo to a goose. This is the inverse of the *Yes-man Coefficient*, which can be expressed as Y.M.C. A high G.B.Q. is an asset to the intelligent but a menace in the hands of a fool, for to have the courage of one's convictions is useless if the convictions are foolish, and leads to senseless aggression. A high G.B.Q. is essential for iconoclasts, deans of medical schools, and chairmen of committees. Those with low G.B.Q.'s are a delight to dictatorial medical superintendents or fierce ward sisters, who find them a pleasure to handle; they also make good housemen for chiefs who make mistakes but do not wish to be corrected.

So there are four headings under which you can jot down impressions of your fellow men: intelligence, bee-in-bonnet, goat-getting, and goose-booing. We already have matrix tests, &c., for intelligence; no doubt psychologists will evolve appropriate methods for measuring the others.

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St. Margaret's Hospital,
Epping, Essex.

FRANK MARSH.

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It is not uncommon to find contraction of the brachial artery in cold-sensitive psychotic patients, who display severe peripheral cyanosis when exposed to mild chilling at room temperatures of 60–64° F; the artery is contracted to a firm pulseless cord which can be rolled under the finger but dilates fully after warming an indifferent limb (reflex vasodilation), whereas the axillary artery can be felt and seen to pulsate normally above this level. Observations on these patients, which will be reported more fully elsewhere, suggest a "physiological" level below pectoralis major insertion, with greater vasomotor alertness below this level, strikingly displayed in some exaggerated thermoregulatory reactions.

F. MACKENZIE SHATTOCK.

Three Counties Hospital, Arlesey, Beds.

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SIR,—Mr. Reid and his colleagues (Feb. 15, p. 269) prefer intermittent to continuous irrigation on the ground that the latter may permit sidetracking much of the peritoneal surface by the development of a straight channel between the inlet and outlet tubes. This has never been observed in our necropsy material in patients or in animals, for the apparent reason that irrigation, when uncomplicated by infection, does not provoke deposition of fibrin when heparin is used. In animals dye injected into the inlet tube shortly before death stained the entire peritoneal cavity, even when there was peritoneal inflammation. Peritoneal irrigation continued for many days, with or without peritonitis, shows no decline in the capacity of the peritoneum to clear urea. Nevertheless there may be an advantage in using intermittent irrigation. We also have used this method occasionally, but we have always maintained a current flow instead of a stagnant pool.[1] The latter has the notable advantage of greatly reducing the volume of irrigating fluid required, and we do not doubt its capacity to extract as much of the retention products as does continuous irrigation.

The finding, by Mr. Reid and his colleagues, of a concentration of urea in the fluid in excess of that in the blood requires some elucidation. In 1939 Gilligan and Altschule[2] showed that the thiocyanate levels in blood and a fluid deposit take from four to ten hours to reach equilibrium, depending on the volume of the fluid deposit. In the two-litre volume used by Mr. Reid the urea content of the fluid at its point of contact with the diffusion membrane will be higher in the earlier phase of the diffusion period than towards the end of this period. The average urea content of the fluid after two hours should be the mean of the concentrations in the blood at the beginning and at the end of the period. This mean will be higher (cf. Gilligan and Altschule) than the blood-urea level measured at the end of the period, and lower than that measured at the beginning of the period, assuming that all the fluid with a still higher urea content from a previous rinsing period has been completely extracted. It would be necessary to have all these data before accepting the implications from Mr. Reid's statement.

We agree with Mr. Reid's warning of greater danger from waterlogging than from a moderate hæmoconcentration, because uræmic patients are especially susceptible to pulmonary œdema, which may be rapidly fatal. With the formula variations we have used we have not had reason to fear hæmoconcentration except in one instance, when the fluid used consisted of 5% gelatin solution plus $2^1/_2$% glucose.

Mr. Reid's suggestion that penicillin may be irritating to the peritoneum deserves consideration, but the concentration we have used is less than that in blood when average parenteral therapeutic doses are used. Mr. Reid's further suggestion that exudate may interfere with osmosis does not conform to our observation that in the presence of peritonitis the urea excretion

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1. In certain instances when the sump did not reach or did not remain in the cul-de-sac, we were not successful in avoiding stagnation. Such a stagnant pool can be the source of unintended overhydration if it remains after ionic equilibrium is reached. The time required for this depends on the fluid volume, but it is surprisingly short. Therefore, it is essential to remove a stagnant pool of fluid before it loses hypertonicity.
2. Gilligan, D. R., Altschule, M. D. *J. clin. Invest.* 1939, 18, 501.

Liaison with the social service has been sadly neglected. In the past year or so it has become increasingly evident that a collateral social history, taken by a skilled person, *will elucidate factors contributing to dyspeptic, rheumatic,* thyrotoxic, and many other disorders. Thus the discovery of occult factors, which seem to raise or lower a person's susceptibilities or which appear to unmask a constitutional trend, can be made. Medical students certainly find this approach interesting and helpful, and it gives an added educational value to their study of the patient. The insidious progression of disorder to disease can often be nicely correlated with the pressing problems in the social history.

Our teaching should not be limited to the clinical and special methods of diagnosing the lesion; we must proceed to inculcate the notion that some of the commoner diseases, such as rheumatoid arthritis and ulcerative colitis, have not uncommonly a preamble in psychosomatic or neurosomatic stresses, which, if fully explored through the channels of clinical and social medicine, may be remedied in such a way and at such a time that progression of the disease is checked. The student should develop an attitude of mind whereby he says to himself, "I know the diagnosis is (say) duodenal ulcer, or asthma; but why has this occurred in this individual? What are the factors, outside ordinary medical or surgical practice, which must be inquired into in order to get the patient back on to a firm and steady track?" By such a clinical discipline the student will come to learn the significance of the possible conflicts of personality and environment in its widest sense: the gradual—or sometimes apparently acute—wearing down of somatic resistance under stress, or, one might say, the decline of one or more of the barometers of health to a degree sufficient to precipitate disease.

Social study of the patient therefore reaches a high plane of practical application, and one can readily see *how futile is the treatment of patients without this* larger background to work upon. It implies an intelligent interest in the family life, the factory, the particular good or bad industrial selection of the individual, the educational and possibly scholastic problems of the child, and a host of variables which may be gathered up to allow a final conclusion in the "total diagnosis." I hope that a better appreciation of all this will be shown by hospital authorities, so that each physician will be able to have his social worker at hand at all times. It *may well be that if social pathology is intensively* studied, we shall gain much information on the causes of the common maladies; in fact, it may be regarded as an important research project in hospital practice. The scheme at Newcastle-upon-Tyne, as outlined by Prof. R. C. Browne, is excellent.

Birmingham. A. V. NEALE.

THE MEDICAL SCHOOL

SIR,—Like "Amos" (March 29), I was a war-time student at one of London's medical schools; but unlike him I have no complaint against the organisation of my teaching. Certainly I have not found teachers indifferent to our presence "and to our early difficulties in approaching the patient in his bed." At my school we had an elementary course in medicine and surgery for six months after taking the 2nd M.B., and during our early clinical training we had lectures on nursing techniques by a sister-tutor.

I would comment on Amos's five suggestions as follows. (1) The average student is not in a position to know what is really good for him. (2) I commonly see in our hospital a round taken by a registrar who is teaching 3 or 4 students individually; larger rounds are split up now that the numbers of men qualified to teach has increased. (3) Our lectures were very systematic, but I agree that teaching in some of the special departments left much to be desired. (4) I cannot see any benefit to be gained from student house appointments: the newly qualified house-officer is quite raw enough. (5) The final suggestion, that students should sit on medical rounds, adds weight to the contention of some of the older teachers that the medical student of today is rapidly becoming more decadent. We willingly stand for three hours to watch a rugger match, yet are supposed to require a chair for a ward round.

HOSEA.

HEALING OF PEPTIC ULCERS

SIR,—I would like to add a few points in support of Dr. Morton Gill's excellent article of March 8.

For a number of years I have been struck by the symptomatic improvement which so often follows immediately upon the initiation of full investigation. Time and again patients referred to me on account of resistance to routine treatment have at the second consultation which follows radiological and pathological investigation reported remarkable lessening of symptoms. It has often been possible to show that symptomatic improvement has gone hand in hand with a *process of healing; and this observation has* been made too frequently to be merely accidental. Nor does it seem likely that the barium meal by its mechanical effect deserves the credit for this happy state, though I have heard this suggestion put forward. It is more probable *that the confidence which full investigation commonly* engenders has been responsible.

We have treated with Young's duodenal tube a number of patients who had large lesser-curve ulcers previously resistant to full hospital treatment. This method has been so immediately successful, and it has apparently mattered so little whether the tube reached the duodenum or remained curled up in the stomach, that it looks as though the effect was more on the psyche than on the soma.

For ten years phenobarbitone has been used freely in the treatment of peptic ulcer, and I am firmly convinced that it is still the most useful drug in the ulcer syndrome. This again emphasises the importance of the patient's emotional state.

Finally, I have sometimes wondered whether the unquestioned success of certain surgical procedures owes something to the effect upon the victim's soul; for there remains amongst us a certain inherent faith in the drama of surgery. It will be interesting to learn whether the cases of perforation which are treated without operation show the same long symptom-free interval which can so confidently be expected to follow surgical closure.

Winchester. KENNETH ROBERTSON.

EX-SERVICE ADMINISTRATORS

SIR,—After ten weary years in the Indian Medical Service may I support the plea of "Burma Star" (Feb. 15) that military administrators should be kept out of the National Health Service. It was a poor commentary on the I.M.S. that from 1942 the consultants in India Command were almost entirely drawn from the home teaching hospitals. Under the guidance and encouragement of these distinguished men the standard of military medicine was raised to a level which has never been achieved by the pure "administrators." The patient had come into his own.

Let us see to it that we start with a clean slate. Let the newborn infant be tended through its first years by men who wish to see it flourish and not by those who will smother it in innumerable forms, the bane of the clinician and the delight of the "administrator." Let us ensure that when the doctor is called to see a case, he is able to think of the patient and that he is not subconsciously worrying about a pair of Spencer-Wells forceps which have disappeared from his surgery.

ENMESHED.

DEODORANTS

SIR,—Your note of April 5, reviewing Mr. Dewey H. Palmer's survey, quotes his opinion that volatile deodorants should not be used in places where food is stored.

Some years ago I was consulted by a company that owned large refrigerating rooms in the Middle East, on how to abolish the "refrigerating odour" that is so noticeable in such establishments. This odour clings to refrigerated meat, butter, and other foods. I advised them to spray out the rooms every day with a watery solution of chloramine (made by mixing ammonia vapour with water containing free chlorine), and this routine (using monochloramine ten parts per million in water sprayed with an ordinary 'Imshi' pump), together with as much cleanliness as was possible in the treatment of floors and shelves and in the handling of bulk foods, successfully dealt with the nuisance. Ten parts per million of monochloramine in water is tasteless and odourless and does not harm tissues; it is however a very effective bactericidal agent and completely disrupts the organic molecule that is mainly responsible for the objectionable odour.

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FRANK MARSH.

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With regard to provision of "pension or insurance," mentioned in your last paragraph, I remember that some years ago, when I was writing *Your Doctor of the Future*, I found that this solution had considerable support in medical, legal, and actuarial circles. On the other hand, Major-General Mitchiner, of St. Thomas's Hospital, speaks with authority in saying: "long years on the Royal Medical Benevolent Fund have convinced me that some form of universal contributory scheme is essential."

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continues to be as high as when the peritoneum is not inflamed.

We have not observed pain from the procedure, or any injury to the viscera from pressure caused by the tubes.

Our view is that control of chemical balance will not be so difficult as control of peritonitis. We have recently modified our method of loading the carboys containing the irrigating fluid so as to reduce the possibility of contamination from this source. We have also modified the outlet tube so that it cannot slide back and forth in the incision, and that overflow of fluid cannot collect in the dressings round the incision. Back flow of such fluid containing skin organisms through or alongside the tube is thus avoided. The air entering the irrigating fluid carboy is now filtered through alkaline cresol and parachlorphenol solution. If these improvements in sterility technique solve the problem of peritonitis, the intestinal origin of peritoneal infection in these patients can be dismissed. If not, this source of contamination will need further exploration. Preliminary studies of this problem are in progress. Meanwhile all patients, except those suspected of sulphonamide sensitivity, receive sulphthalidine by mouth to reduce intestinal bacterial counts.

We have recently modified the irrigation system by combining the inflow and outflow systems in a double-tube arrangement connected to a much shortened and weighted sump drain, the whole of which lies deep in the cul-de-sac and which is introduced so that neither overflow nor backflow can occur. A small volume of a hypertonic fluid is run in and totally removed every 15 minutes with a resulting satisfactory urea clearance. This prevents overhydration and we have reason to believe it will also prevent peritoneal contamination from the skin. The apparatus will be described in a forthcoming publication.

We wish to thank you for the interest you have shown in this problem and the care you are taking to point out its difficulties and complexity, so that the harm done by injudicious use of the method will not overbalance the possible good that may come of it.

Department of Surgery, Harvard University, Boston, Mass.

JACOB FINE
HOWARD FRANK
ARNOLD SELIGMAN.

COMPRESSION OF MEDIAN NERVE IN CARPAL TUNNEL

SIR,—I apologise for returning to this subject (*Lancet*, March 8, 22, and 29, April 5), but I must reiterate that the median nerve is normally enlarged and pinkish in colour proximal to the anterior carpal ligament. This pseudoneuroma has been well known for over a hundred years.

Every nerve in the body increases in cross-sectional area before passing beneath a ligament. This increase in area is due to the addition to the nerve of a nutrient artery and vein. Beneath the ligament, on the other hand, the nerve usually receives no arteries or veins and is surrounded by a sheath of loose cellular tissue. Moreover the swollen pinkish nerve, which is circular or slightly elliptical in cross-section proximal to the ligament, becomes definitely flattened beneath the ligament.

The internal popliteal (posterior tibial) nerve is pinkish and swollen proximal to the ankle-joint. Beneath the various ligaments at the ankle the nerve (or its internal and external plantar branches) becomes flattened. This normal " pseudoneuroma " on the posterior tibial nerve is almost as well marked as that normally situated on the median nerve. The external cutaneous nerve of the thigh, as it passes beneath Poupart's inguinal ligament, lies in a sleeve-like sheath of loose cellular tissue.

It has been shown that there is a smaller amount of connective tissue in the female nerve than in the male, and as far back as 1853 Romberg called attention to the fact that neuromata are much less frequent in the female than in the male. Gowers stated that lesions of the median nerve, if rare, are apt to be severe and their course correspondingly prolonged. Kinnier Wilson stated that " weakness and atrophy of the median muscles, partial or complete, sometimes follows prolonged use of trade tools, or constant repetition of professional movements—an ' occupation ' neuritis seen occasionally for example in gardeners, ironers, scrubbers, carpen smiths, dentists, and others, whose business entails th grasping instruments for long periods, or pressing into the ball of the thumb."

When I suggested that the hand should be ligh bound over a solid core in the position of rest I ass that the use of cotton-wool was known, for the har cannot be lightly bound without placing a solid core the palm. There is no risk of compression of the nerve or of its digital or muscular branches with such a dressing intelligently applied.

Anatomy School, University of Cambridge. H. A. HARRIS.

BONES IN THE BANK

SIR,—I had the pleasure of meeting Dr. Bush in New York last November, and I feel sure he would wish to correct an impression given by your annotation of April 12. His interesting work on the storage of bone did not originate in Pennsylvania but in that famous institute of orthopædics, the New York Orthopædic Hospital, where until recently Dr. Bush was on the staff. I saw his bone bank at that hospital, and was convinced that worth-while results were being achieved, in spite of the biological disadvantages which one might expect from previous experience with homogenous skin and nerve grafts—let alone the heterogenous grafts which you mention.

Exeter. NORMAN CAPENER.

THE CALL-UP

SIR,—In your annotation of April 12 you made a strong case for the economical use of newly qualified medical men. You did not, however, discuss the simplification of the problem if the student put in his year's service with the Colours before entering a medical school.

For a certain proportion, this timing would, I think, be advantageous to all concerned. The man who passes straight from school to hospital without a period of general education at a university is especially in my mind. The knowledge of the outside world acquired and the personal contacts involved in any of the Services should equip him better for his medical career than does the average school education.

Most teachers agree that the ex-Servicemen at present training in the medical schools are apt and industrious pupils. Though the comparison is not exact the circumstances are in some degree parallel.

Faversham, Kent. MAX PAGE.

*** We agree with Sir Max Page that the enthusiasm and judgment of the ex-Service medical student strengthen the claim for a break between school and university. Ideally, no doubt, there ought to be a break; but present conditions are far from ideal. We argued on March 22 (p. 375) that the supply of doctors is limited by the number of places in the medical schools, and that a later age of entry is extravagant because it reduces the professional life of those who gain admission. We also suggested that any further delay in qualification is both biologically and professionally undesirable: even now the doctor marries late, and the profession loses good recruits who attach importance to an early marriage and family. When, as is feasible, these drawbacks are removed, there will be nothing against, and much in favour of, an interval before medical training. It should lessen the strain now imposed by continuous book-work between the ages of 7 and 23. —ED. L.

CORRECTION OF MEDICAL REGISTER

SIR,—I am desired by the Returning Officer to say that voting papers for the purpose of the forthcoming election of one member of the General Medical Council to represent the registered medical practitioners resident in England were issued on April 22 to all practitioners having registered addresses in England; and that the authorities of the Council would be glad if any such practitioner who has not received a voting paper would communicate immediately with the office of the Council (44, Hallam Street, London, W.1), *whether or not he proposes to vote in the election*, in order to ascertain that his address is correctly entered in the Medical Register.

MICHAEL HESELTINE
Registrar.

London, W.1.

GROUPING OF HOSPITALS

SIR,—It would be difficult to exaggerate the importance of some of the issues raised in your editorial last week on the grouping of hospitals. It is time that attention was drawn not only to the critical nature of the nursing problem which will confront the regional boards in any case, but also to the additional hazards which will be introduced if the method of grouping ignores the psychological aspects of recruitment and staffing.

An arbitrary pooling and distribution of nursing staff in a region, in accordance with needs but out of accord with personal choice, would inevitably reduce the pool to drought level. The limited measure of direction of nurses into the scarcity fields during the war indicated how violent is the reaction against interference with a nurse's free choice of work, and how harmful such interference can be to the cause of nursing recruitment.

It would be disastrous to group hospitals in such a way that some groups had no focal hospital of strong recruitment appeal and had to depend on staff drafted in by the regional board. Already potential recruits are asking at the Nursing Recruitment Centre, "If I take up nursing, may I choose my own hospital, or shall I come under a scheme which will send me to any hospital?" On the answer to that question may depend the decision to take up nursing or to choose some other career. Instead of reducing the source of supply even further than at present, it would be well to stimulate recruitment by allowing some measure of competition, and then, by a process of natural adjustment, to staff the scarcity fields with a generous overflow from other fields.

Many of the teaching hospitals have doubled the capacity of their preliminary training schools for the time being in order that they may staff additional beds, and have thereby reduced their waiting-lists both of student nurses and eventually of patients. A number of other voluntary hospitals could follow their lead if they had sufficient accommodation for nursing staff.

This is in line with your suggestion of including deficit hospitals in a group containing a teaching hospital or other hospital which is able to increase its intake of nurses. A nurse who has chosen a particular general hospital will gladly work in the chronic wards attached to that hospital when she would resist transfer to an institution for the chronic sick—probably by leaving hospital service altogether.

In a profession already regarded as hemmed about with restrictions, we could not afford to sacrifice the element of free choice of hospital and thereby to widen still further the gap between demand and supply.

H. MORLEY FLETCHER
Chairman, Nursing Recruitment Committee.

Nursing Recruitment Centre, 21, Cavendish
Square, London, W.1.

ANALGESIA IN LABOUR

SIR,—It is now nearly fourteen years since R. J. Minnitt showed that women can be helped in their confinements by the administration of nitrous oxide. Further developments of Minnitt's technique, such as the Chassar Moir attachment, and the promising results with 'Trilene,' now make it possible to promise the expectant mother that her confinement will not be the nightmare of former days. Yet full use is not being made of these recent advances.

During the past few months I have received a number of letters telling the same sorry tale, and, from my own observation, I know that these correspondents have good reason to complain; many hospitals do not seem to recognise that the relief of pain during confinement is a primary duty. Analgesia is too often administered half-heartedly and for too short a time.

The two main reasons for this lamentable failure are (1) lack of medical interest, and (2) shortage of staff. I have found that while the actual administration of the analgesic can be entrusted to nurses, yet there must be "medical interest" in their work. It is essential that an experienced anæsthetist, genuinely interested in the relief of pain in labour, should watch the administration from time to time, and should frequently inspect apparatus; for only a trained anæsthetist can notice at once the small mechanical defects which so frequently lead to bad results.

Are we not asking too much of our overworked midwives? Would it not be much better to have a number of nursing auxiliaries trained as analgesists, with no other duties? We cannot rest content with present arrangements, which are neither to our credit nor to our advantage. In 1937 there was published a Maternal Mortality report, which shook public confidence in our profession. I have little doubt that if a 1947 Maternal Analgesia report were to be published we should suffer an even worse loss of prestige.

New Barnet. JOHN ELAM.

Obituary

SYDNEY ARTHUR MONCKTON COPEMAN

M.D. CAMB., F.R.C.P., F.R.S.

Dr. S. Monckton Copeman was an officer of the Local Government Board and Ministry of Health for over thirty years; but though he became an able administrator he remained an investigator, and it was no accident that in 1898, while the Vaccination Bill was passing through Parliament, Copeman in his Milroy lectures to the Royal College of Physicians was describing the scientific experiments which led to the official adoption of glycerinated lymph.

He was educated at King Edward VI School at Norwich, where his father was a canon, and at Corpus Christi College, Cambridge. In 1885 he qualified from St. Thomas's Hospital, and he took his M.D. five years later. Meanwhile he had served as an assistant lecturer in physiology and morbid histology at St. Thomas's and taken the D.P.H. in 1889 preparatory to joining the Local Government Board in 1891. It was in this year, at the International Congress of Hygiene, that he first called attention to his method for the bacteriological purification and preservation of vaccine lymph. The admixture of glycerin with vaccine lymph was, as he himself pointed out, no new device, but he was the first to recognise its selective action in eliminating extraneous germs from the lymph without affecting the specific virus. Later, with F. R. Blaxall, he showed the advantage of glycerin over soft paraffin and lanolin as a vehicle for vaccine lymph.

Press Portrait Bureau

Copeman remained at the Ministry till 1925, and served not only his own department but also the Home Office and Board of Trade as a Government delegate to European countries and to the United States. His own profession he served as a member of the council of the Royal College of Physicians, as president of the epidemiology section of the Royal Society of Medicine, and as a special commissioner of the British Medical Association. During the 1914–18 war he was in charge of the department of hygiene at the Royal Army Medical College, holding the rank of lieut.-colonel. He was also for many years lecturer in public health at Westminster Hospital, an examiner for the Conjoint Board and for the universities of Bristol and Leeds, and chairman of the board of studies in hygiene of the University of London.

Though working long at a desk he did not lose his interest in the bench. His papers on the relationship between variola and vaccinia were read before the Royal Society in 1903, and in the same year he was elected to their fellowship. He had already been awarded the Cameron prize of the University of Edinburgh, and the Fothergill medal of the Medical Society of London, and he was later to receive the Buchanan gold medal of the Royal Society, the Jenner medal of the Royal Society of Medicine (1925), and the gold medal of the International Faculty of Sciences (1938). His interests were not limited to the subject which he had made his specialty, and with M. Greenwood he wrote a paper on diet and cancer. In 1928, at the International Cancer Congress held in London, he read a paper on irradiated fluorescein in the treatment of cancer, and he was a member of the Ministry of Health's committee on cancer.

On his retirement Copeman continued his public-health work from a different angle as a member of the hospital and medical services committee of the London County Council and as chairman of the public-health committee of Hampstead borough council. He also contributed articles to the *Encyclopædia Britannica* and the *Dictionary of National Biography*. A member of the livery of the Society of Apothecaries, he was a freeman of the City of London, and a knight of grace of the Order of St. John of Jerusalem. "To his juniors," writes a colleague, "he was especially kind and courteous: a generous host, a genial neighbour, he always had the knack of seeming pleased to see one. His wide experience was ever at the disposal of his friends, and anyone who consulted him would receive of it in full measure. I shall always remember gratefully one occasion of great urgency in connexion with an outbreak of anthrax, when Copeman's knowledge and his prompt and effective action saved a dangerous situation, and incidentally greatly relieved me."

Dr. Copeman died at Hove on April 11, at the age of 85. His wife, Ethel Margaret, daughter of Sir William Boord, predeceased him, and they leave two daughters and a son, Dr. W. S. C. Copeman.

KURT LEWIN

The death of Kurt Lewin in Massachussetts in February at the age of 56 deprives the world of science of a vigorous and an integrating mind. He was not a medical man, but like a good clinician he could combine the results of investigations made in a number of fields of inquiry in such a way that each investigation was seen as part of a whole. His chief gift to medicine, however, was an indirect one through his contribution to the philosophy of science.

He began work in the famous Berlin Psychological Institute with a team which created the *Gestalt* school of psychology (Wertheimer, Koffka, Koehler, and others), but when the Nazis were coming into power he emigrated to America. There he absorbed a new aspect of "dynamic psychology" and did much to give the *Gestalt* and the Freudian ways of thought a mutual illumination. He was a professor and trained as a laboratory research-worker, but his laboratory in the latter part of his life was in "real-life situations"; he brought his powers of conceptualisation into everyday life and made the workshop of industry and the classroom his laboratory and tested there his theories "in real life." Appropriately he found a home in the Massachussetts Institute of Technology, and was head of the department of group dynamics. An annotation on his contribution to psychology appears on another page.

Births, Marriages, and Deaths

BIRTHS

Ayres.—On April 17, at Chippenham, the wife of Dr. Geoffrey Ayres—a daughter.

Beckett.—On April 20, in London, the wife of Dr. H. D. Beckett—a son.

Campbell.—On April 16, the wife of Mr. W. G. Campbell, F.R.C.S.—a son.

Currie.—On April 13, in London, the wife of Dr. Donald Currie—a daughter.

Herbert.—On April 16, at Worksop, the wife of Dr. George Herbert—a daughter

MacLeod.—On April 17, in London, the wife of Mr. Cameron MacLeod, F.R.C.S.—a daughter.

Russell.—On April 17, the wife of Mr. P. M. G. Russell, F.R.C.S.—a daughter.

Tait.—On April 11, at Edinburgh, the wife of Dr. G. B. Tait—a son.

MARRIAGES

Charles—Hume.—On April 18, at Newcastle-upon-Tyne, John Alexander Charles, F.R.C.P., to M. F. Hume.

Howat—Harker.—On April 18, at Goathland, Yorks, James M. L. Howat, M.B., to Margaret E Harker, M.R.C.P.

DEATHS

Blackmore.—On April 13, George John Blackmore, M.D. Edin., D.P.H., aged 83

Gill.—On April 17, Cyril Illingworth Carswell Gill, M.B. Camb., aged 53.

Manson.—On April 13, James Kennedy Manson, M.B. Glasg

Orton.—On April 18, George Harrison Orton, M.D. Camb.

Smith.—On April 16, John Morland Smith, M.R.C.S., D.A., aged 32.

Tibbetts.—On April 15, Arthur Willoughby Tibbetts, M.R.C.S., aged 49.

Notes and News

NEWLY QUALIFIED ASSISTANTS

Position in Relation to Military Service

The Central Medical War Committee thinks it desirabl to draw attention to the fact that newly qualified practitioner liable to military service, although now free to accept assistantships in general practice, are not free to remain in suc appointments after they have been qualified for six month

The committee urges all newly qualified practitioners, i their own interests and the interests of the hospitals, to see junior hospital appointments of the A category. A practitioner liable to military service is granted deferment t enable him to hold such a post for six months, *provided that he has obtained the post within three months of qualification* He is then granted a further six months' deferment if selected for a B2 post, and if, on completing this post, he is appointed to a B1 post, his recruitment is again deferred, normally for twelve months at least, and he may eventually be recommended for recruitment as a graded specialist. If, however, he enters general practice on qualification, his recruitment is initiated about five months after the date of qualification with a view to call-up when he has been qualified for six months, and the committee will not then entertain an application for deferment for the purpose of gaining hospital experience before undertaking military service.

At the present time, male practitioners are liable to military service as general-duty medical officers if they were born on or after July 1, 1916.

SUTTON INDUSTRIAL NEUROSIS UNIT

When men and women in industry need psychiatric advice they will normally be referred first to an outpatient clinic The Ministry of Health notes (Circular 64/47) that they may need outpatient treatment, and adjustment of difficulties at home or at work; or will profit by a period in a training centre before resettlement; or that they may be fit to undertake ordinary or sheltered work at once. Some, however, will need inpatient treatment in hospital, and some will be uncoöperative and unemployable. Finally, there are some about whom a decision cannot be reached at the outpatient clinic, and who present a problem to both the clinic and the employment exchange. For these, a special inpatient centre of 100 beds was opened on April 1 at Sutton Emergency Hospital, where they can get psychiatric treatment, occupational assessment, work therapy, and occupational therapy, according to their needs. Work therapy will be carried out in a normal work environment—whether firm, shop, Government training centre, or technical institute The period spent in hospital will be 6–8 weeks, which is not long enough, of course, for a complete training, but which is sufficient to allow the medical staff to study aptitudes and advise on vocational selection.

Applications for admission made either through the Commissioner of Medical Services (in the case of ex-Service or ex-Merchant Navy patients whose accepted war disablement is psychosis or psychoneurosis), or else through a neurosis centre, must be accompanied by a psychiatrist's report Final selection of cases will be made by the hospital authorities at Sutton.

COLOUR-VISION TESTS ON VIEW

The Colour Group of the Physical Society had assembled an instructive collection of apparatus for testing colour vision, as part of the Physical Society's exhibition held in London on April 9–12. Many of the tests mentioned in the Colour Group's report [1] were on view. These ranged from the simpler tests, like the Holmgren wools and the various confusion test charts, to delicate research apparatus, like the Wright colorimeter. The first room contained the simpler classical tests—the Ishihara and other confusion charts, the Holmgren wools and various other matching tests—and also some new apparatus based on the principle of the Nagel Anomaloscope. In this type of test the subject views a circular field divided into two. One half of the field is a standard yellow, while the colour of the other half is determined by the subject who can vary a mixture of red and green. The Shaxby test and one devised in Messrs. Ilford's research department are of this kind. Messrs Kodak have produced a test in which pairs of light filters of different colours are selected to detect the different types of colour-blindness; these filters are illuminated by an ordinary X-ray viewing box and the subject is asked to point out the pairs which match. These new tests are very simple to apply but are designed to give a high degree of sensitivity. The apparatus is not yet generally obtainable.

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[1] Report on Defective Colour Vision in Industry. See *Lancet*, April 5, p. 455.

Other exhibits included the Board of Trade lantern, which is designed to imitate conditions at sea, and some highly specialised research apparatus which makes it possible to determine the exact nature and degree of a defect of colour vision; in this type of apparatus the source of light is usually a pure spectrum.

At present the materials for many of the classical tests, such as the Ishihara, are very scarce, and they are not easy to produce because the colour of the inks used in printing them is all-important. Any really large-scale testing of sections of the population is therefore ruled out, but experiments on reasonably large samples might now be made to determine which tests could most easily be applied to large numbers without sacrifice of sensitivity.

TESTIMONIALS FOR EX-R.A.F. MEDICAL OFFICERS

To clear up misunderstanding among released medical officers regarding the furnishing of a testimonial, the Director-General of Medical Services, R.A.F., writes: "*A document of this nature, if it is to be of any value, must be written by someone who has a personal knowledge of the individual who requests it, and on this condition senior officers are empowered to give such testimonials. The practice in this Directorate-General is to advise ex-Service doctors who write to us for testimonials to apply to senior officers of the Medical Branch under whom they have worked, for a statement of their character and professional skill. Letters addressed to senior medical officers, care of this Directorate-General, will be forwarded. A released medical officer may obtain a certificate of service based on the whole of his service by applying to the Under-Secretary of State, Air Ministry (A.R.9), Kingsway, London, W.C.2.*"

University of Sheffield

On July 1 the honorary degree of D.SC. will be conferred on Sir Howard Florey, F.R.S.

University of Leeds

On Monday, May 5, at 3.30 P.M., Dr. M. N. Smith-Petersen, professor of orthopædic surgery in Harvard University, is to deliver the Moynihan lecture at the University Union. He is to speak on the Evolution of the Surgery of the Hip-joint.

Royal Faculty of Physicians and Surgeons of Glasgow

The following have been admitted to the fellowship:

James Allan, Richard Thomas Stanley Gunn, John Raven Lauckner, Alasdair Cameron Macdonald, John Hamilton Ramage, David Neilson Ross, qua physician; James Arthur Victor Hamilton, David James Livingstone, Iain McLennan, Valliyaveetil Muhamed, John Neilson, Alexander Paterson, William Reid, David Gemmell Smith, qua surgeon.

Scottish Conjoint Board

The following have been admitted licentiates of the Royal Colleges of Physicians and Surgeons of Edinburgh and the Royal Faculty of Physicians and Surgeons of Glasgow.

M. S. Barnett, H. Y. Caldwell, R. H. Freedman, J. McD. Hanley, W. P. Hanley, Garnet McDermott, Josephine B. McElroy, Hugh McIntyre, R. D. Watssman, E. F. Weiswasser, A. M. Westwater, N. G. P. de S. Wijesekera, Mariella M. Williams.

University College of the West Indies

Mr. B. W. Williams has been appointed medical adviser and dean of the medical school of this college, lately established at Jamaica, which is associated with the University of London.

Mr. Williams, who is 51, was born in Jamaica and educated at Oundle School, and Exeter College, Oxford. During the first world war he served as a trooper in the 2nd King Edward's Horse and later in the Royal Field Artillery reaching the rank of captain. On demobilisation he continued his medical studies at St. Thomas's Hospital; he qualified in 1921, graduated as M.B. two years later, and took his F.R.C.S. in 1924. After holding house-appointments at St. Thomas's he became first assistant in the surgical unit there and was later elected to the staff. He is also surgeon to the Mount Vernon Hospital, Northwood, and consultant surgeon to the L.C.C. hospital service. He has examined for the University of Oxford and the Royal College of Surgeons, and he has held the office of subdean at St. Thomas's. During the late war he served in the R.A.M.C. with the rank of lieut.-colonel. He has published papers on abdominal infections, including his Hunterian lecture of 1927 on toxæmia due to anaerobic organisms in intestinal obstruction and peritonitis.

St. Thomas's Hospital

Prof. W. G. Barnard has been appointed dean of the medical school in succession to the late Prof. B. A. McSwiney.

Guild of Hospital Librarians

A meeting of the guild will be held at Chaucer House, Malet Place, London, W.C.1, at 2.15 P.M., on Wednesday, May 7, when Mr. Adrian Hill will speak on the subject of his book *Art and Illness*.

Central Council for the Care of Cripples

The annual general meeting of the council will be held on Thursday, May 1, at 2.30 P.M. at 1a, Henrietta Place, London, W.1, when Mr. George Tomlinson, Minister of Education, will speak.

Hospitals Day

Hospitals Day in London will be held this year on Tuesday, May 6. Those who wish to help should write to the appeal secretary of their local voluntary hospital or to Lord Luke, chairman, Hospitals Day, 36, Kingsway, London, W.C.2.

British Medical Association

Dr. J. H. Bruce and Dr. John Revans, M.B.E., have been appointed assistant secretaries to the association. Dr. Bruce took his M.B. Glasg. in 1937. Dr. Revans qualified in 1935 from the Middlesex Hospital and afterwards joined the Indian Medical Service.

The London Clinic

Dr. J. D. Robertson has been appointed director of a new department of clinical investigation at the London Clinic. The department, which will include units of hæmatology, biology, histology, and chemical pathology, will provide a comprehensive laboratory service for the clinic and also for outside practitioners.

Society for Relief of Widows and Orphans

At a meeting of the directors held on April 9, with Dr. R. A. Young, the president, in the chair, Dr. E. J. Blackett, who has been secretary for 42 years, tendered his resignation, which was accepted. The annual general meeting will be held on Wednesday, May 21, at 5 P.M., at 11, Chandos Street, London, W.1.

Association of Municipal Medical Officers

This association is being formed, with the knowledge of the Association of Municipal Specialists, to represent the views of medical officers of non-specialist status. Further particulars may be had from the hon. secretary, Dr. J. J. Hamilton, 56, Castlebar Road, Ealing, London, W.5.

Edinburgh Postgraduate Lectures

In connexion with their courses in medicine and surgery the Edinburgh Postgraduate Board is holding the following open lectures on subjects of biological interest: Mr. J. Russell Greig, PH.D., Studies in Comparative Medicine (April 29); Prof. F. A. E. Crew, F.R.S., Biology of Polytocy (May 13); Dr. Reginald Passmore, The Fat of the Land (May 27); Mr. C. P. Stewart, PH.D., Biochemistry of Senescence (June 10); Dr. T. N. MacGregor, Sex Hormones (June 24). The lectures will all take place at 5 P.M. in the west medical lecture theatre of the Royal Infirmary.

Blindness in Africa

The joint mission of the Colonial Office and the National Institute for the Blind which has been inquiring into problems of blindness in British tropical Africa has now returned to this country, and is preparing a report. The mission found that in one small area of Uganda the incidence of blindness among the population was 4187 in 100,000, compared with a rate of 191 in the United Kingdom.

Joyce Green Hospital

On April 21 Mr. A. Reginald Stamp, chairman of the hospitals and medical services committee of the London County Council, opened the extensions completed at a cost of over £130,000 in 1939 when the hospital was converted from an infectious-diseases unit to a general hospital. The new buildings contain wards for neurosurgery and physiotherapy, and for children; clinics for dentistry, for ear, nose, and throat work, and for eyes; an operating-theatre; and a nurses' home. During the war the new wards were not open, because the large amount of glass in their construction made them unsafe.

Appeal for Blood-donors

A number of Post Office stamp cancelling machines are now using dies engraved "Blood donors are still urgently needed." By this it is hoped to assist in the appeal for additional volunteer blood-donors, 200,000 of whom are required immediately.

Closed Shop

Dr. A. T. W. Powell, M.O.H. for Walthamstow, informs us that the council of the borough, having regard to the views expressed by the Ministry of Health, have withdrawn, so far as the medical and nursing services are concerned, their resolution requiring that people in their employ should be members of a trade-union.

Barley Sugar on Prescription

By a Ministry of Food order, which came into force on April 6, glucose barley sugar may be obtained ration free on medical grounds on a doctor's prescription. Not more than 2 lb. may be ordered at a time, but the prescription may direct that this quantity can be repeated twice at intervals of not less than a month.

Gleneagles Fitness Centre

Gleneagles Hotel, taken over in 1939 by the Department of Health for Scotland and used as a hospital and, since 1943, as a fitness centre for the reablement of miners, is being returned to the L.M.S. Railway Company. The centre will reopen at Bridge-of-Earn Hospital, Perthshire, on April 28, where its facilities will be extended by association with the work of a general hospital. Although originally only miners were accepted, any person in industry may now be admitted to the centre if suffering from a disability which may yield to treatment. Patients can be admitted on application to the medical superintendent by their family doctor or the medical officer of a hospital.

U.S.A. Population Increases

The population of the United States is reported by the Census Bureau to have increased by about 10 million since 1940; last July it was 141,288,693, compared with 131,669,275 in April, 1940. Whereas males then outnumbered females by 454,000, females now exceed males by nearly 470,000, this change being attributed chiefly to military losses and the perennial excess of male over female deaths. The numbers have increased in every age-group except 10–19. Shifts in age and sex distribution have been associated with the great rise in the birth-rate dating from the early war years, with reductions in the civilian mortality-rate, and with the small but regular flow of civilian immigrants.

Health Education in Scotland

The Scottish Council for Health Education is holding this summer three schools on the theme of Healthy Living. There will be an elementary course in Edinburgh (July 26 to August 9) under the direction of Prof. James Ritchie; an intermediate course at St. Andrews (in the same fortnight) under the direction of Prof. A. F. Skinner; and an advanced course at Strathpeffer Spa (August 8 to 22) under the direction of Dr. W. G. Clark. Further information may be had from the secretary of the council, 3, Castle Street, Edinburgh, 2. The Central Council for Health Education, Tavistock House, London, W.C.1, is also holding courses at Keble College, Oxford (July 25 to August 8), and at Bede College, Durham (August 20 to Sept. 3).

Recruitment of Midwives

The Secretary of State for Scotland and the Minister of Health have set up a working party to inquire into the recruitment and training of midwives and any other matters which have a bearing on the present shortage of practising midwives. The chairman is Mrs. Mary Stocks, principal of Westfield College, London, and the members are Miss J. P. Forlie, matron-in-charge, Simpson Memorial Maternity Pavilion, Edinburgh Royal Infirmary; Miss V. R. Shand, supervisor of midwives, County of Lancashire; Mr. R. M. Titmuss, of the Cabinet Offices; and Dr. Albertine Winner, of the Ministry of Health. Assisting the working party is a steering committee, also under the chairmanship of Mrs. Stocks, which will include Dr. W. S. Macdonald, of Leeds, and Mr. Arnold Walker, F.R.C.S., chairman of the Central Midwives Board. All correspondence should be addressed to the secretary of the Midwifery Inquiry, Ministry of Health, Whitehall, London, S.W.1.

Return to Practice

The Central Medical War Committee announces that following have resumed civilian practice:

MR. IAN JACKSON, F.R.C.S., M.R.C.O.G., 104, Harley Street, Lond W.1 (Welbeck 1801).

DR. W. ERIC GIBB, 47, Queen Anne Street, London, W.1 (Welb 1011).

Mr. Franklin Kidd, F.R.S., has been appointed director food investigation in the Department of Scientific a Industrial Research.

New arrangements for the issue to ships' surgeons of dri plasma or serum are announced in a Ministry of Transpo notice (no. M. 301); the normal issue for each ship will be bottles.

Appointments

CAMPBELL, RUTH, M.R.C.S.: psychiatrist, child-guidance servic Kent.

CROSBY, J. H. ST.B., M.B. Lpool, D.P.H.: M.O.H., Chingford, and ass county M.O.H., Essex.

LEWSEN, S. C., M.R.C.P.: physician, Institute for Scientific Treat ment of Delinquency, London.

MILNE, ADAM, B.SC., M.B. Aberd.: psychiatrist, Victoria Infirmar Glasgow.

MURDOCH, J. A., L.R.C.P.E.: examining factory surgeon, New castleton, Roxburgh.

SHULMAN, JOHN, M.B. Glasg., D. PHYS. MED.: physician i/c physica medicine, Warneford General Hospital, Leamington Spa.

Napsbury Hospital, Herts:

Chief Physicians:
EDWARDS, A. M., M.B. Lond., D.P.M.
PATTERSON, J. H., M.D. Edin., DIPL. PSYCH.

Diary of the Week

APRIL 27 TO MAY 3

Monday, 28th

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
5 P.M. Dr. Frankis Evans: Spinal Analgesia.
6.15 P.M. Prof. R. Willis: Pathology of Tumours of the Nose and Throat.

Tuesday, 29th

ROYAL COLLEGE OF SURGEONS
5 P.M. Dr. A. D. Marston: Anæsthesia in Obstetric Practice
6.15 P.M. Mr. J. F. Simpson: Chemotherapy and Antibiosis in Otolaryngology.
EDINBURGH POSTGRADUATE BOARD FOR MEDICINE
5 P.M. (Royal Infirmary.) Mr. J. Russell Greig, PH.D.: Studie in Comparative Medicine.

Wednesday, 30th

ROYAL COLLEGE OF SURGEONS
6.15 P.M. Mr. C. Gill-Carey: Chronic Maxillary and Ethmoidal Sinusitis.
SOCIETY OF HEALTH
2.20 P.M. *Group.* (Civic Hall, Leeds.) Mr. J. Lumsden: Education of Blin Children.

Thursday, 1st

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
8 P.M. *Neurology.* Dr. Erik Lindgren: Normal Temporal Horn and its Deformities by Tumours in the Middle Cerebral Fossa.
ROYAL PHOTOGRAPHIC SOCIETY, 16, Princes Gate, S.W.7
6.30 P.M. *Medical Group.* Mr. Edward Brain: Medical Photography.

Friday, 2nd

ROYAL COLLEGE OF SURGEONS
6.15 P.M. Mr. F. C. W. Capps: Malignant Disease of the Paranasal Sinuses.
ROYAL SOCIETY OF MEDICINE
10.30 A.M. *Otology.* Mr. E. C. Naylor Strong: The Design and Application of Electronic Hearing-aids.
2 P.M. *Surgery.* (Royal Sheffield Infirmary and Hospital.) Operations and demonstration of pathological specimens and X rays.
3 P.M. *Epidemiology and State Medicine.* (Harvard Hospital, Salisbury.) Dr. W. H. Bradley: History of Harvard Hospital and of the Common Cold Research Unit. Dr. C. H. Andrewes, F.R.S.: Plan of Research into the Ætiology of the Common *Cold.* Dr. D. K. M. Chalmers: Routine of Experiments with Human Volunteers. Dr. F. Fulton: Interim Report on the *Results of Transmission* Experiments.
5.30 P.M. *Anæsthetics.* Dr. E. Trier Moerch: Controlled Respiration by means of Automatic Apparatus in use in Denmark and Sweden. Dr. J. Clutton-Brock: Skin *Temperature as a Clinical Aid* during Anæsthesia. Dr. R. P. Shackleton: Anæsthetics in Yugoslavia.

Saturday, 3rd

ROYAL SOCIETY OF MEDICINE
9.30 A.M. *Surgery.* (Royal Sheffield Hospital.) Short papers and clinical cases.

BACKACHE *

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There used to be no more unwelcome patients in orthopædic departments than those with backache. Now they are much more satisfactory to treat because we know, or think we know, the pathology. Treatment without knowing the pathology is a depressing business.

In our opinion very many of these cases—perhaps the majority—are due to a lesion of the intervertebral disk; in fact, we hold the view that nearly all recurrent attacks of backache, and many cases of chronic backache, are due to disk lesions.

It is impossible to separate backache entirely from sciatica, because both are often manifestations of the same underlying condition. Indeed, it is through the clarification of knowledge of the cause of sciatica that light has been thrown on the cause of backache.

There are two common types of low backache associated with a disk lesion: lumbago and "lame back." Lumbago implies the sudden onset of acute pain in the low back with localised tenderness over the lumbar muscles, or in the mid-line over the interspinous ligaments. The attack may last a few hours or some days. If it lasts more than a fortnight it often passes into sciatica. Examination of movements of the spine reveals restriction of forward bending, whereas sideways bending is free. Between attacks the back may be normal, but there may be some restriction of forward flexion. The patient with "lame back" is often all right if he is lying down, but the pain returns on exercise or even on sitting or standing. It may follow an attack of lumbago, or may be a persistent complaint without acute exacerbations. It sometimes follows a severe and protracted attack of sciatica, in which case, after many months, the severe sciatica subsides, leaving the patient with a chronic backache and occasional pain down the leg.

Both of these types will at some time have restriction of movements, however slight. This will be most notable when the pain is bad.

There is also a type of backache in which there is never any restriction of movement and the only physical sign is tenderness. When the tenderness is localised and constant it may be referred from a visceral lesion; when it is diffuse and variable it may be due to a neurosis.

We shall not discuss those who have discomfort in the back after maintaining an uncomfortable position, such as bending forwards or sitting in an uncomfortable seat. This backache is transient and disappears on altering position. Nor shall we consider the stiffness which follows unwonted activity, for this occurs in all muscles.

We shall try to explain our reasons for thinking that many cases of backache are due to disk lesions. We were slow in coming to this conclusion, for until comparatively recently we had not operated on patients with backache alone, but only when it was accompanied by sciatica. Latterly, however, we have operated in 37 cases for backache alone and found a disk lesion in 34 of them. This number is small, relative to the number of operations for sciatica, because patients with backache alone are seldom bad enough to require operation, and they tend either to get better, or, if they get worse, they usually develop sciatica. Further, most patients with sciatica due to protrusion of a disk have, in their early stages, symptoms of backache only. Of the patients who had their disks removed for sciatica, 68% had pain in the back alone as their earliest symptoms, and the pain was limited to the back for months, or even years, before the sciatica developed.

DIFFERENTIAL DIAGNOSIS

Most of the chronic cases of low back pain not due to disk lesions can be diagnosed by routine radiography, which may show spondylolisthesis, spondylitis (except in the early stages), osteo-arthritis, Paget's disease, old fractures, osteomyelitis, or growths.

Spondylolisthesis is much more commonly recognised than it used to be, largely because of improvements in radiography. Minor degrees with merely a laminar defect require good radiograms and close scrutiny. We have several times operated in such cases, thinking that the patient had a disk lesion. A small apparent slipping may cause a palpable ledge, which may give rise to backache or sciatica, or both.

Spondylitis can be readily detected, for, like any form of arthritis in these joints and elsewhere, it causes restriction of movements in all directions, and is therefore easy to distinguish from a disk lesion, in which sideways movement is free. Except sometimes in the earliest stages it can be confirmed by radiography.

Osteo-arthritis is also revealed by radiography. If it is localised to two adjacent vertebræ it is almost certainly due to an old disk injury. Some patients with severe compression fracture may have persistent pain. The pain is usually felt in the dorsolumbar region—D 11/12 or L 1—and may arise from disalignment of the lateral vertebral joints resulting from the deformity.

Sacro-iliac arthritis is also a rare cause of backache, and in the early stages, before radiological changes have developed, it is difficult to diagnose, but there is often pain on compressing the iliac crests and a positive Trendelenburg sign.

The frequency of *neoplasms* as the cause of low back pain and sciatica has been exaggerated; in the record of 1000 cases of backache kept by one of us (R.H.Y.) some years ago only 6 were due to secondary carcinoma.

Patients with *referred pain* from the visceral organs of the pelvis or the kidneys will have no restriction of movement, though there may be some local tenderness. Gynæcologists agree that intrapelvic conditions are much less often the cause of backache than was formerly suspected; for instance, a retroverted uterus, if otherwise normal, is not now considered to be a cause of backache. Moreover, those intrapelvic conditions which give rise to backache can be readily discovered on examination by a gynæcologist.

In our opinion the incidence of many other conditions which have been accused of causing backache has been unduly emphasised. More than one authority has given support to some of these. True, like us, they regard most conditions as having mechanical, as opposed to infective, causes, but the mechanical causes they give are somewhat different from ours. They make their diagnosis according to the site of the tenderness. When it is over the sacro-iliac joint they call it sacro-iliac strain and recommend manipulation; when it is over the lumbosacral articulation in the mid-line they call it lumbosacral strain and recommend removal of the spinous process. When the patient indicates the site of the pain as being over the lumbar part of the erector spinæ, with muscle spasm, they say it may often be a disk lesion, and that it may improve with physical treatment. Another site of the pain is over the sciatic notch, and they say this may ultimately give rise to a full-blown sciatica, which, in their opinion, is most often due to a narrowing of the lateral vertebral foramen. We hold that the pathology cannot be defined from the site of the tenderness, since patients with proved disk lesions cured by operation have shown tenderness in any or all of these areas.

The explanation of the fact that tenderness is sometimes at a higher level than the affected disk is that, in a disk lesion, the pain in the early stages is, we think, due to tension of the posterior longitudinal ligament, which is stretched over the posterior surface of the disk. It has been shown that the posterior surface of the disk may be innervated by small nerves coming from two or three segments higher, and the pain and tenderness are due to localised muscle spasm induced by irritation of the segmental nerve. We have had many patients who have started with pain, say, over the erector spinæ opposite the third lumbar vertebra, but they subsequently developed sciatica from a disk lesion at the L4–L5 or the L5–S1 space.

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* Read to the Chelsea Clinical Society on Nov. 12, 1946.

The tenderness at all these various sites may be temporarily relieved by injection of procaine, as was shown by Kelgren some years ago, but one is not justified in implying, as he did, that the pain originates at these sites. The tender areas, as has been shown by Elliott (1944) and confirmed by Weddell et al. (1944) using electromyography, are due to localised muscle spasm arising from an irritation of the nerve-root before it leaves the spinal column.

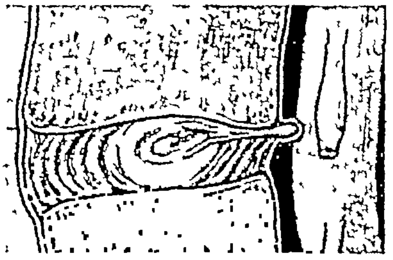

Fig. 1—A small protrusion of the nucleus pulposus through a horizontal tear of the annulus. This gives rise to backache only.

A friend of ours illustrates these points very well.

Many years ago, for pain in her back, she had her sacro-iliac joint fused, but the pain persisted and she was kept on her back for six months. Some time after this, probably because of the rest, she was free from pain. Then we saw her with a tender spot on the upper and outer side of the calf, and we rather lightheartedly diagnosed this as tennis leg, because it came on during a game of tennis. Later, however, she developed a full-blown sciatica. *At laminectomy a large disk lesion was found, the removal of which cured her.*

The moral of this case is that it is misleading to make a diagnosis merely from the site of the tenderness, which is often referred from an intraspinal cause.

ÆTIOLOGY

Persistent backache sometimes follows an injury to the bone or soft parts of the back, as with a chronic sprain elsewhere, but one must not exaggerate the frequency of this condition. Other sites in the body, say in the thigh or arm, which should be equally exposed to strain, are only rarely accused of being the cause of the trouble. We used to diagnose a sprain of the wrist much more often before we learnt to recognise the fractured scaphoid. Once a torn muscle or a flake fracture has become painless elsewhere in the body it remains painless *and is not the cause of recurrent attacks.* An example of this type of fracture is a fracture of the transverse process of a lumbar vertebra. *This will be rapidly and permanently cured if free movement is restored by exercise.*

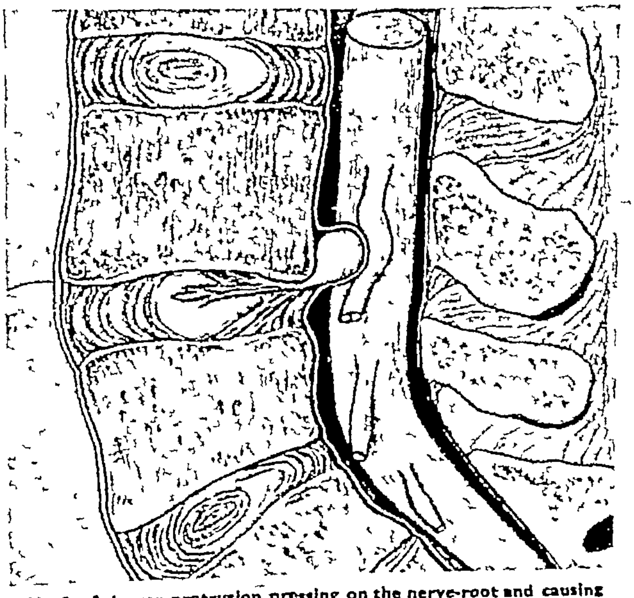

Fig. 2—A larger protrusion pressing on the nerve-root and causing sciatica.

Postural strain may be a factor in some cases of backache. Much emphasis was laid on it some years ago, but we very rarely see this, except in a patient with lordosis below a kyphosis, or perhaps where there is a gross cause for it, as sometimes in the later stages of pregnancy. It should be, and in our experience is, relieved by lying down. *Certainly it is very rarely a factor in the young adult,* in whom it causes only transient trouble.

Postpregnancy backache is said to follow relaxation of the ligaments at parturition, but in a large number of radiograms observed by Roberts (1938-39) the separation of the symphyses was rarely more than 2 mm. Thus it is difficult to see how the sacro-iliac joint could be strained. Postpregnancy backache usually clears up, but where it persists we should expect it to be due to an injury to the disk. In fact, we have had many cases in which a disk protrusion was found and the original injury undoubtedly occurred at parturition.

Sacro-iliac strain from any cause is rare, in our opinion, if indeed it occurs at all.

We regard neurosis as a much less common cause of pain in the back than we formerly did. There is nearly always an organic basis, and it is striking how many patients have been accused of having a neurosis in whom we have found a prolapsed disk. Many cases of what used to be called "railway spine" fall in this category.

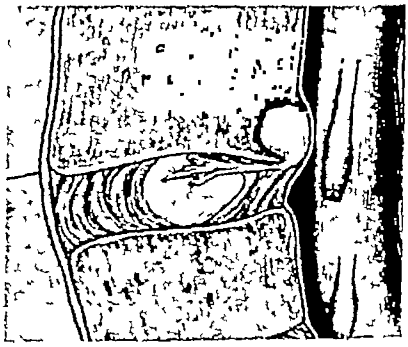

Fig. 3—A condition sometimes found in old-standing cases where the patient no longer complains of sciatica but has persistent backache.

Infective or metabolic causes of backache, such as are attributed to rheumatism or fibrositis, if they exist at all, are not now diagnosed by us. Yet some patients seem to prefer that their recurrent attacks of backache should be ascribed to these causes, rather than to a more precise and accurate mechanical cause. For instance, a patient seems more ready to believe that his attacks of lumbago are consequent on a mild debauch, such as drinking too much champagne or port, than that it should be due to a simple thing like a disk. This is surprising, because it implies, *we should have thought, a considerable constitutional upset,* with a breakdown of the normal metabolism.

We see little evidence of rheumatism, which is supposed to be associated with, or made worse by, cold and damp, *as a cause of painful backaches.* The importance attached to cold and damp as factors in backache or so-called rheumatic complaints has rapidly decreased with increasing knowledge. In the Army the symptoms were often ascribed to these conditions, whereas the truth was that the soldier was at the same time doing strenuous work in which he was likely to damage his disk.

An investigation into "tank back" at a tank-testing unit near Botley revealed that 20% of tank drivers there had backache which came on after they had been driving tanks at speed over rough ground. Those whose age was over 28 or 29 showed a much higher incidence even than this. These patients showed a typical picture of a protruded disk.

In fact, it is becoming increasingly probable that most cases of pain in the limbs have a mechanical cause, and when the pain is referred down the limb *it is due to pressure on the nerve-root.* This applies not only to pain in the lower limb but also to brachialgia or brachial neuritis, many cases of which are due to cervical disk or costoclavicular compression.

PATHOLOGY

We believe it is possible to correlate the symptoms with the pathology we have observed.

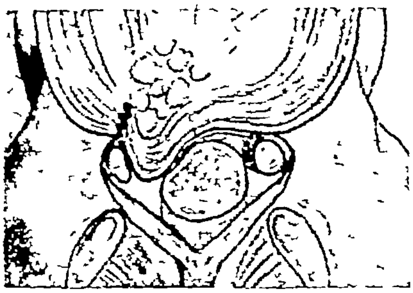

Fig. 4—A tear of the annulus with a bulge.

Fig. 1 indicates how a small protrusion of nuclear material, not large enough to irritate the nerve-root and cause sciatica (fig. 2), can, by causing tension of the posterior longitudinal ligament, give rise to backache alone. These protrusions may pop in and out almost as easily as a hernia does. We have, at operation, often pushed them back; and, if the patient is under light enough anæsthesia to cough or heave, the protrusion reappears.

A similar effect is produced by another type of tear—a lesion of the annulus fibrosus (figs. 4 and 5). Here the torn piece of annulus can swing in and out, mimicking a torn cartilage of the knee. Both these types of lesion, when the protrusion is reduced, give rise to no symptoms, but bending or lifting may force the disk material backwards, producing tension on the posterior longitudinal ligament, thereby causing backache. This, in our opinion, is the explanation of recurrent attacks of backache.

Fig. 3 illustrates an occasional finding in old-standing cases of persistent backache.

TREATMENT AND RESULTS

If these observations on the pathology are accepted, a rational treatment is possible. Needless to say, we do not find it necessary to operate on a high proportion of patients with backache alone. As previously mentioned, most of them get sciatica when they get worse. Nevertheless, operation offers the best chance of permanent cure. None of our patients has been made worse by operation; in fact the operation is without danger—but not without difficulty. The amount of pain and disability have to be balanced against the inconvenience of, and the time spent recovering from, the operation.

The alternatives are rest in bed, or modified rest by wearing a corset. We see little advantage in wearing a plaster cast, since it is more cumbersome and less comfortable than a corset, which is as efficient in restricting movements at the lumbosacral junction.

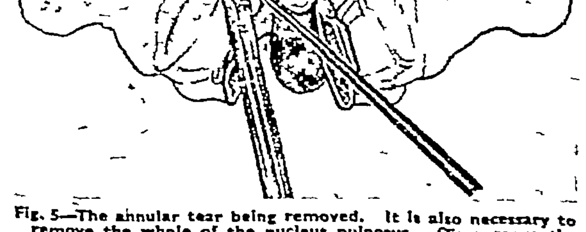

Fig. 5—The annular tear being removed. It is also necessary to remove the whole of the nucleus pulposus. (To remove the charge from the shell, as it were.)

A patient who has an occasional attack of lumbago or a mild chronic backache will prefer to put up with it than submit to operation. Even with sciatica, in the first attack we try the effect of three weeks in bed; then, if the pain goes, we let them off with a caution and a corset. Other types of treatment in our hands have a limited effect, at best only transient. Most of them are efficient in temporarily relieving spasm; but, when the treatment is over, the pain is likely to return. Local injections act in this way, and their effect lasts only a few hours. We have had an extensive experience of epidural injections; they may have been occasionally helpful, probably by anæsthetising the posterior longitudinal ligament or the nerve sheath, but the results are often disappointing and impermanent.

Other forms of physical treatment, such as radiant heat, diathermy, and infra-red rays, do give temporary ease by diminishing the muscle spasm, but their effect is not lasting.

We used to practise manipulation for low backache. Here also the effect was disappointing in our hands, and we rarely do it now. Sometimes it was dramatically effective, probably because it allowed the protruded part to return to its proper place, or shifted the root off the protruded disk. But not infrequently the patient was made worse, and sometimes the patient with sciatica will say that he only had backache before the manipulation, but after it he developed sciatica.

PATIENTS WITH SCIATICA

Treatment	Total cases	Still in pain or having attacks	Symptom-less
Not operated on: First seen 1939–42. Followed up 1945	248	79%	21%
Operated on: 1941–45. Followed up 1946	310	Improved 11% No better 9% } 20%	80%

At one time we used to give all these treatments, and their lack of lasting effect in backache and sciatica is indicated by the accompanying table. Admittedly, this refers to the more severe cases, but the same should apply to less severe cases when the cause is the same.

The figures in the table are from cases of backache and sciatica treated by all the methods in vogue before we operated on them; 248 of these were available for follow-up last year. It will be seen that 79% were still having attacks. Since we began operating in such cases in 1941 the position has been reversed: 80% are now symptomless, and 20% have some pain, 11% being improved but not cured, and 9% no better. All but 9 patients with severe sciatica have been operated on.

The commonest cause of failure, in our opinion, is protrusion of another disk. This occurs less often since we realised that about 12% of the patients operated on have a protrusion of two disks—a double lesion. Another cause of failure, also less common now, is a further protrusion of the same disk, due to incomplete removal of the nucleus pulposus. Re-exploration will remedy both these errors.

A less common cause of failure is a persistently adherent nerve-root. This is benefited by a spinal graft, as are some other uncommon conditions. In fact it is difficult to think of many conditions causing severe low back pain where the pain cannot as a rule be relieved by operation of some description—in a disk lesion removal of the protrusion, in some other conditions by spinal graft, or when there is pressure on the dura or nerve-roots (as sometimes in osteoarthritis or Paget's disease) by laminectomy and uncapping the nerve-roots. Even the pain from a malignant growth of the spine may often be relieved by removing the pressure.

SUMMARY

Persistent or recurrent low backache commonly arises from a lesion of an intervertebral disk or the annulus fibrosus. The other causes can nearly always be diagnosed by straight radiography.

When disk lesions get worse the patient usually develops sciatica.

Operation is the rational treatment for all cases of severe backache due to disk lesions and will cure nearly every case. The operation is free from danger, so the inconveniences of operation must be balanced against those of the backache.

In cases not severe enough to justify operation, all other treatments have a limited effect, except rest and time, which will cure some of them.

Of 310 cases of sciatica due to disk lesions operated on in 1941–45, a follow-up has shown that 80% are still symptomless.

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STREPTOMYCIN IN EXPERIMENTAL PLAGUE

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STREPTOMYCIN is an antibacterial substance produced by the mould *Actinomyces griseus.*[29] It has been isolated in a pure state,[4 21 26] and its chemical constitution partly elucidated; it appears to be the meso-1, 3-diguanidino-2, 3, 4, 6-tetrahydroxycyclohexane glycoside of an as yet incompletely identified disaccharide, one hexose component of which is N-methyl-*l*(-) glucosamine.[3 5 22 27]

In the test-tube streptomycin shows strong antibacterial activity against many species of gram-positive, gram-negative, and acid-fast bacteria.[28 29 30 37] It is comparatively non-toxic to experimental animals [12 28] and humans.[13 18 39] These facts suggest that streptomycin may prove a valuable chemo-therapeutic agent, and it has been used to treat various experimental infections in animals with in most cases considerable success.[2 6 7 8 14 15 16 20 23 28 32 38] Preliminary results in small-scale trials on human patients have been rather encouraging.[9 11 17 19]

In particular, streptomycin has given exceedingly good results in the treatment of tularæmia, both experimentally in animals and in man.[11 14] In view of the close biological relationship between *Brucella tularensis* and *Pasteurella pestis* it was decided to test the effect of streptomycin in experimental plague infections in mice and guineapigs.

METHODS

Media.—The medium used for broth cultures was a 2% tryptic digest of casein, pH 7·6, containing 1% sodium glycerophosphate as buffer, and 0·2% glucose ("TC-glucose broth"). For solid media, a tryptic digest of beef muscle, pH 7·6, containing 1·5% agar and 5% of a peptic digest of sheep's blood [10] was used ("TM-PSB agar").

Viable counts were made by delivering from a calibrated dropping-pipette 7 drops (0·2 ml.) of a suitably diluted bacterial suspension on to the surface of TM-PSB agar plates, and spreading the drops by rotation.[24] Colonies were counted after 40 hr. at 37°C. If desired, 1/500,000 crystal violet may be added to the agar to reduce contaminants. The presence of the peptic blood is essential to obtain full development of isolated colonies under aerobic conditions.[31]

Dilutions were made in 0·9% NaCl or 1% phosphate buffer pH 7·6; broth is not superior to these simple diluents.

Opacities of bacterial suspensions were measured in a Hilger Spekker photo-electric absorptiometer and are expressed as optical densities (log I_0/I per cm. depth).

Strains.—The three virulent strains used (nos 327, 336, and 337) were isolated from human cases in North Africa in 1942. Two avirulent strains—Soemedang and Tjiwidej (Otten's vaccine strains [35])—were also used in in-vitro experiments. Stocks were preserved by drying in gelatin-ascorbic-acid broth,[35] by which means virulence has been fully preserved since 1942; cultures in current use were grown in TM-PSB agar stabs and kept at 0°C, subcultures being made monthly for not more than 6 months.

Test Animals.—White mice (18–20 g.) and guineapigs (225–250 g.) were used. To prevent cross-infection, mice were kept in metal boxes with separate compartments for each animal, and guineapigs in separate cages with cloth covers. Animals were examined daily for a minimum of 3 weeks, some for as long as 6 weeks. Most of those dying were examined post mortem, and the spleen and heart blood examined microscopically and culturally for the plague bacillus. A proportion of survivors was also killed at the end of the experiment and examined post mortem.

Infecting Dose.—Cultures grown for 16 hours at 37°C, either in TC-glucose broth or on TM-PSB agar slopes, were used; contrary to Sokhey's [33] findings, they were equally virulent. The standard infecting dose was 0·2 ml of a 1/10[6] dilution of a suspension of optical density 0·2; dilutions may be made in broth, buffer, or saline. This contained on the average about 500 viable organisms; the exact number was determined in each experiment by viable counts.

Streptomycin.—Two batches of streptomycin hydrochloride (Merck) were used; their potencies were 130 and 280 units/mg.—i.e., 16% and 35% pure. (The material was received in January, 1945; much purer preparations are now available.) Solutions of the desired strength were made in normal saline and sterilised by seitz filtration. Doses of 0·2 ml. were injected subcutaneously or intraperitoneally; care was taken to keep the site of injection of the drug as far as possible from the site of injection of the organisms. In most experiments the streptomycin was injected twice daily, in two equal doses morning and evening.

RESULTS

In-vitro Experiments

Streptomycin inhibits the growth of *Past. pestis* in TC-glucose broth (table I). The minimum concentration required for complete inhibition of growth increases somewhat with increasing size of inoculum, but the effect is small, except with very heavy inocula. The apparently diminished efficacy in this case may be due to the more rapid onset of fermentation and consequent fall of pH, since streptomycin is less effective at an acid pH.[1] Tests were made in glucose broth as being a better approximation to in-vivo conditions than plain broth, and because *Past. pestis* grows poorly in plain broth.

TABLE I—INHIBITORY EFFECT OF STREPTOMYCIN ON GROWTH OF STRAIN 337 IN BROTH, SHOWING EFFECT OF SIZE OF INOCULUM

Inoculum (viable cells/ml.)	*Streptomycin concentration (units/ml.)*					
	0	0·5	1·0	2·0	4·0	6·0
$1{\cdot}25\times10^7$	++++	++++	++++	++++	+++	0
$1{\cdot}25\times10^6$	++++	++++	++++	+	0	0
$1{\cdot}25\times10^5$	++++	++++	+++	0	0	0
$1{\cdot}25\times10^4$	++++	++++	++	0	0	0
$1{\cdot}25\times10^3$	++++	++++	+	0	0	0
$1{\cdot}25\times10^2$	++++	+++±	0	0	0	0

Growth from 16-hour TMA-PSB slope washed off, diluted, and inoculated into 10 ml. tubes of TC-glucose broth containing indicated amounts of streptomycin; inoculum size determined by viable count. ++++, +++, &c., indicates extent of growth after 48 hours' incubation at 37°C.

For comparison, the growth-inhibiting effects of sulphanilamide, sulphathiazole, and penicillin were tested under the same conditions (table II). From these results, *Past. pestis* appears considerably more sensitive to all three drugs in vitro than most gram-negative bacteria are reported to be.

The minimum inhibitory concentration of each of these drugs, and of streptomycin, was the same for all the plague strains tested; no difference was observed between the virulent and avirulent strains.

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* Now working in the Medical Research Council's Unit for Bacterial Chemistry, at the Lister Institute, London.

TABLE II—IN-VITRO ANTIBACTERIAL EFFECT OF PENICILLIN AND SULPHONAMIDES

Penicillin	Conc. (units/ml.)	0	0 5	1 0	1 5	2·0	3·0	4·0
	Growth (48 hr.)	++++	+++±	+++	++	+	0	0
Sulphanilamide	Conc. (*M*)	0	$2{\cdot}5 \times 10^{-4}$	5×10^{-4}	10^{-3}	2×10^{-3}	5×10^{-3}	10^{-2}
	Growth (48 hr.)	++++	++++	+++	+	0	0	0
Sulphathiazole	Conc. (*M*)	0	10^{-5}	3×10^{-5}	10^{-4}	3×10^{-4}	10^{-3}	3×10^{-3}
	Growth (48 hr.)	++++	++	+	0	0	0	0
Sulphathiazole and *p*-aminobenzoic acid	Conc. (*M*)	0	10^{-4}	10^{-4}	10^{-4}	10^{-4}	10^{-4}	10^{-4}
	Conc. (*M*)	0	10^{-5}	3×10^{-6}	10^{-6}	3×10^{-7}	10^{-7}	0
	Growth (48 hr.)	++++	++++	++++	++±	±	0	0

Methods exactly as in table I. Strain 337 used in last experiment, and Tjiwidej in first three; inoculum in all cases 6×10^{-8} cells/ml.

Streptomycin appears to have a direct killing action on bacteria, as table III shows. With a concentration of 10 units/ml., an inoculum of 2×10^{6} viable cells/ml. was reduced to 1520/ml. in 2 hours and completely sterilised in $5^1/_2$ hours. With 3 units/ml. the bactericidal action was somewhat slower, but effectively complete in 24 hours, and with 1 unit/ml. no fall in viable count was observed, but growth was delayed compared with the control.

Streptomycin therefore appears to have a bactericidal rather than a bacteriostatic action, in this respect resembling penicillin rather than the sulphonamides.

TABLE III—BACTERICIDAL EFFECT OF STREPTOMYCIN

Streptomycin conc. (units/ml.)	Viable count (cells/ml.) after incubation for:				
	0 hour	0 5 hour	2·0 hours	5·5 hours	24 hours
0	1,900,000	2,600,000	6,500,000	35,000,000	290,000,000
1·0	1,900,000	2,400,000	5,500,000	17,000,000	130,000,000
3·0	1,900,000	2,100,000	2,300,000	970	45
10 0	1,900,000	2,050,000	1520	0	0

10 ml. tubes of TO-glucose broth, containing different concentrations of streptomycin, inoculated with 0 05 ml. of a 16-hour broth culture of strain 337. Samples withdrawn for viable counts immediately and after different periods of incubation at 37°C.

Experiments on Mice

In chemotherapeutic experiments it is important to use a susceptible test animal and a highly virulent infecting organism in sufficient dosage to ensure an almost certain 100% kill in control animals. Strain 337 was used for all the animal experiments reported here. In a typical titration of this strain, subcutaneous doses of 5, 50, and 504 viable organisms killed respectively 19/20, 20/20, and 20/20 mice (mean death times 6·1, 4·8, and 3·7 days). The standard infecting dose was 500 viable organisms; in these and other experiments, in which over 300 control mice were infected with this dose, none survived.

Fig. 1 shows an experiment in which groups of 20 mice, infected subcutaneously with the standard infecting dose, were treated with streptomycin at three different dosage levels. Five doses were given over a 48-hour period, the first dose immediately after infection. At dosage levels of 800 and 400 units/day, the survival-rates were 85% and 45%; all the control mice died. A dosage of 200 units/day saved only 5%, though survival-time was significantly prolonged.

TABLE IV—MICE INFECTED SUBCUTANEOUSLY AND TREATED WITH STREPTOMYCIN 800 UNITS/DAY, STARTED 0, 1, 2, AND 3 DAYS AFTER INFECTION

Streptomycin treatment started:	Survivors (21 days)	Mean death time (days)
Immediately after infection	17/20 (*85%*)	6·8
24 hr. after infection ..	12/20 (*60%*)	8·1
48 hr. after infection ..	1/20 (5%)	5 8
72 hr. after infection ..	0/20	6 0
Controls (no treatment) ..	0/20	3·8

Mice 16–18 g. Infecting dose 349 viable organisms subcutaneous (in back). Streptomycin doses of 400 units in 0 2 ml saline injected intraperitoneally twice daily for $2^1/_2$ days (5 doses = 2000 units in all).

These results show that streptomycin in doses of 800 units/day gives very good protection when used semi-prophylactically—i.e., treatment starting at the same time as infection. A more realistic and more stringent test of the efficacy of a drug is provided by therapeutic treatment. Table IV shows the results of an experiment in which the administration of streptomycin was delayed for 1, 2, and 3 days after infection; in all cases the dosage was 800 units/day (given in two equal doses) continued for $2^1/_2$ days. When treatment was begun at the time of infection 85% survived (cf. the previous experiment); when it was delayed for 24, 48, and 72 hours the survival-rates were 60%, 5%, and 0%. In the last two groups survival-time was significantly prolonged.

Fig. 2 shows a similar experiment in which twice the above dosage of streptomycin was used (1600 units/day) and treatment continued for $3^1/_2$ days. In this case the survival-rates for treatments started 0, 24, and 48 hours after infection were 90%, 95%, and 35%, compared with 85%, 60%, and 5% in the previous experiment. The combination of higher dosage and longer treatment is therefore definitely more effective. There were again no survivors in the group where treatment was delayed for 3 days after infection, though survival was significantly prolonged; it should be pointed out, however, that in this group 30% of the animals were already dead and most of the rest extremely ill before treatment started.

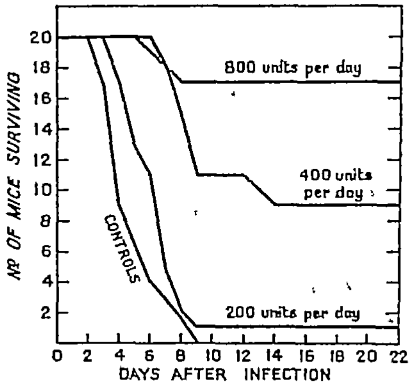

Fig. 1—Effect of different dosages of streptomycin on survival of mice weighing 18-20 g. infected subcutaneously with 592 viable organisms; streptomycin given in doses of 400, 200, or 100 units intraperitoneally twice daily for $2^1/_2$ days (5 doses in all), starting immediately after infection.

At the end of this experiment the survivors were reinfected with the same dose of virulent plague organisms, to test for immunity (table V). In the group whose treatment had been started at the time of infection there was no detectable immunity. In the groups whose treatment started 1 and 2 days after infection there was respectively moderate immunity (26% survivors) and good immunity (86% survivors). The longer the organism is allowed to develop in the body before treatment begins, therefore, the greater the subsequent immunity in surviving animals.

In the experiments so far described the streptomycin was administered in relatively small doses over several days. In view of the bactericidal action of streptomycin in vitro, which is greater the higher the concentration (table II), it was thought that a single massive dose would possibly be more effective than the same total amount of drug given in several small doses over a longer period. Table VI records an experiment in which groups of mice were given a single dose of 2000 units at 0, 24, and 48 hours after infection. The corresponding survival-rates were 80%, 10%, and 0%. In the experiment recorded in table IV the same amount of streptomycin was given in 5 doses of 400 units during $2^1/_2$ days, and here the corresponding survival-rates were 85%, 60%, and 5%; this treatment therefore seems more effective than does administration of all the drug in a single large dose.

In the next experiment streptomycin was compared with penicillin and sulphathiazole, both of which inhibit the growth of the plague bacillus in vitro (table II). Sulphathiazole has already been found to give quite good results in plague infections of mice and men[34 36]; so far as I am aware, no reports on penicillin treatment of plague have yet appeared.

TABLE V—MICE INFECTED SUBCUTANEOUSLY AND TREATED WITH STREPTOMYCIN 1600 UNITS/DAY, STARTED 0, 1, 2, AND 3 DAYS AFTER INFECTION; SURVIVORS TESTED FOR IMMUNITY

—	First infecting dose—1st day (590 viable organisms)		Second infecting dose—24th day (726 viable organisms)	
Streptomycin treatment started:	Survivors *(24 days)*	Mean death *time* (days)	Survivors (21 days *after* 2nd infection)	Mean death *time* (days)
Immediately after infection	18/20 (*90%*)	14	0/18	3 8
24 hr. after infection	19/20 (*95%*)	3	3/19 (*26%*)	5·0
48 hr. after infection	7/20 (*35%*)	9·8	6/7 (*86%*)	12 0
72 hr. after infection	0/20	5·0	..	..
Controls (no treatment)	*0/20*	3·5	..	..
"	..	..	0/20	3·1

Streptomycin doses of 800 units in 0 2 ml. saline injected intraperitoneally twice daily for $3^1/_2$ days; 7 doses = 5600 units (cf. fig. 2). After 24 days, survivors given second infecting dose (but no further streptomycin treatment) to test for immunity.

The minimal amounts of these three drugs required to inhibit the growth of strain 337 in vitro are about 2 units of streptomycin, 3 units of penicillin, and 5 μg. of sulphathiazole per ml. of broth. Groups of infected mice were therefore given each day two doses each sufficient to produce ten times these concentrations in the bodies of 20 g. mice—i.e., total daily doses of 800 units of streptomycin, 1200 units of penicillin, and 20 mg. of sulphathiazole. Two more groups were given 5000 units/day of penicillin and 10 mg./day of sulphathiazole. Treatment was started immediately after infection and continued $2^1/_2$ days with streptomycin and 6 days with the other two drugs. The results are shown in fig. 3.

In the streptomycin-treated group there were 90% survivors, whereas in the penicillin-treated group receiving 1200 units/day there were no survivors (though life was significantly prolonged). Since the doses of the two drugs were in the ratio of their respective in-vitro activities, it is evident that penicillin is relatively much less effective in vivo than streptomycin. One reason for this may be that penicillin is more rapidly excreted. That penicillin has some in-vivo activity is shown by the fate of the group receiving 5000 units/day, in which there were 30% survivors; in view of the relatively enormous dosage, however, this result cannot be considered very impressive.

TABLE VI—MICE INFECTED SUBCUTANEOUSLY AND TREATED WITH SINGLE LARGE DOSE OF STREPTOMYCIN

Streptomycin (2000 units) injected:	Survivors (21 days)	Mean death time (days)
Immediately after infection ..	8/10	6 0
24 hr. after infection	1/10	5·3
48 hr. after infection	0/10	5·5
Controls (no treatment)	0/10	3 6

Infecting dose 592 viable organisms, subcutaneous, in right flank. Streptomycin dose 2000 units in 0 2 ml. saline, subcutaneous, in left flank.

With sulphathiazole (20 mg./day) there were no deaths during the treatment period, but animals began to die after the drug was discontinued, and on the 24th day only 55% survived. This is in contrast to the results obtained with streptomycin, where very late deaths are uncommon, and is in agreement with the view that the action of sulphathiazole is bacteriostatic only, whereas that of streptomycin is mainly bactericidal. Sulphathiazole in smaller dosage (10mg./day) was far less effective, giving only 5% survival, though again most of the deaths were late.

These and other results I have obtained with sulphathiazole are less impressive than those of Sokhey and Dikshit,[34] who used a less severe infecting dose and sulphathiazole doses of 40 mg. and even 80 mg./day, continued for 10 days. In common with other workers, I have found such doses definitely toxic, causing significant death-rates in control mice; 20 mg./day appeared to be the highest safe dose for continued administration.

Better results might have been obtained with sulphathiazole if treatment had been continued longer than 6 days. Even so, streptomycin was considerably more effective with a still shorter treatment period ($2^1/_2$ days) and a dosage well below the toxic level. From these comparative tests streptomycin appears to be definitely superior to sulphathiazole and greatly superior to penicillin.

Experiments with Guineapigs

Guineapigs are as susceptible as mice to plague, though rather less regular in their response; occasional "escapes" may occur with high infecting doses. In a titration of strain 337 in guineapigs doses of 360, 36, and 4 viable organisms killed respectively 7/8, 8/8, and 8/8 animals in 3 weeks (mean death times 6·9, 7·8, and 9 0

TABLE VII—GUINEAPIGS INFECTED SUBCUTANEOUSLY AND STREPTOMYCIN TREATMENT STARTED 0, 1, AND 2 DAYS AFTER INFECTION; SURVIVORS TESTED FOR IMMUNITY

—	First infecting dose—1st day (456 viable organisms)		Second infecting dose—22nd day (693 viable organisms)	
Streptomycin treatment started:	Survivors (22 days)	Mean death time (days)	Survivors (21 days after 2nd infection)	Mean death time (days)
Immediately after infection.	8/8	..	0/8	6 1
24 hr. after infection ..	8/8	..	1/8	7 5
48 hr. after infection ..	8/8	..	2/8	9 5
Controls (no treatment)	0/8	7 1	..	..
"	..	..	0/8	6 5

First infecting dose injected subcutaneously into right flank. Streptomycin doses of 5000 units in 0·5 ml saline injected subcutaneously into left flank, twice daily for $3^1/_2$ days (7 doses = 35,000 units in all), starting at the times indicated After 22 days, survivors given a second infecting dose (but no streptomycin), to test for immunity.

days). The standard infecting dose of about 500 organisms, however, almost invariably produced 100% deaths.

Owing to the scarcity of streptomycin and the larger doses required, it was possible to perform only one experiment with guineapigs, the results of which are shown in table VII. The streptomycin dosage was 10,000 units/day, given in two equal doses; this is the same dosage on a body-weight basis (40,000 units/kg./day) as was used in most of the mouse experiments. Dosage was started 0, 1, and 2 days after infection and continued for $3^1/_2$ days. The results were spectacular; all the treated animals survived 3 weeks, whereas all controls died in 10 days. The treated animals remained healthy and put on weight.

On the 22nd day all survivors and a fresh group of controls were reinfected to test for immunity. The group whose streptomycin treatment had started immediately after infection showed no immunity; all died in about the same time as the controls. In the groups whose treatment had started 1 and 2 days after infection there was some slight evidence of immunity; 1/8 and 2/8 respectively survived, and death times were prolonged. The immunity, however, was much less than in the corresponding experiment with mice (table V).

DISCUSSION

Owing to the scarcity of streptomycin in April-August, 1945, when this work was carried out, many desirable experiments had to be left undone. Incomplete as the results are, they nevertheless show that streptomycin is strikingly effective in the treatment of plague infections in guineapigs and mice. Infection by subcutaneous inoculation produces in these animals a reasonably close replica of natural bubonic plague in man. Intraperitoneal inoculation leads to a more acute type of infection, corresponding rather to pure septicæmic plague. In both types of infection streptomycin appears to be equally effective (cf. figs. 2 and 3).

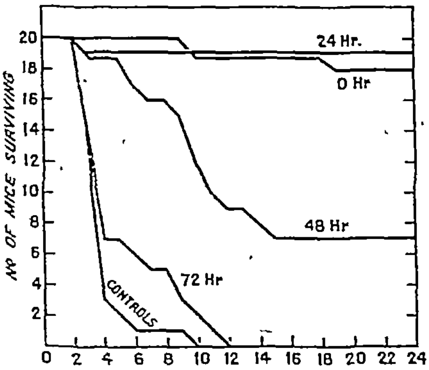

Fig. 2—Effect of streptomycin, 800 units intraperitoneally twice daily for $3^1/_2$ days, on survival of mice weighing 18-20 g. Infected subcutaneously with 590 organisms; treatment started at times after infection indicated on curves.

It has also been possible to produce in animals, by inhalation, lung infections closely corresponding to pneumonic plague in man. (This was done by exposing animals to aerosols of virulent plague organisms produced in an apparatus designed at the Microbiological Research Department, Porton, by Dr. D. W. Henderson, a description of which is shortly to be published.) In this type of infection, also, streptomycin is highly effective—a striking finding, since pneumonic plague is a more severe disease than the bubonic form, with a case-mortality under natural conditions usually close to 100%.

A remarkable feature of streptomycin therapy is the success achieved with comparatively short periods of treatment, or even with a single dose. This is in sharp contrast to sulphathiazole, which has to be given over a long period to produce good results, and suggests that streptomycin has a direct bactericidal action in vivo as in vitro.

The short treatments and moderate doses necessitated in these experiments by lack of material were almost certainly not optimal. For example, mice dying late after short-period streptomycin treatment usually showed local necrotic lesions at the site of infection which were much larger than in control mice (presumably because these died sooner). It seems probable that the streptomycin was preventing any generalised infection but did not succeed in sterilising these necrotic areas owing to inefficient penetration or less effective action at the lowered pH in such lesions.[1] Better results in such cases might well be obtained with larger doses, giving higher tissue concentrations, and with longer periods of treatment. The doses used in these experiments were well below the toxic level.

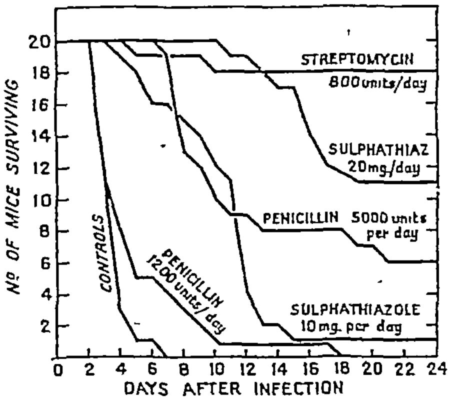

Fig. 3—Comparison of effects of streptomycin, sulphathiazole, and penicillin on survival of mice weighing 18-20 g. Infected intraperitoneally with 599 organisms; drugs injected subcutaneously twice daily, streptomycin being continued for $2^1/_2$ days, and penicillin and sulphathiazole for 6 days.

The guineapigs and mice used in this work are animals with little or no natural resistance to plague. In a species, like man, with a fair degree of natural resistance, even better results might be expected. Now that streptomycin is beginning to be obtainable in reasonable quantity it seems desirable that it should soon be tried in human plague.

SUMMARY

Streptomycin inhibits the growth of the plague bacillus in vitro and, in concentrations of 3 units/ml. or over, brings about rapid sterilisation of plague cultures.

In mice infected subcutaneously with a highly virulent plague strain, in dosage sufficient to kill 100% of control animals, $2^1/_2$-day courses of streptomycin injections (800 units/day) started 0, 24, and 48 hours after infection gave 85%, 60%, and 5% survival. A dosage of 1600 units/day for $3^1/_2$ days gave 90%, 95%, and 35% survival when started 0, 24, and 48 hours after infection.

In guineapigs infected by subcutaneous injection, $3^1/_2$-day courses of streptomycin injections (40,000 units/kg./day) gave 100% survival, even when dosage was delayed for 48 hours after infection.

Streptomycin is equally effective in the treatment of artificially induced pneumonic plague in both mice and guineapigs.

Penicillin and sulphathiazole also inhibit the growth of *Past. pestis*, which in vitro appears more sensitive than most gram-negative organisms to these drugs. In comparative tests in infected mice, however, streptomycin was considerably more effective than sulphathiazole, and penicillin was only slightly effective, even in very high dosage.

This work was done at the Microbiological Research Department, Experimental Station, Porton, where I was seconded by the Medical Research Council. I wish to thank the Chief Superintendent and staff of the department for the help and facilities afforded; the Director, Camp Detrick, U.S.A., for

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CLICKING PNEUMOTHORAX

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FOR several years it has been known that a patient with a small pneumothorax on the left side may be conscious of a curious clicking sound synchronous with the heart beat, and occasionally this is the only clinical evidence of the condition. Physical examination may reveal nothing of significance, though with the stethoscope the sound is generally to be heard on the left side of the chest in various situations and most often near the apex-beat. Sometimes the "click" is so loud that it is audible at some distance from the chest. Careful radiography may show the small pneumothorax, but its demonstration is not easy.

Scadding and Wood [1] discussed the causation of these systolic clicks due to left-sided pneumothorax. The lesion in the lung is presumably small—e.g., a minute perforation of an emphysematous bulla—and the escape of air into the pleural cavity limited, so that a bubble forms, at the periphery of which there will be viscous adhesion between the visceral and parietal layers of pleura. Should this occur on the left side, each beat of the heart causes a slight separation of the viscous adhesion, with a clicking sound audible to the patient, either because the heart changes its position in systole and diastole, and so alters the shape of the bubble, or as the result of a slight change in intrapleural tension induced by the sudden expulsion of about 100 c.cm. of blood from the thorax in systole. However that may be, there is no doubt that the sound is always synchronous with the heart beat and that it immediately disappears if the pneumothorax increases in size. Scadding and Wood produced the sound experimentally by inducing a very small pneumothorax in a case of tuberculosis; it ceased as soon as a larger quantity of air was injected.

I have records of two patients in whom the small bubble was demonstrated radiographically in the axillary region; neither suffered any pain. Within a few days both developed a total pneumothorax, and the clicking sound ceased. Both of these patients recovered completely; they were under 30 years of age.

All the patients agree that the sound varies in intensity with their position, and that it may in certain postures entirely disappear—possibly because the bubble changes its situation.

CASE-RECORDS

Case 1.—On July 17, 1937, a man, aged 72, was playing tennis, when he suddenly gave a cry and fell to the ground; his breathing became distressed, and he quickly died.

His previous health had been good; he had just returned from a holiday, and his friends had been pleased by his apparent recovery from his wife's death in March of the same year. He had not consulted his doctor, and his sudden end was attributed to coronary occlusion; no necropsy was made.

In 1945, eight years after his death, a journal of his was discovered which contained an admirable description of the essential symptom of limited spontaneous left-sided pneumothorax:—

"*June 11, 1937:* this strange ticking is getting rather more frequent. I cannot locate it except to say that it is not in the heart, nor apparently in the brain. The throat seems the nearest spot that I can suggest—or perhaps over the back of the roof of my mouth. It resembles the tick of a grandfather clock more than any other sound I can identify. It seems to be constantly with me; but, though it seems almost incessant when I am quiet, occasionally it ceases.

"I can give no explanation whatever for its appearance or disappearance. I am in perfect health so far as I know. I suffer from no headaches, no unusual shortness of breath, nor any form of pain or inconvenience, neither is there any thumping or palpitation. It seems better when I am lying on my back in bed; but when I lie on my side it seems much as when I am sitting or standing.

"The first occasion I noticed it was about a week ago. I was alone in the library, and the noise was so loud that I thought it was the kitchen clock ticking, and I went to the door of the kitchen to see if it was open.

"*June 20* (Scilly): up to yesterday there seemed to be little change, but I do not think the noise lasted so long. But last night and today I think it is decidedly better. If, as I imagine, it is nerves, no doubt the perfect rest and holiday are doing it good."

Four weeks later he died suddenly as I have described—almost certainly because the pneumothorax recurred and overwhelmed him.

An important feature of this condition which has not received adequate attention is an occasional severe pain persisting for several days and suggesting on superficial analysis the pain of coronary occlusion.

Case 2.—In 1939 a young man consulted me. Six months previously, while playing tennis, he had been seized with severe pain in the left pectoral region, radiating to the shoulder and down the left arm. The pain persisted for several days and gradually disappeared.

His doctor told him that he had probably had "a clot in the blood-vessel of his heart." He rested for four months and then, as he felt quite well, began to play tennis again without his doctor's knowledge.

A week before I saw him, in the middle of a game, he was seized with similar pain. His doctor rebuked him and referred him to a cardiologist, who confirmed the tentative diagnosis of coronary occlusion and advised complete rest for a year.

The electrocardiogram and radiogram of the heart were normal. Physical examination revealed nothing of importance, and the blood-pressure was 120–80. When I asked him if he had had any other symptom but the pain, he said that he hardly liked to mention it, but on each occasion he had been conscious of a clicking sound, which ceased in the first attack just before the pain disappeared. The sound varied in intensity, and he could make it go by lying on his left side with the trunk slightly raised. I asked why he was diffident about describing so remarkable an experience, and he replied that, when he had done so previously, he had been considered fanciful, and one doctor asked if he had *seen* anything as well, as if he had been drinking.

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[1] Scadding, J. G., Wood, P. *Lancet*, 1939, ii, 1208.

The same day Dr. James Brailsford demonstrated radiographically a small bubble of air in the upper mediastinal area of the left pleural cavity, and later published the picture.[2] Ordinary anteroposterior and lateral radiograms did not show this bubble, and it took much careful positioning to obtain the radiographic evidence. The man recovered quickly and has led a full and active life since.

Case 3.—In October, 1936, a doctor, aged 32, developed a severe cold; he had no fever, but some rales were found at the right base, and his sputum was a little bloodstained. No tubercle bacilli were found in it, and cultures showed pneumococci. He appeared to recover and went for a holiday.

Six weeks later, soon after returning to work, a sudden pain came on in the left side of the chest and shot down the left arm. The pain in the arm seemed to throb with the heart beat and was worse on effort. He had no cough, no fever, and no dyspnœa. He remained in bed and, while lying on his back, was conscious of a strange rhythmical sound—" like fish falling on a slab "—but he had not noticed, until I pointed it out, that it was synchronous with the heart beat. At the left lateral border of the manubrium in the first intercostal space a sound suggesting pericardial friction was audible with the stethoscope. A radiogram of the chest three weeks after the onset was normal.

The patient has been well since, but in 1938 there was another slight hæmoptysis when he had a cold. Further radiography and several examinations of the sputum revealed nothing.

He probably has a small bronchiectasis associated with an emphysematous bulla which ruptured. In view of the situation of the friction sound the limited pneumothorax was probably in the mediastinal area; as in case 2. An air bubble in this situation might cause pain suggesting angina by its distribution but not by its character, whereas an air bubble elsewhere is painless.

DISCUSSION

Altogether, including the cases described above, I have notes of 8 patients with " clicking " spontaneous pneumothorax; in 2 the condition was associated with pain suggesting angina (1 of these had two distinct attacks in six months); in 5 the sound was detectable with a stethoscope, but in 2 I could hear nothing abnormal, though the patients complained of the clicking, and radiography showed the small pneumothorax. One patient (case 1) was not examined, but his diary leaves no doubt of the diagnosis; 3 patients developed total pneumothorax within a short time of the first appearance of the sound, which then ceased immediately. One man, aged 72, died suddenly about six weeks after the clicks first appeared; total pneumothorax in the elderly is often rapidly fatal.

I agree with Scadding and Wood [1] that the clicking sound in limited left-sided pneumothorax is quite distinct from the crackling to be heard in mediastinal emphysema. In the only case of spontaneous mediastinal emphysema that I have seen—associated with asthma, as it generally is—the sounds were quite different in quality from that of the clicks, and they also varied more with the respiration than with the heart beat.

SUMMARY

A description is given of 3 cases of clicking spontaneous pneumothorax, and 5 others are briefly reviewed.

The clicking is usually heard on the left side, near the apex-beat. It is probably due to an air bubble in contact with a pleural adhesion. Such a bubble can sometimes be demonstrated radiographically.

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[2] Brailsford, J. F. *Med. Annu.* 1940, plate ix (wrongly labelled " mediastinal emphysema")

HYPOPITUITARISM, HYPOGONADISM, AND ANÆMIA

TREATED WITH TESTOSTERONE

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THE rôle of the pituitary in hæmopoiesis is well recognised, polycythæmia being associated with basophilism, and anæmia with hypopituitarism. In 1937 Snapper and colleagues first described pituitary deficiency complicated by anæmia, usually macrocytic but in some cases microcytic and hypochromic. Most of the patients had achlorhydria and signs of hypogonadism, and 3 developed subacute degeneration of the spinal cord. All responded well to iron or liver. Witts (1942) reported 2 more cases in which the macrocytic anæmia responded well to liver.

The 2 cases of hypopituitarism and hypogonadism described here are unusual in that the associated anæmia was resistant to treatment with liver, thyroid, or iron but responded dramatically to injections of testosterone propionate.

Case 1.—An engineer's assistant, aged 20, was admitted to the Worcester Royal Infirmary on March 8, 1943, under the care of Dr. H. C. Rook, for increasing lassitude and weakness. At the age of 16 he had had a macrocytic anæmia which responded to liver. Treatment was discontinued at the age of 18.

The most notable feature was his extremely youthful appearance, for he resembled a boy of 13. He was well proportioned but of small stature, with a smooth skin and fine hair. Weight 84 lb. Moderate pallor, with symmetrical pigmentation over the " butterfly area " of the face. He had no axillary hair and had never shaved. Pubic hair scanty but of male distribution. Penis and testicles rather small. He spoke quietly with the voice of an adolescent. Tongue smooth, but had never been sore. Fingers tended to be clubbed; no koilonychia; nails not brittle. Spleen and lymph-nodes impalpable, but liver enlarged to three fingerbreadths below costal margin.

He ran an irregular fever, which reached on occasions 102°F, but produced no subjective symptoms; and in spite of his lassitude and weakness it was with difficulty that he could be persuaded to leave his work and enter hospital for investigation. Thyroid not enlarged. Pulse-rate 80 per min., blood-pressure 120/70 mm. Hg. No signs of disease of central nervous system. Breasts not enlarged. Blood-count showed moderate macrocytic anæmia, with slight or moderate anisocytosis and poikilocytosis; Hb 44% (Haldane), red cells 1,750,000 per c.mm., colour-index 1·25, mean corpuscular diameter 8·6 μ; leucocytes 4100 per c.mm. of which 2173 were neutrophils (myelocytes 41, young forms 41, band forms 41, and segmented 2050), no eosinophils, 41 basophils, 1681 lymphocytes, 164 monocytes, and 41 erythroblasts. There was an associated thrombocytopenia, the platelet count being 45,000 per c.mm.

Sternal puncture showed slightly reduced cellularity, with a decrease in the myeloid-erythroid ratio due to an absolute reduction of the more mature neutrophil leucocytes. Earlier myeloid cells were present in normal proportions. A slight excess of eosinophils was noted and attributed to the liver therapy. A study of the erythroid cells showed a decided erythroblastic transformation, the defect in maturation of the nucleus being more notable than the premature hæmoglobinisation. Megakaryocytes not seen. The findings therefore were those of a dyshæmopoietic macrocytic anæmia not inconsistent with a diagnosis of addisonian anæmia.

Erythrocyte fragility: hæmolysis began at 0·45% and was complete at 0·3%. Test-meal showed achlorhydria, but histamine was not administered. Glucose-tolerance was increased, blood-sugar levels being 54, 55, 58, 64, and 65 mg. per 100 c.cm. Liver function, as assessed by Takata-Ara test and lævulose-tolerance curve, appeared normal. Microscopical examination of the stool showed no abnormality, and no evidence of steatorrhœa was present on chemical analysis of a stool (total fat 35·9%, of which 97% was split). Wassermann and Meinicke reactions negative, and radiograms of pituitary fossa normal. Basal metabolic rate + 32%.

Plasma-bilirubin level 0·2 mg. per 100 c.cm., blood-chlorides 453 mg. per 100 c.cm., serum-potassium 23 mg. per 100 c.cm., and serum-sodium 326 mg. per 100 c.cm. No urinary abnormalities. Urinary androgen output 3 mg. a day. This estimation was performed by the method of Callow et al. (1938), slightly modified by Mr. H. S. Salt. By this method the normal androgen output estimated as 17-ketosterone is 3·5–15 mg. a day in men and 1·7–12·6 mg. in women. The figure therefore was below normal and was additional evidence of hypogonadism.

During the next six weeks various parenteral and oral liver preparations were administered with no improvement. Three blood-transfusions gave only transient benefit. In fact, the hæmoglobin had fallen as low as 28% and red cells to 1,200,000 per c.mm. some four weeks after admission. In this period he lost 5 lb. in weight.

At the end of six weeks, on the advice of Prof. L. J. Witts, the liver therapy was suspended for four days and then started again. In this period testosterone propionate 5 mg. daily was given for two days, and thereafter in doses of 25 mg. twice weekly. The drug produced a rapid improvement in the blood condition. The reticulocyte count rose to 16·5% on the ninth day. The Hb value and red-cell count rose steadily in the next five weeks, Hb reaching 100% and red cells 4,500,000. During the same period his weight increased by 35 lb., and he developed a ruddy complexion reminiscent of the "brewers' drayman" facies. The tongue was thought to be less smooth than previously, and the liver was no longer palpable.

He was discharged after some eleven weeks in hospital and has been seen several times since. Though he has received neither testosterone nor liver, he has remained well and at work, and his blood-count is still satisfactory. He has, however, lost his ruddy complexion, and the vigour and alertness which he possessed while in hospital.

After recovery several of the tests were repeated. A glucose-tolerance test now gave figures of 89, 106, 119, 94, 92, and 90 mg. per 100 c.cm., suggesting that pituitary function had improved. This was further confirmed by the reappearance of free acid in the gastric juice. Mr. Salt investigated the blood-sugar response following the injection of three minims of adrenaline. The result indicated substantially normal glycogenolytic activity:

	Mg. per 100 c.cm.		Mg. per 100 c.cm.
Fasting	97	25 min.	116
5 min.	88	30 ,, ...	104
10 ,, ...	88	40 ,, ...	96
15 ,, ...	96	50 ,, ...	101
20 ,, ...	95	60 ,, ...	106

The relevant features of the case are summarised in fig. 1.

Case 2.—A male clerk, aged 52, was admitted to hospital under the care of Dr. Geoffrey Evans on Feb. 11, 1944, for undue fatigue and impotence. He said that he had never felt well since the last war, when he was discharged from the Army because he was "pale and lifeless." He suffered from severe recurrent colds which completely incapacitated him for several weeks at a time. He was admitted to hospital in 1924 with severe pyorrhœa requiring the removal of several teeth. This was followed by septicæmia, from which he made "a miraculous recovery." After this illness his previous lassitude increased.

He married in 1931 and, though libido was present, he failed to have sexual intercourse on several occasions. He noted that his testicles were becoming smaller, and during the next ten years he experienced no sexual desire. In 1934 he was told he was anæmic and was treated with iron and thyroid. He had been under constant medical treatment since then, and his doctor had found it impossible to raise the Hb level above 70% despite various iron and liver preparations.

For the past year he had noted that the hair on his head was being shed. The hair on his body had almost disappeared. For the past five years he had needed to shave only every third day. There had been no glossitis, dysphagia, or sore corners of the mouth, and no paræsthesiæ had been felt in the extremities.

His height was 6 ft. 2 in. and his weight 13 st. 7 lb. He was coöperative, with a happy disposition, and spoke in a high-pitched rather feminine voice. His skin was pale and sallow, resembling parchment. There was a tendency to prognathism. Hair scanty on the chin and upper lip, thin and fine on scalp. His fat was of the female distribution, as was also his scanty pubic hair. No axillary or pectoral hair was present. There was no gynæcomastia. Mucosæ pale and nails ridged and brittle. Tongue rough, thyroid normal. Heart showed no abnormality; blood-pressure 136/74 mm. Hg; pulse-rate 64 per min. Penis normal in size, but both testicles atrophic, being the size of peas.

He had a moderate microcytic hypochromic anæmia: Hb 62%, red cells 3,250,000 per c.mm., colour-index 0·9; anisocytosis and moderate poikilocytosis present; white cells 8600 per c.mm. (differential count normal).

Test-meal showed histamine-fast achlorhydria. Glucose-tolerance curve showed a moderately increased tolerance (70, 100, 95, 90, and 80 mg. per 100 c.cm.). Basal metabolic rate – 10%.

Sternal puncture (Dr. George Discombe) revealed some marrow hypoplasia, but normoblastic erythropoiesis was present. Gastroscopy (G. W.) showed some atrophy of mucosa in upper half of stomach. Pituitary fossa of normal size on radiography.

Hypopituitarism and anæmia were diagnosed, and treatment attempted with dilute hydrochloric acid and iron. There was no improvement in the blood picture, and the addition of liver

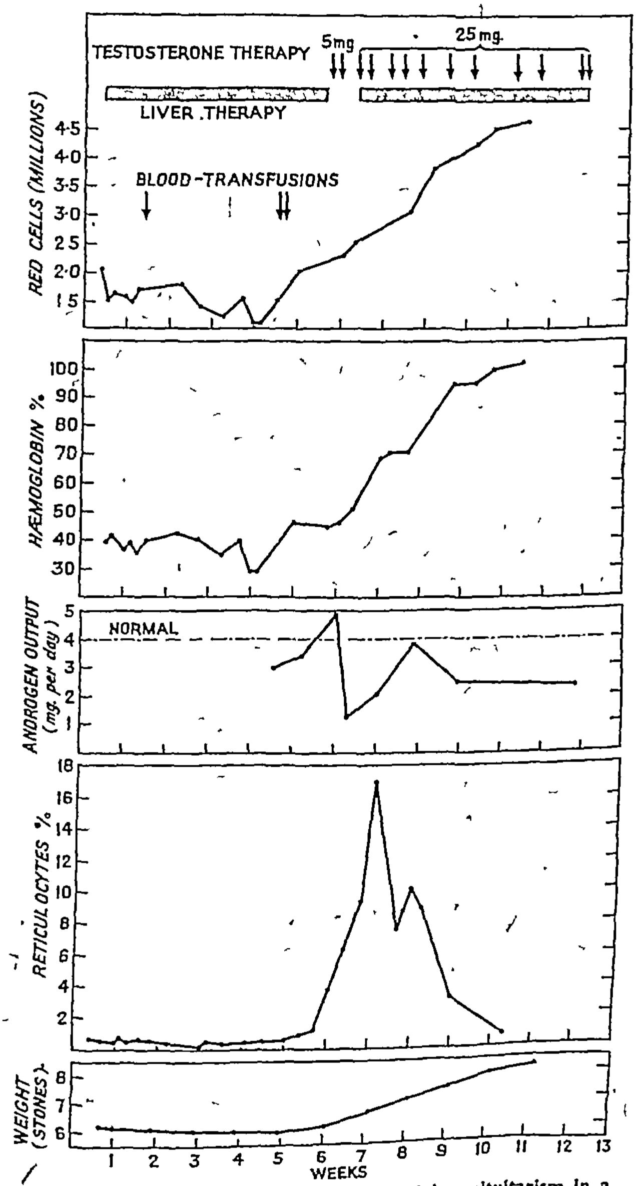

Fig. 1—Macrocytic anæmia, hypogonadism, and hypopituitarism in a man (case 1), showing lack of response to liver therapy alone but good response to testosterone and liver therapy.

injections and adequate doses of thyroid also failed to induce any improvement.

Testosterone propionate was then prescribed in addition to the iron, liver, and thyroid to combat the impotence. To our surprise the drug caused a striking improvement in the blood picture, producing a reticulocytosis of 8% on the second day, followed by a steady rise in the Hb concentration in the next month to 80% and a month later to 98%. For the next four months he remained well, the Hb level fluctuating between 90% and 98%.

It was thought desirable to decide which of the four drugs he was taking was causing the improvement in the blood. Accordingly all therapy was stopped and the patient allowed to relapse. In the next two and a half months his Hb level fell to 70%, and he was then readmitted to hospital.

Daily reticulocyte counts were made and the drugs given singly in turn. Iron was given for two weeks with no improvement; several liver preparations for a further three weeks; and thyroid for two weeks without producing any reticulocytosis. No success was met by giving testosterone alone in doses of 10 mg. daily for a week. Iron, liver, and testosterone were then given together, producing a reticulocytosis of 6% in the first week and a steady rise in the Hb level to 90% in the next two months.

When last seen the patient was well, Hb 98%. He was still taking 5 mg. of testosterone in linguets by mouth daily and was considerably stronger and more vigorous than previously.

The relevant features of this case are summarised in fig. 2.

DISCUSSION

These cases conform to the syndrome described by Snapper et al. (1937) and Witts (1942). Both patients were men, their ages 20 and 52, and their symptoms could be related to dysfunction of the anterior lobe of the pituitary, one showing infantilism, and the other feminisation. Pituitary deficiency was shown by the increased glucose tolerance. There was demonstrable improvement in pituitary function after treatment in the first case. Gonadal insufficiency was shown by small testicles and deficiency of secondary sexual characteristics in both patients, and lack of libido in the second. In the first case there was a reduction in excretion of urinary androgens, and the hypogonadism appeared to be of the secondary or pituitary type. Thyroid deficiency, as assessed by the basal metabolic rate, was present in the second case. Both patients had achlorhydria, the acid returning in case 1 after treatment.

The 8 published cases of this syndrome—hypopituitarism, hypogonadism, and anæmia—all responded to iron and liver. The present 2 cases, however, were resistant until testosterone was added to the treatment. It seems, therefore, that the hypogonadism was an important factor in the production of the anæmia, in the one case macrocytic and in the other microcytic.

Snapper et al. (1937) comment on the hypogonadism but think that the associated anæmia is pituitary in origin. They believe that the relation of the pituitary to the bone-marrow may be complex, and postulate that the polycythæmia and anæmia associated with hyperpituitarism and hypopituitarism may be apparent only, by reason of alteration in the water-balance mechanism of the body, which is controlled by neighbouring hypothalamic centres. They conclude that the anæmia is probably secondary to changes in gastric secretion, which are under pituitary control (Spence and Witts 1939).

Our cases suggest that gonadal deficiency is sometimes associated with impairment of erythropoiesis. Eunuchs commonly have an anæmia, usually of the hypochromic type. Burger and Witts (1934) noted that men with hypochromic anæmia were often of asthenic build and looked younger than their years.

The lower hæmoglobin level and erythrocyte count in women was at one time thought to be due to menstrual loss, but the work of Steinglass et al. (1941) on the effect of castration and the sex hormones on the blood of the rat seems to cast doubt on this theory. These workers have found that normal male rats have a higher red-cell count and Hb level than have female rats. Castration of male rats causes a fall in the red-cell count and a reduction in the percentage of reticulocytes, and examination of the marrow after a time shows it to be considerably less cellular than previously, with a reduction in the erythroid tissue. Testosterone brings about a brisk reticulocytosis, with a rapid rise in Hb and red-cell count to normal. Castration of a female rat causes an immediate increase in reticulocytes, followed by a steady rise in the Hb concentration and erythrocyte count to a level equal to that of the male rat. Examination of the marrow after a time shows it to contain more erythroid tissue than previously. If œstrogens are administered to such a castrated female rat, the regenerating marrow reverts to its previously hypoplastic state. They conclude that the male hormone has a stimulating action on blood formation, whereas the female hormone inhibits it. It is unlikely that the male hormone exerts its stimulating action through the pituitary, for the changes are greater in the hypophysectomised animal (Vollmer et al. 1939). Steinglass and his associates conclude that there is probably a direct action on the marrow produced by the general stimulating action of the male hormones on metabolism and somatic growth.

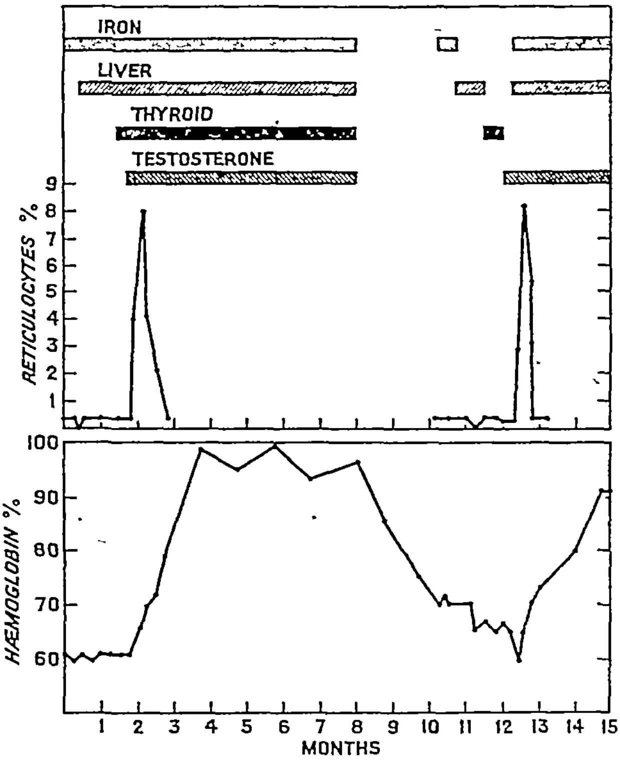

Fig. 2—Microcytic anæmia, hypogonadism, and hypopituitarism in a man (case 2), showing response to iron, liver, and testosterone therapy.

More recently, in a study of the action of the sex hormones on post-hæmorrhagic anæmia in rats, Finkelstein et al. (1944) have found that normal male rats, after bleeding, show a greater rate of regeneration than do normal-bled female rats. The administration of male sex hormone hastens, and a female sex hormone delays, the return of the count to normal. Blood regeneration is more rapid in the castrated female than in the bled castrated male. Male sex hormones accelerate erythropoiesis in both types. A similar effect is observed in the bled hypophysectomised animal. Combination with cobalt is more effective in castrated rats than either agent alone. Bone-marrow studies confirm the observations. These facts show the importance of the male hormone in erythropoiesis in the normal animal.

Our cases seem to conform well to the experimental findings. In both an anæmia had developed, probably *initiated* by pituitary deficiency and aggravated by long-continued hypogonadism. The deficiency of the sex hormone probably caused the reduction in cellularity of the marrow which was noted in both cases; it must be remarked, however, that assessment of cellularity by sternal puncture is unreliable.

The resistance of the anæmia to simple methods of therapy confirms this view. The administration of the male hormone corrected a long-standing deficiency and apparently enabled the marrow to utilise hæmatinic principles which it had previously been unable to do. The hormone alone in case 1 caused a small response in the marrow, which with the addition of liver became more pronounced. In case 2 the hormone alone failed to induce any improvement but with the other hæmatinic principles became effective.

In the belief that testosterone might benefit other refractory anæmias it was administered to 2 other patients, whose anæmia had proved resistant to treatment but in whom no evidence of pituitary or gonadal deficiency was present. The drug failed in these patients to have any persistent beneficial effect, confirming that it would only be effective in cases with gonadal deficiency. The drug induced a temporary remission in one case, suggesting that it is worth a trial in refractory anæmias, especially if associated with a hypocellular marrow.

Case 3.—A woman, aged 55, had an idiopathic aplastic anæmia resistant to all therapy. Medication with various liver preparations, iron, and thyroid failed to induce any improvement, and finally monthly transfusions became necessary. Testosterone 25 mg. twice weekly induced a temporary remission, with a reticulocytosis of 8% two days after the drug was administered. Three months elapsed before the next transfusion was necessary.

In view of the relapse of the patient splenectomy was done but had only a temporary effect. The patient died some fifteen months after the onset of the disease. Necropsy revealed extramedullary hæmopoiesis, and sections of the marrow showed the changes of primary focal myelofibrosis (Dr. Discombe).

Erf and Herbut (1944), in a survey of 13 cases of myelofibrosis of various types, used testosterone in 4 or 5 cases of primary myelofibrosis. They noted a temporary remission in 3 of them. They remark that this effect is hard to assess, because such cases may undergo temporary spontaneous remission, but they think the drug worthy of further trial in these cases.

Case 4.—A man, aged 68, had a severe macrocytic anæmia, with atypical megaloblastic transformation of the marrow. Free acid was present in the stomach, and the anæmia proved resistant to intensive parenteral and oral liver therapy. The anæmia seemed to conform to the descriptions given of achrestic anæmia (Israëls and Wilkinson 1940). Testosterone was administered here in full dosage for several weeks but failed to produce any improvement.

CONCLUSION

There seems to be little doubt that testosterone exerts a stimulating effect on the bone-marrow, and that it is indicated in the anæmia complicating long-standing hypogonadism or hypopituitarism which has proved resistant to treatment. It may be also worth a trial in other refractory anæmias, particularly those associated with hypocellular marrows.

Long-standing gonadal deficiency appears to reduce the cellularity of the marrow, which testosterone improves, either by restoring the cellularity to normal or by enabling the marrow to utilise hæmatinic principles which it had previously been unable to.

SUMMARY

Two cases of anæmia, one microcytic and one macrocytic, complicating pituitary and gonadal deficiency, conform to previous descriptions but are unusual in their lack of response to simple therapy with iron, liver, or thyroid, and in their dramatic response to testosterone propionate.

The relation of the gonads to erythropoiesis is reviewed, and a hypothesis is advanced of their mode of action.

Two further cases of refractory anæmia were also given testosterone; in one, a case of primary focal myelofibrosis, testosterone induced a temporary remission, as has been reported by other workers; in the second case, one of achrestic anæmia, it did not exert any beneficial effect.

The evidence produced shows that hypogonadism may be important in the production of anæmia, and testosterone may have a good effect in cases of this type.

Our thanks are due to Dr. H. C. Rook for allowing us facilities for studying case 1, and to Dr. George Discombe for his help in cases 2, 3, and 4.

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THE USE OF CURARE IN ELECTRIC CONVULSION THERAPY

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PREMEDICATION with curare is a promising method of eliminating the risk of fracture in electric convulsion therapy (E.C.T.) (Bennett 1940, 1941, 1943).

During one year 29 patients having E.C.T. at the Brighton County Borough Mental Hospital were given premedication with curare, a total of 178 injections being administered. Two preparations of curare were used, *d*-tubocurarine chloride (Burroughs Wellcome) and 'Intocostrin' (Squibb). From the doses of the two drugs needed to obtain similar degrees of relaxation in the same patient *d*-tubocurarine chloride seems to be about five times as potent weight for weight as intocostrin. Prescott et al. (1946) state that 1 unit of intocostrin is equivalent in potency to 0·3 mg. of *d*-tubocurarine chloride, whereas the Council of Pharmacy and Chemistry (1945) reported that, by assay on rabbits, the provisional unit of intocostrin was equivalent to 0·15 mg. of *d*-tubocurarine chloride. The anæsthetics committee jointly appointed by the Medical Research Council and the Royal Society of Medicine are considering the standardisation of curare, and in the meantime think it inadvisable to rely on any dose-weight ratio.

DOSAGE

The manufacturers of intocostrin state that an average dose for E.C.T. is 0·5 mg. or units per lb. of body-weight, but the accompanying table shows that the dosage needed to obtain relaxation has only a rough relationship to body-weight. However, the dose needed to produce the same clinical effects at each treatment in the same patient is fairly constant, and no evidence of acquired tolerance was found.

A calculated dose sometimes produces too deep a paralysis or insufficient relaxation with the risk of fracture still present. It is therefore better to find the dose for each patient by observing the response to the curare. Thus, at the first treatment the curare is injected slowly and, as the signs of curarisation appear, even more slowly, and the injection is stopped before the desired degree of paralysis has been fully attained, allowance being made for further

DOSAGES OF CURARE WHICH GAVE ABOUT THE SAME DEPTH OF RELAXATION IN DIFFERENT PATIENTS IN RELATION TO THEIR BODY-WEIGHT

Body-weight (lb.)	Intocostrin (mg.)	*d*-tubocurarine (mg.)	Body-weight (lb.)	Intocostrin (mg.)	*d*-tubocurarine (mg.)
116	80	14	135	80	—
116*	50	—	135	20	—
118*	70	—	135	—	16·5
119	58	—	136	—	15·5
123	—	14·5	136	—	14
123*	52	—	140	60	14
124	60	—	140	70	—
124	75	—	143	70	—
126*	—	10	146	80	—
126	42	—	155	70	—
127	75	—	158	72	—
130	44	—	159	—	15
130	70	—	163	100	17
132	70	—	182	80	16
134	76	—			

* Female.

action of the curare for about 2 min. after the end of the injection.

The time taken for the first injection of curare has generally been about 4–5 min. At subsequent treatments the same dose can be given in 2 min. without altering greatly the depth of curarisation attained.

STAGES OF PARALYSIS

The patient's response can give accurate guidance in determining when sufficient curare has been injected only if the overall rate of the injection is kept fairly constant from patient to patient, and if one is well acquainted with the stages of development of curare paralysis. This follows a moderately clear-cut pattern.

At first there is mistiness of vision due to paralysis of the muscles of accommodation, associated with nystagmus and later with ptosis. The weakness of the ocular muscles spreads to the muscles of the face, and facial expression is lost. Speech becomes slow, hesitant, and dysarthric. At this point the main skeletal musculature becomes affected, the muscles of the spine and neck before the limb muscles. The head when raised from the pillow is moved jerkily, and contraction of the platysma is more evident than normal. At the next stage the head cannot be raised voluntarily and the patient cannot keep his arm held up from his side. The last muscles to be affected are the muscles of respiration.

A degree of relaxation just sufficient to make head-raising difficult or impossible seems to be all that is required for the effective control of the convulsions in E.C.T. Beyond the dose of curare necessary for this effect there still remains in most patients a reasonable margin of safety before the respiratory apparatus is paralysed.

APPARATUS

Before treatment is started all equipment necessary to deal with an emergency—e.g., mouth-gag, tongue-forceps, and airways—should be at hand. Sterile syringes already assembled should be available, including a 5 c.cm. syringe fitted with an intravenous needle for giving neostigmine. A resuscitation apparatus, consisting of an anæsthetic facepiece attached to a large rebreathing bag with an expiratory valve, which can be closed instantaneously, is used for the administration of CO_2 and O_2 during the first few inspirations after the convulsion. In the event of respiratory paralysis after the injection of curare the lungs can be inflated by closure of the valve and compression of the rebreathing bag.

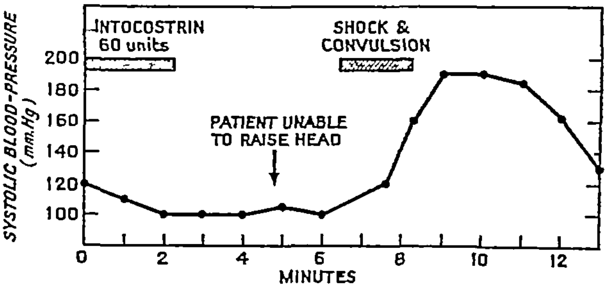
RESULTS

It is important that the effect of curare should have reached its peak before the electric shock is given. This peak is reached about 2–3 min. after the end of an injection if the time taken to give the injection is about 2 min. Recovery after the convulsion does not appear to be delayed in the curarised patient. Slight weakness and unsteadiness of gait may persist for a time after treatment but were so slight that 4 patients, who attended as outpatients, returned home accompanied by a relation in less than an hour after receiving treatment. The lassitude produced by the drug may not be altogether undesirable. One patient, who passed through a perfectly quiet recovery phase after convulsions controlled with curare, displayed such extreme restlessness after treatment without curare that he had to be given intravenous 'Pentothal.'

Complications.—No injuries occurred, and there were no serious complications. Curare does not normally embarrass respiration to any serious extent in the dosage required for E.C.T. Any tendency to alarm on the part of the patient because of mild respiratory difficulty was easily relieved by reassurance. As is well known, overdosage paralyses the respiratory muscles. If this happens artificial respiration should be given and 1–2 c.cm. of neostigmine (0·5–1·0 mg.) injected intravenously.

One patient, subject to bronchial asthma, developed bronchospasm after the injection of 15 mg. *d*-tubocurarine, and his respiration became strident and weak and almost ceased. Fortunately resuscitation overcame this condition. After a few more treatments on a reduced dose of curare with only mild symptoms the original dose was resumed without a repetition of the complication.

Another complication arose in a very asthenic patient to whom 60 units of intocostrin, calculated from body-weight, was given. At 5 min. from the start of the injection shock treatment was begun. The first two shocks were subconvulsive, but the third produced a major fit, at the end of which the patient's cyanosis faded into a grey pallor. He was pulseless, and his respiratory movements were feeble and ineffective. After the insertion of an airway and artificial respiration, pulse and breathing began again. On recovery he felt no ill effects apart from vomiting. Two days later, to determine his correct dose of curare, he was given 20 units of intocostrin. This produced almost complete abolition of head-raising for a short period. It seems possible that this patient may have belonged to a rare class who show undue sensitivity to small doses of curare (Cash and Hoekstra 1943).



Changes in systolic blood-pressure during and after injection of curare.

The only patient who showed signs of residual effects of curare was one in whom the first six treatments were with a combination of curare and pentothal. After the fifth treatment he developed a temporary and partial ptosis of the right eye. This reappeared and persisted longer after each subsequent treatment. At the end of the course of sixteen treatments the condition slowly improved, but remained to some extent for about two months. There was also some impairment of vision; but, because of his former mental state, it could not be determined if this had developed during treatment.

PHYSIOLOGICAL EFFECTS OF CURARE

Blood-pressure

During the treatments observations on blood-pressure changes were made on 5 patients by means of recordings at one-minute intervals. In 3 cases the systolic pressure was found on repeated occasions to be considerably raised and to fluctuate apparently with the degree of emotional tension experienced at the time. In another case the resting blood-pressure was 190/130, but during the injection of curare it ranged about 200/140 and rose to 220/140 with the onset of curarisation. One patient showed complete emotional indifference; his systolic pressure is recorded in the accompanying figure.

RESPIRATION

Recordings of respiratory movements of patients having treatment both with and without curare were made. Where curare was used these tracings showed no change in either the rhythm or range of respiratory excursion up to the point of development of paralysis of the neck muscles. Where deeper curarisation was attained respiration became shallower and faster. In 2 patients these changes were preceded by slowing of respiration. Even where there were some changes in the respiratory recordings there was no delay in the re-establishment of respiration after the convulsion.

SUMMARY

Premedication with curare is a promising method of eliminating the risk of fracture in electric convulsion therapy. This paper describes its use in the treatment of 29 patients receiving a total of 178 injections.

The disadvantages of calculating the dose of curare from the patient's weight are indicated. It was found better to inject the drug slowly, observing the stages of curarisation and allowing for the continued action for some two minutes after stopping the injection. The stage of curarisation to be aimed at is that in which the patient just cannot raise his head or can do so only with difficulty.

Curare has little effect on the recovery time after the convulsion. The few complications experienced are described and observations on blood-pressure and respiration are summarised.

I am indebted to Dr. W. McCartan, medical superintendent, for his help, Dr. R. Binning, of the honorary staff of the Royal Sussex County Hospital, for advice when treatment with curare was first undertaken, and Mr. J. Hughes, departmental nurse, for his technical assistance in recording observations and for his skilled direction of the nursing arrangements.

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TREATMENT OF TROPICAL SPRUE WITH FOLIC ACID

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The use of folic acid in the treatment of sprue has been described by Darby and Jones (1945), Darby et al. (1946), Spies (1946) and Spies et al. (1946a and b), but the only accounts of sprue treated in this country with folic acid are those of Manson-Bahr and Clarke (1946), Davidson et al. (1947), and Davidson and Girdwood (1947). Four cases of tropical sprue treated with synthetic folic acid are described here.

RECORDS

Case 1.—A soldier, aged 25, had served between April, 1943, and August, 1946, in India, Burma, and Malaya. In March, 1945, he complained of abdominal swelling, persistent diarrhœa, sore mouth, and loss of weight. In August, 1945, he improved after treatment with sulphaguanidine, but early in 1946 the symptoms returned and were again relieved with sulphaguanidine. He returned to England in August, 1946, and soon afterwards the diarrhœa recurred with general weakness and a sore mouth. In October he was admitted to a military hospital, where his fæcal fat was 70% by weight of the dried fæces, and a hyperchromic anæmia with achlorhydria was noted. Tropical sprue was diagnosed, and he was transferred to us for treatment, having had no specific therapy.

Investigation.—He was pale and sallow; weight 131 lb. Tongue red, shiny, and fissured; papillæ small. Abdomen distended and doughy. Red-cell count 2,470,000 per c.mm., Hb 60% (Sahli), colour index 1·2, mean corpuscular Hb 38%, hæmatocrit 32, reticulocytes 0 25%, white cells 5400 per c.mm. Sternal-marrow biopsy showed normoblasts 31%, megaloblasts 7·5%. The oral glucose-tolerance test produced a rather flat curve (fasting 125 mg., $^1/_2$ hour 150 mg. per 100 c.cm., 1 hour 131 mg., $1^1/_2$ hours 130 mg., 2 hours 126 mg., $2^1/_2$ hours 111 mg.).

Stools numbered 2–6 daily; they resembled soft putty and were offensive, the weight of 24-hour specimen being 28–60 oz. Radiography of gastro-intestinal tract showed that the stomach was distorted by the colon, which was much distended with gas. The descending and fourth parts of the duodenum and upper jejunum appeared somewhat distended, with loss of the normal feathery pattern.

Treatment.—After thirteen days on an ordinary ward diet there was no change in symptoms. On the third day of treatment with folic acid (20 mg. by mouth daily) he found he had more energy; the abdominal distension and discomfort were less, and the stools not so offensive. By the sixth day the number of stools had fallen to 1 or 2 daily, and the weight of the 24-hour specimen to 5–8 oz.; the stools have since this time remained between 1 and 3 daily, and of the same daily weight.

A daily reticulocyte count showed a rise to 2·5% on the third day of treatment, and reached a peak of 5% on the ninth. On the fifteenth day a blood-count gave Hb 76%, red cells 3,800,000 per c.mm.; sternal-marrow biopsy showed normoblasts 30%, megaloblasts 4·5%. The fæcal fat was 26% by weight of dried fæces, and he had gained $11^1/_4$ lb. He said his appetite had "changed from indifferent to keen" and that he could tolerate fats well. The dose of folic acid was reduced to 10 mg. daily.

On the thirty-fifth day of treatment he weighed 152 lb., and a blood-count gave Hb 92%, with red cells 3,910,000 per c.mm. The dose of folic acid was maintained at this level for a further four weeks and then discontinued. He now weighed 156 lb.; fæcal fat was 18% by weight of dried fæces; and blood-count gave Hb 78%, with red cells 4,400,000 per c.mm. Four weeks later, after being on leave and leading an active life without any treatment and on an ordinary diet, he felt well and weighed 154 lb.; his blood-count gave Hb 74%, with red cells 4,300,000 per c.mm., and mean corpuscular Hb 27%. Free acid had returned to his gastric juice, and there were no intestinal or other symptoms.

Case 2.—A colonel, aged 46, had served for over 20 years in India. In 1935 he contracted pulmonary tuberculosis, but made a good recovery. In October, 1944, he began to have dyspepsia, and lost more than a stone, but by July, 1945, he had regained his weight. In May, 1946, a month after an operation for transplantation of the right ulnar nerve, he complained of sore tongue and of ulcers in the mouth. He felt very weak, and had diarrhœa, loss of appetite, abdominal rumblings, and vague epigastric discomfort associated with a sensation of food sticking in his throat. He was sent into hospital on Oct. 18, 1946, with a diagnosis of pernicious anæmia.

Investigation.—He was thin and wasted, with a dry inelastic skin; the effort of walking about his room produced fatigue. Tongue smooth and fissured, with a small ulcer on the frænum. Abdomen distended and tympanitic; abdominal muscles poorly developed and atonic.

Stools numbered 4–6 daily, of the consistence of gruel, biscuit-coloured, bulky, and offensive: on standing in a glass jar yellow liquid pools of fat separated out.

A blood-count showed Hb 57%, red cells 3,300,000 per c.mm., reticulocytes 0·25%. The sternal marrow contained normoblasts 11·5%, megaloblasts 7·5%. A glucose-tolerance curve after 50 g. of glucose by mouth gave the following figures: fasting 88 mg. per 100 c.cm., $^1/_2$ hour 150 mg., 1 hour 130 mg., $1^1/_2$ hours 124 mg., 2 hours 118 mg., $2^1/_2$ hours 90 mg. No free hydrochloric acid was present after a fractional test-meal, and a fat analysis of stools gave 41% of the dried fæces. Radiography did not reveal any abnormal gastro-intestinal pattern.

Treatment.—On an ordinary ward diet, for three weeks, with rest in bed, the patient got steadily worse. On Nov. 7 treatment with folic acid 20 mg. daily by mouth was begun. Within 48 hours appetite had returned, dyspepsia had ceased, physical weakness had much diminished, diarrhœa had stopped, and stools had decreased to 2 daily, with the consistence of clay. The daily weight of the fæces fell from about 50 oz. to 10 oz., though subsequently it rose temporarily, probably owing to a dietetic indiscretion (a pound of grapes) due to a voracious appetite. At the end of the first week patient had gained over 13 lb.

A daily reticulocyte count showed a maximal rise of 7% on the seventh day of treatment. Sternal-marrow biopsy on twenty-fifth day showed normoblasts 21·5%, megaloblasts 1·5%. Fæcal fat had fallen to 35% after a month, and to 25% a week later. Fractional test-meal after treatment still showed achlorhydria.

The general condition and weight continued to improve, and on the thirty-seventh day of treatment his Hb was 95%, and the red cells 4,200,000. The dose of folic acid was then reduced to 10 mg., and finally on the sixtieth day to 5 mg. The patient is now living at home, and feels perfectly fit. In spite of walking eight miles a day his weight had increased to 152 lb. by the end of March, but his blood picture was still short of normal—red cells 4,100,000 per c.mm.

Case 3.—A major, now aged 59, had sore tongue, anæmia, and pale bulky frothy stools in 1936, and was treated for tropical sprue. A relapse in 1940 was treated with blood-transfusions and liver injections. He recovered, but lately had been feeling easily tired and had been passing bulky pale stools. In spite of liver injections his blood-counts had not been satisfactory. He was admitted to hospital on Sept. 4, 1946.

Investigation.—General condition fair; skin pale and parchment-like; tongue normal; abdomen distended; stools typical of sprue. Blood-count: Hb 73%, red cells 3,750,000 per c.mm., white cells 4950 per c.mm. An oral glucose-tolerance test did not reveal any flattening of the curve. Barium follow-through showed abdominal distension, with gas and pools of barium in small intestine. Fæcal fat 27% of dried stool. Fractional test-meal: achlorhydria. Sternal marrow: normoblasts 11%, megaloblasts 5·5%.

Treatment.—With no treatment beyond a full hospital diet, the reticulocyte count on Oct. 1 was 0·6%. Folic acid (20 mg. daily by mouth) was then given, but the reticulocyte count did not rise appreciably, and the blood picture did not improve. After sixteen days' treatment the hæmoglobin was 77% and red cells 3,140,000, and after fifty-three days' treatment the hæmoglobin was 64% and red cells 3,300,000. Folic acid was then stopped.

Though the bone-marrow did not respond, patient felt better. Stools were darker and less bulky and offensive, and fat-content had dropped from 27% before treatment to 12% afterwards. There was no gain in weight.

Case 4.—A nursing sister, aged 32, invalided home from India, was admitted in September, 1945. She had lost 36 lb. and complained of pale loose frequent stools, lassitude, sore lips and tongue, and abdominal distension.

Investigation.—General condition poor; weight 88 lb.; angular stomatitis. Blood-count: Hb 80%, red cells 3,000,000 per c.mm. Fæcal fat 26% by weight of dried fæces. No entamœbæ or parasites seen in stools.

Treatment.—Patient was given a high-protein diet, vitamins, and liver extract, and made slow progress. In February, 1946, she weighed 96 lb., had a red indented tongue, and was still passing loose stools with a fat content of 40% by weight: Hb 85% and red cells 4,100,000. In June, 1946, her weight was 97 lb., and as she was not improving all previous treatment was stopped and she was put on a low protein and high carbohydrate diet, with folic acid 15 mg. daily. The hæmatological response was negligible: reticulocytes reached a maximum of 2·5% on the eighth day; on the fifteenth day the hæmoglobin was 88% and red cells 3,700,000. There was, however, improvement subjectively and in the diarrhœa; stools decreased from 6 daily to 1–3 by the seventh day, and abdominal discomfort was less. A large dose of 100 mg. folic acid on the sixteenth day, followed by 20 mg. daily, with an ordinary diet, produced no reticulocyte peak and no change in hæmoglobin or total red-cell count. For another three weeks she had 30 mg. daily, after which folic acid was withdrawn.

On returning to the sprue diet, vitamins, and proteolysed liver by mouth, she continued reasonably well for four months. Folic acid (20 mg. daily) was again tried, with no effect on the reticulocyte or red-cell count, but with some improvement in her abdominal discomfort.

DISCUSSION

Cases 1 and 2, previously untreated, showed the expected dramatic response to folic acid; but in cases 3 and 4, which had both been treated for some time previously, there was no significant hæmatological response or gain in weight, though the gastro-intestinal symptoms diminished slightly.

Darby et al. (1946) described 3 cases of non-tropical sprue treated with folic acid, all of which showed a good hæmatological response; one of the patients had previously had liver therapy, and the response to folic acid was greater than with liver. In the case reported by Manson-Bahr and Clarke (1946) the patient had also had liver therapy for a long period and yet responded to folic acid.

The lack of hæmatological response in cases 3 and 4 is at present unexplained.

SUMMARY

The progress of four cases of tropical sprue treated with synthetic folic acid is described.

Two cases, previously untreated, showed a dramatic improvement both in the blood and in intestinal absorption.

The two other cases, which were of long standing and had long been treated with liver, were improved subjectively, but little or no effect on the blood was observed.

Our thanks are due to Lieut.-Colonel W. H. Hargreaves, O.B.E., R.A.M.C.; Messrs. Lederle Laboratories Inc. for supplies of 'Folvite' (synthetic folic acid); Major-General Sir Alexander Biggam, K.B.E., for his help and encouragement; Major W. R. Ashby, R.A.M.C., for the pathological work; and the Director General, Army Medical Services, for permission to publish.

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Medical Societies

SOCIETY OF BRITISH NEUROLOGICAL SURGEONS

THIS society held its spring meeting in Lisbon on April 10 and 11 under the presidency of Sir Hugh Cairns. The meeting was arranged to pay tribute to Prof. Egas Moniz for his pioneer work. It was he who in 1927 introduced arteriography, which was used at first in cerebral work. The leucotomy operation for certain mental disorders was a later conception and was first performed by Professor Lima in 1935. The visitors, including members from several European countries, were welcomed by Professor Flores, of the Lisbon faculty of medicine, Professor Moniz's successor in the chair of neurology.

Professor Moniz spoke on thrombosis of the internal carotid and its branches, and on the interpretation of cerebral angiograms, especially the striking difference in circulation-rate through the internal and external carotid systems. Professor Lima described the diagnosis of subdural hæmatomas by arteriography. Professor Furtado and Dr. Marques spoke about the Arnold-Chiari malformation, Professor da Costa on the neuroblastomas, and Professor Fernandes on leucotomy. The technique of carotid arteriography was demonstrated by Dr. Imaginário and of aortic arteriography by Dr. dos Santos. An excellent exhibition of cerebral angiograms included the early experimental procedures and instruments used for them, now of interest historically. Several communications, mostly relating to Professor Moniz's work, were given by the visitors, including Mr. Norman Dott on intracranial aneurysms, and Prof. Geoffrey Jefferson, F.R.S., on frontal lobectomy.

Reviews of Books

The Rhesus Factor

G. FULTON ROBERTS, M.B. Camb. London: W. Heinemann Medical Books, 1947. Pp. 47. 3*s*. 6*d*.

THE rhesus factor was identified in 1940 by Landsteiner and Wiener, and not in 1939 by Levine and Stetson as suggested in this booklet. Most of the subsequent advances have been on the academic side and concern the geneticist; but the clinicians are responsible for blood-transfusion and obstetric practice, and they have been somewhat confused by rapid development of academic work and the many changes in terminology. Dr. Fulton Roberts has reviewed the subject, in 47 pages, for the average clinical reader; all the relevant information is briefly and clearly set out, and helpful case-reports illustrate the points raised. While the dangers of transfusing the Rh-negative person with Rh-positive blood are properly stressed, the potential dangers of transfusing the Rh-positive person with Rh-negative blood are somewhat overemphasised. Hæmolytic disease of the fœtus and newborn (erythroblastosis fœtalis) is often referred to as rhesus disease, which is an ugly term and not sufficiently comprehensive. But this good little book should help to clear up confusion for many.

Care of the Neurosurgical Patient

ERNEST SACHS, M.D., professor of clinical neurological surgery, Washington University, St. Louis. London: H. Kimpton, 1945. Pp. 268. 30*s*.

NEUROSURGERY more than other specialised branches of medicine depends on the integrated activity of a team. The efficiency of the team naturally depends on the acceptance and constant repetition of technical procedures, whose merits are sometimes less important than the standard of their performance by the team. This tendency has had two results: first, that the neurosurgeon passes on his rigid technique to others; secondly, that schools of method, rather than thought, have arisen—schools in which practical minutiæ have an important place. In this book Prof. Ernest Sachs has laid down the methods which he has perfected in his unit in St. Louis, with the principles and beliefs on which they are based. It is really a day-to-day account of his work, written in the first person and dedicated by name to the 28 neurosurgical fellows who have worked with him, and who will find in it a pleasing résumé of their training. Other neurosurgeons will find the technical descriptions too brief to be of great value to them, but general surgeons will get much guidance for their simpler adventures in brain surgery. The book cannot be regarded as a critical survey of the wealth of thought and activity which has in a few years produced modern neurosurgery. Such statements as "I have always felt that, irrespective of the ætiological factor, all headaches are due to positive or negative tension in the dura," and "Today, with the full use of ventriculography, over 97 per cent. of all tumours are located and removed," are scarcely acceptable. It would not be fair, however, to make too much of such shortcomings in the book, important as they are; for each chapter deals with action, and the development of technical perfection naturally limits theoretical consideration. Professor Sachs expresses his views clearly, and presents his techniques in short vivid descriptions, with plenty of case-abstracts and good illustrations.

Differential Diagnosis of Jaundice

LEON SCHIFF, M.D., associate professor of medicine, department of internal medicine, University of Cincinnati; director, gastric laboratory, Cincinnati General Hospital. Chicago: Year Book Publishers. London: H. K. Lewis, 1946. Pp. 313. 30*s*.

ANY monograph which makes for clear thinking on the subject of jaundice is welcome. By combining clinical, pathological, and biochemical data on the diseases causing jaundice, Professor Schiff hopes to expedite diagnosis and save patients from being "studied to death"; and he gives a complete review of published work on most aspects of jaundice. No short cut to diagnosis is offered, but each aspect of the causation of jaundice is fully presented. He attempts no synthesis of these into a plan of clinical and laboratory investigation suitable for any case. Close reading and close reasoning are necessary to follow him, but the reader is helped by plenty of first-hand case-histories and a good typographical layout. A summary of homologous serum hepatitis is included, though he recognises that advances in knowledge of the condition are proceeding rapidly. The chapters on clinical and laboratory aids to diagnosis are mercifully clear, and those on liver biopsy and X-ray examination well illustrated. He gives full instructions for the carrying out of laboratory tests, with references to the original papers; but a number of reagents mentioned are American proprietary preparations. This detailed book of reference is likely to be much used on both sides of the Atlantic.

Diseases of Children

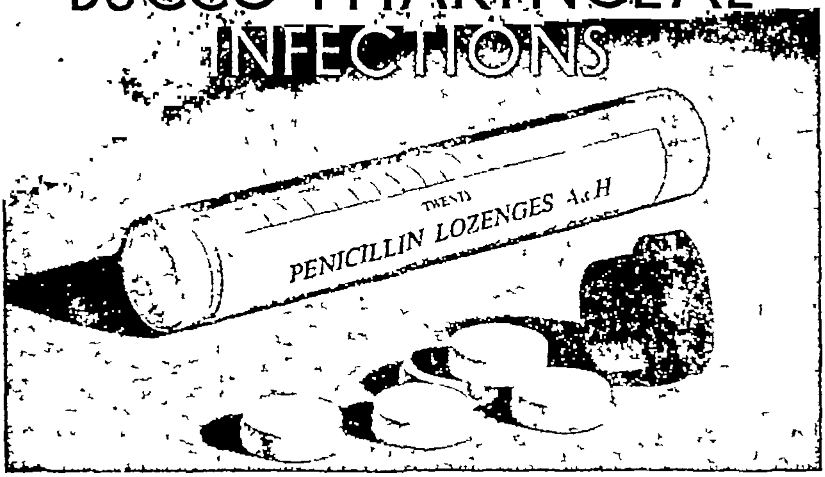
(4th ed.) Editors: DONALD PATERSON, M.D. Edin., F.R.C.P., physician, Hospital for Sick Children, Great Ormond Street; ALAN MONCRIEFF, M.D. Lond., F.R.C.P., Nuffield professor of child health, University of London. London: E. Arnold. Vol. i. 1947. Pp. 771. 30*s*.

THE 4th edition of this standard work, originally produced by Sir Archibald Garrod, F. E. Batten, and Hugh Thursfield, has been almost entirely rewritten and has changed its format from one large volume to two of more manageable size. The death of Dr. Thursfield in 1944 has removed the last of its originators; but the present editors have achieved, under considerable difficulties, a worthy successor to the previous three editions. By a pleasant innovation the list of contributors includes three American authors, who by reason of their Service duties had come into close association with their British colleagues. As before, the staff of the Hospital for Sick Children, Great Ormond Street, is widely represented in the list, and the editors have wisely included a number of relatively junior contributors. New material includes sections on growth and development, the use of sulphonamides and penicillin, clinical pathology, anæsthesia, and lung surgery, to mention only a few subjects in which great advances have been made since the last edition appeared. Each chapter is followed by a useful selection of references. The illustrations are perhaps a little unequally distributed, but for the most part are well chosen. If the second volume maintains the high standard of the first, this work will keep its popularity.

Textbook of Biochemistry (London and Philadelphia: W. B. Saunders, 1946. Pp. 592. 22*s*.).—The 4th edition of Prof. Benjamin Harrow's useful book covers more ground than is needed for most examinations in biochemistry in this country but can be recommended to students, though there are one or two errors in structural formulæ. The emphasis on the cyclic structure of the sugars is welcome, and it might have been carried even further. The field of biochemistry is well covered: there are chapters on immunochemistry and chemotherapy, and evidence from the use of isotopes is freely cited. The illustrations, too, are good.

***An Introduction to the Prescribing and Fitting of* Contact Lenses** (London: Hammond, 1946. Pp. 168. 42*s*.).—This book by two practising opticians, Mr. Frank Dickinson and Mr. K. G. Clifford Hall, covers the historical background of these lenses and their optical properties, and then relates how they are prescribed and fitted. A large trial set of lenses is used to find an approximate fit for the eye, and the lens selected is then ground until it makes a perfect fit. (The process of altering these lenses by grinding is not described, nor do the authors make clear whether this is done on the spot by themselves or sent away to a factory.) If the eye to be fitted is of such unusual shape that no stock lens is an approximate fit, a mould of the eye is taken with 'Zelex,' a dental impression compound, and a positive cast of this is made from dental stone. From this cast the contact lens is pressed. The process of taking a mould is clearly explained, but no account is given of the making of a lens from this mould. Not much is said of plastic lenses, which need elaborate machinery for their manufacture; but they seem likely, because of their lightness and smaller cost, to replace glass lenses entirely in time. Some first-class photographs make the process of fitting the lenses, and of detecting misfits, perfectly clear.

RATIONAL THERAPY IN BUCCO-PHARYNGEAL INFECTIONS



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References Shortage of space precludes list of references, but full documentation may be obtained on application to Clinical Research Dept. 18B.

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THE LANCET

LONDON: SATURDAY, MAY 10, 1947

Infections and the Developing Embryo

SINCE 1941, when MCALISTER GREGG in Australia first drew attention to the connexion between rubella during pregnancy and congenital cataract, upwards of fifty papers confirming and extending his findings have been published in Australia, Europe, and the United States. There can now be no doubt that rubella during early pregnancy interferes with fœtal development and so produces congenital malformations, of which cataract, deaf-mutism, and heart disease are the most important. But there are indications that we have so far only touched the fringe of a larger problem. The knowledge gained in the last few years has opened up two lines of inquiry, one clinical and one experimental, which may substantially reduce the loss of life from prenatal causes and improve the quality of our infant population. Accurate clinical observations during pregnancy, with special attention to some details hitherto ignored, and the application of the experimental methods of the older amphibian embryologists to mammals should together lead to a new concept of the nature of sporadic congenital anomalies and so-called somatic mutations.

We know from the experiments of such pioneer embryologists as SPEMANN and ROSS HARRISON that a sublethal noxious influence acting on a developing embryo will, if it has any demonstrable effect at all, produce an anomaly of structure. This anomaly will be the direct result of interference with cells which are rapidly dividing at the time of application of the noxa; so its extent and nature will depend on the stage of development of the embryo at the time of the experiment. At a given stage of development the degree of protoplasmic activity varies in different parts of the body, and regions of high activity are electro-negative to those of low activity. These variations are directly related to susceptibility to poisons; curves of susceptibility can be drawn which will run parallel with the curves of electronegative potential and of metabolic and cellular activity for the same regions. The region of highest activity succumbs first to poisons in high concentration, but with low concentrations the most active region may be the quickest to become acclimatised. The experimental evidence has been almost entirely based on the behaviour of amphibian embryos, under the impact of such diverse agents as cyanides, alcohol, heat, cold, ultraviolet light, and alkaloids. Knowledge of mammalian reactions is scantier, but the action of X rays in permanently altering the layering of the developing retina in rats and in man suggests that similar experiments would give similar results. In all cases the resultant anomaly is specific for the stage of development at the time of the experiment rather than for the noxious agent used.

More work is needed on the placenta-passing properties of organic and inorganic, living and non-living, noxa; the data already obtained indicate a species variability. Many viruses as well as bacteria and their toxins are known to pass the placenta in man, and the earlier in development that a sublethal toxin acts the more likely it is to produce a congenital anomaly. When viruses, toxins, &c., attack the fœtus after the organogenetic period they reproduce more or less faithfully the disease seen in adults, modified by environment and the peculiarities of the fœtal circulation; they do not lead to developmental anomalies, except of structures not fully differentiated at the time. Good examples of the effects of virus infection after fœtal differentiation is well established are the cases of intrauterine smallpox, where placental transmission of the disease after the 4th month of fœtal life leaves the scars of modified pocks. When congenital defects follow maternal rubella, on the other hand, the mother's illness has usually occurred in the first 3 months of pregnancy. The periods of maximum cellular activity, and therefore of maximum susceptibility to attack, are for the developing lens the 4th to 8th week and for the internal ear the 7th to 10th week; and in the Australian series the average stage of pregnancy when the rubella occurred was for cataract 1·5 months and for deafness 2·1 months. So far, therefore, the evidence supports a time specificity, and it is strengthened by the case-report[1] of congenital buphthalmos where the mother had rubella in the 6th month of pregnancy, for that date coincides with early differentiation of the iridocorneal angle and of Schlemm's canal. Is there any evidence that infections other than rubella can produce similar results? So far the reports are scanty. SWAN et al.[2] in Australia have collected 18 cases of measles in pregnancy, 10 of them in the first four months, and 4 of the babies were born with defects; for mumps their figures were small but suggestive—6 cases, 5 with defects and 1 with a nævus; for varicella 2 cases, 1 with heart disease and 1 with a nævus; for herpes zoster 2 cases, both with defects; for scarlet fever 2 cases, 1 with obliteration of bile-ducts. LAFORET and LYNCH[3] report an example of extensive congenital defects following maternal varicella. Congenital defects have also followed maternal influenza,[4] hepatitis, and poliomyelitis.[4] In some of these the association was no doubt accidental, but the suggestive feature is the frequency of maternal infection at a stage of pregnancy which matches the defects in the child

Further inquiries, then, should not be confined to rubella, nor to one period of pregnancy, nor to one type of anomaly, but should be planned on a broad basis.

On the clinical side, antenatal supervision must begin earlier than has been the custom. As soon as pregnancy is diagnosed, all febrile illnesses, upsets, accidents, or shocks occurring since just before the mother realised she was pregnant should be noted. This detailed history should be correlated later with a thorough examination of all the infants, and with a study of the family history, to avoid misinterpreting genetic defects fortuitously associated with maternal illness. Teams of investigators working through the antenatal clinics might well tackle such inquiries; and at least one such team is already at work in this country. Next, all infectious diseases arising in pregnancy might be made notifiable; it would not be sufficient merely to ask for particulars of pregnancy on the present notification forms, because the "trivial" fevers, which are not notifiable, are important in this inquiry. The need is for all cases of infectious disease in pregnancy to be followed up, whether through the medical officers of health or infant-welfare clinics or otherwise. Experimental work on placenta-passing viruses in mammals may tell us when and how developmental anomalies originate. Rubella, it seems, cannot be transmitted to animals (with the possible exception of chimpanzees) but there are other viruses which attack some of the ordinary laboratory stock Lymphocytic choriomeningitis of mice will infect the embryo in utero, and canine distemper of dogs is worth considering as an experimental instrument It might be helpful to extend the experiments with X rays and chemical poisons to pregnant mammals, and to investigate their effect on the whole embryo at term and at different stages after exposure.

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[1] Dupont, G. *Amer. J. Ophthal.* 1946, 29, 100.

[2] Swan, C., Tostevin, A. L., Black, G. H. B. *Med. J. Aust.* 1946, ii, 889.

[3] Laforet, E. G., Lynch, C. L. *New Engl. J. Med.* 1947, 236, 534.

[4] Dogramaci, I., Green, H. *J. Pediat.* 1947, 30, 295.

Meanwhile steps should be taken to protect women in early pregnancy against infection The proved danger from rubella and the possible danger from other infections should be widely known, so that pregnant women will do what they can to avoid contact with exanthemata to which they are susceptible An instance of intelligent propaganda is the recent notice sent to parents of boys at a big public school during a rubella epidemic, explaining the risks to sisters or other relatives who are pregnant Protection by means of convalescent serum is already under trial,[6] and if this is successful gamma-globulin prepared from such serum will no doubt become obtainable. But in prophylaxis, as in future research, the accent on rubella should not be so heavy that other infections, and perhaps trauma and malnutrition too, are excluded from consideration.

Hospital Admissions

THE cry is often heard that the general practitioner spends too much time on the telephone trying to get patients admitted to hospital. When doctors are being worked off their feet, this weakness of voluntary-hospital organisation merits attention.

Most hospitals do not know how long it takes a doctor to find out whether they will admit his case. However infuriated he may be, he seldom reports the matter, and he does not keep any note of the delays. The Emergency Bed Service, however, has kept a record of the times taken to admit patients to a group of large London voluntary hospitals in January. Some hundreds of calls were timed from the telephonist lifting her receiver to the receipt of a definite reply. The results are revealing. For a hospital with an efficient admission office, which keeps an up-to-date bed state and has the power to admit all types of cases, the average time taken was 4·8 minutes. (This includes dialling the number and being given the right extension by the switchboard.) Allowing for the fact that the extension is sometimes engaged, this average could hardly be reduced Another hospital which has no admitting officer but relies on the various housemen to admit emergencies took an average of 15 minutes to give a decision In the group as a whole it was clear that only those hospitals with a permanently-staffed admission office were consistently quick in replying.

The methods of admission differ considerably from hospital to hospital. Some are of an antiquated type dating from the days before the telephone, when the doctor sent a polite note to the honorary asking for his patient to be taken in. There are still hospitals which work on an admitting-ward system by which the wards take turns to admit urgent cases for a week, and in consequence patients may be turned away though there are some vacant beds in other wards. With the present shortage of beds this system may inflict gross hardship. The modern methods vary according to the size and layout of the hospital. Broadly speaking, they hinge either on an admission office, where someone with power to admit—not necessarily a doctor—is always on call, or on a resident medical officer who can be found rapidly by some kind of signals throughout the hospital The former is the more certain, and has the advantage that all admissions, whether from waiting-lists, the outpatient department, or other sources, and all discharges, go through the one office, which thereby knows the exact state of occupancy of the hospital and can answer the practitioner from information immediately at hand. An admission office, however, is probably warranted only in large hospitals. The alternative system, by which all admissions are made by a constantly moving R M O, will succeed only if satisfactory machinery is devised for finding the R.M.O. without delay and putting him in direct touch with the doctor. This is easy in a small hospital and difficult in a big one: but it is always simpler than attempting to link up the outside doctor with the right houseman, when there are perhaps a dozen to choose from

How far it is desirable for the admitting officer to be a medical man is a debatable point. At least one major hospital in London uses laymen for this purpose and maintains that it is wasteful to employ a doctor to answer questions that can with few exceptions be answered equally well by an office with an experienced staff. This view is supported by the fact that the doctors who admit patients are often the less experienced members of the profession, and do it for only a short time. Practitioners have been known to say hard words about young housemen who question their diagnoses without seeing the patient, and there is a lot to be said for permanent lay officers who cannot argue about a diagnosis but have learnt the right questions to ask. It seems hardly justifiable to keep a doctor permanently on duty merely to weed out the occasional case where the practitioner has drawn on his imagination for convenience' sake.

In the 750–1000-bed units of the future the admission system will be no less important. Since all types of case will be dealt with, the problems will resemble those of the present municipal hospitals rather than of the voluntary ones. But the practitioners' time will be no less valuable, and the admission office will make or mar their relations with the hospital service.

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[6] Gunn, W. See *Lancet*, 1946, ii, 870.

Dust in the Lungs

THE conference arranged in London by the Institutions of Mining Engineers and of Mining and Metallurgy provided an excellent opportunity for international discussions on the nature and prevention of pneumoconiosis in its various forms. The experience gained in the goldmines of South Africa was a fitting introduction, because they have had to face much the same man-power difficulties as those confronting the British coalmines today. Forty-five years ago fear of silicosis had made goldmining unattractive and there were few new recruits. By demonstrating that dust suppression could be effective and by assiduous training of new entrants the industry again won favour. Similar aims are in the forefront of the programme to attract young men to coalmining.

Prof. SUTHERLAND STRACHAN recalled that in the earliest days of goldmining on the Rand there were no regulations governing the work and it was not uncommon for a miner to die within two or three years as a result of exposure to dust. Today the first signs of silicosis rarely appear in less than 18–20 years, and even then the disease seldom produces functional disability, unless complicated by tuberculosis. The annual incidence of silicosis on the Rand is now less than a tenth of what it was in 1916, when systematic measures of prevention, detection, and compensation were introduced. The reduction in incidence has been attained principally by dust suppression but also by initial medical examination, whereby unsuitable recruits are debarred from working in the mines, and by periodical examinations for the detection and exclusion of cases of tuberculosis. Dust suppression has been a story of ingenuity and perseverance by mining engineers and ventilation experts. The measures employed in South Africa are water suppression of dust made in drilling and other operations, improved ventilation, arrangements of the times of blasting, and filtration of dusty air. Success has not been complete, because increased mechanisation has intensified the difficulties. The more powerful impact of modern machinery on rock has produced more and smaller particles, especially from the harder rocks. It is impossible to prevent the formation of these small particles, so the aim must be to deal with them at their source. Water will do much but not all, for some of the finer particles escape into the atmosphere even with the most efficient water-suppression methods; so adequate ventilation is needed in addition. A new form of drill, now in the experimental stage, extracts all the dust it forms, none reaching the miner's atmosphere. This is of especial importance in deep mining, where, on account of the heat, the use of water would so increase the humidity as to make working conditions impossible. Such conditions exist in the Kolar goldmines in India and may arise in the deeper mines projected in South Africa.

The results of dust suppression and medical supervision in the hæmatite mines in north-west England illustrate the great improvement that can be obtained. Dr. JOHN CRAW claimed that because of the control of dust, the selection of employees, and periodical medical examinations silicosis will probably cease to be a danger in these mines, though tuberculosis has still to be controlled. The main dust-suppression measure is the use of water-oil mist which rapidly brings down the dust generated during shot firing. In British coalmines the use of water and improved ventilation to control dust has been most actively studied in South Wales, where the incidence of pneumoconiosis is highest. Mr. J. IVON GRAHAM and Prof. T. D. JONES explained that the aim is to suppress dust whatever its source, whether it be from the coal seams or the rock strata. Where the coal is cut by machinery, water is brought to the site of cutting, and the dust at loading points is laid by water sprays. Wetting agents and foam are also used Another method, not applicable to metalliferous mines, is to infuse water into the coal seam before cutting, by boring holes and injecting it under pressure. The water seeps through the clefts so that when the coal is subsequently cut little or no dust forms. The amount of water introduced must obviously be regulated, for a wet working place can be uncomfortable and unhealthy. Most workers approve of this infusion method. A measure which has been reintroduced is the consolidation of dust along the roadways into a hard surface by applying calcium chloride. Supplies of the chemical are limited, but many miles of roadway in South Wales mines have already been treated. The attempts to suppress all forms of dust in coalmines are justified, since the pneumoconiosis of coal-workers is not a pure silicosis but due to the action of mixed dust. Dr. J. GOUGH compared the changes in coal-workers' lungs with those of goldminers and others showing classical silicosis. The few coalminers engaged principally on rock-drilling show classical silicosis, but those engaged on the coal face and in other operations in the mines and trimmers loading coal into ships show a different condition. Like classical silicosis, the disease in coal-workers is focal but the collections of dust show much less fibrosis. These changes correspond with the X-ray appearance now described as reticulation. The collections of dust are often accompanied by a characteristic focal emphysema, which appears to be more severe than that developing around silicotic nodules. The coal-workers' disease may be a modified silicosis, for coal always contains silica. It is now recognised that dust of relatively low silica content, such as commercial coal, can cause disability and fatal lung disease. Tuberculosis plays an important part in coal-workers' pneumoconiosis. The massive forms of fibrosis seem to be due to the combined action of dust and infection, usually tuberculosis. But open tuberculosis only occurs in a small percentage of cases, so the infection can rarely be diagnosed clinically. The fibrous type of tuberculosis is now more common in goldminers than the destructive form in which tubercle bacilli were readily identified.

The reactions which take place on the surface of silica particles are of great importance, because alterations of the surface can neutralise the toxicity. These surface effects form the basis of the use of aluminium in the prevention and treatment of silicosis. Aluminium forms a coating on the silica which reduces its solubility, and this seems a likely explanation of its antidotal effect. After aluminium treatment in Canada and the United States a high proportion of the men treated claimed to be benefited, but there was little objective evidence of improvement.

Further research is necessary, and the method will be tried out in Britain.

Mining engineers and medical men have worked too independently on the problems of dust disease, but better integration of effort and more consultation with each other is likely to be one outcome of the conference. An interdepartmental committee is to consider what more can be done in this way.

Almroth Wright

DISCOVERY is a process, not an event; and if we are not concerned with "what porridge had John Keats" we must be interested in the steps by which man climbs out of ignorance into knowledge. ALMROTH WRIGHT graduated in medicine in 1883, two years after PASTEUR had made the crucial test of the attenuated anthrax vaccine, and a year before METCHNIKOV described phagocytosis. The stage was set for applying the facts of practical immunology to man, and WRIGHT'S real life-work began with antityphoid vaccine. HAFFKINE and PFEIFFER having paved the way, he followed with all the vigour of an inspired personality. From successful prophylactic inoculation he turned to the therapeutic use of bacterial vaccines; but here success proved doubtful, and bacteriologists found themselves ranged in a battle whose sound still echoes. Then came his work on the opsonic index, done with the late S. R. DOUGLAS and based on METCHNIKOV'S studies in phagocytosis. The test they devised is now almost a thing of the past. But the modern theory and practice of absolute rest in tuberculosis owes it more than is generally supposed.

The first world war inspired his last great research, on the immunology of wound infection. The old drastic rule-of-thumb antiseptic treatment was unconscionably long a-dying, and WRIGHT gave it its quietus with hypertonic salt solution. Granted the right conditions, he believed, the protective mechanism of the body could deal with infection without antiseptics; and if today, thirty years later, polemics about this have ceased, and the stage is held by the sulphonamides and penicillin, it remains true that his courageous thinking and acting in the years 1914–18 pointed the way to a new conception of the infected wound. Dovetailed into all these fundamental researches was the practical bench-work which has influenced technique all over the world. He showed laboratory workers what can be done with a rubber teat and a piece of drawn-out glass tubing.

Always an uncompromising individualist, WRIGHT seemed to take little notice of what other people found out. Nor did he make much attempt to fit his observations into the corpus of accumulated knowledge. Nevertheless he took immense pains over exposition, and in his belief that language could be made a better vehicle of thought he invented a number of new words, some of which will survive. He had a great dislike of statistics, and was in many other ways wilful and wayward. Some thought of him as a hero; others as a grim lion, liable at any moment to turn and rend; others again as just a wrong-headed rebel. But none can now deny him the salutary influence of the original mind which invades the holy places of accepted dogma and sets up sign-posts in deserts. Often these signs have led us otherwhere than he or we expected, but they have kept us on the march.

Annotations

VITAMIN NEEDS OF MALARIA PARASITES

IT has been generally believed that malaria is favoured by malnutrition and that when a population is suffering from famine it is correspondingly less able to resist an epidemic of malignant or benign tertian malaria. In the main this is probably correct, since many dietary deficiencies tend to impair the defence mechanisms involved. But evidence is also accumulating that under special circumstances the malaria parasite may suffer from lack of vitamins in the diet quite as much as its host does. Thus infections of *Plasmodium lophuræ* in chicks are diminished in intensity if the chicks are suffering from a riboflavine deficiency[1]; presumably the parasite does not get enough riboflavine for its own metabolism. And it has recently been reported that *P. knowlesi* requires ascorbic acid, and that if the rhesus monkey suffers from even slight deficiency, too mild to be recognised as scurvy, the usual well-known virulent infection is replaced by a low-grade parasitæmia which does not end fatally.[2]

The most recent development of this subject concerns *P. gallinaceum* and pantothenic acid. It has been known that pantothenate is necessary for the growth of many bacteria such as hæmolytic streptococci. The multiplication of these organisms can be checked either by an actual deficiency of pantothenate or by the presence of some compound sufficiently like pantothenate to be taken up by the pantothenate-receptors of the germ, and sufficiently indigestible to resist further changes; such compounds block the receptors just as sulphanilamide blocks the receptors for *p*-aminobenzoic acid. In the case of hæmolytic streptococci blockage of the receptors can be produced in vitro and in vivo by pantoyltaurine.[3] *P. gallinaceum* requires pantothenate just as much as streptococci do, and if chicks are subjected to severe deficiency of this vitamin (so that growth is seriously stunted) the malaria parasite cannot develop properly in their red blood corpuscles and only very mild infections result.[4] The forms of this parasite which grow in the tissues, such as those which develop from the sporozoites, are not handicapped in this way; probably because the concentration of pantothenate in the tissues is always much higher than that in the blood. The results of pantothenate deficiency can be produced more conveniently by the administration of "homologue blockers" than by keeping the chickens on a deficient diet. The most active compound of this type so far discovered is pantoyltauramido-4-chlorobenzene, or, $CH_2OH{\cdot}C(CH_3)_2{\cdot}CHOH{\cdot}CO{\cdot}NH{\cdot}CH_2CH_2{\cdot}SO_2N(C_2H_5){\cdot}C_6H_5Cl$. When given to chicks in the diet, this compound is 4–16 times as active as quinine in controlling malaria due to *P. gallinaceum*. Since its antimalarial action is produced by blocking pantothenate-receptors, it can be neutralised by adding more pantothenate to the diet, but it requires 8 molecules of pantothenate to neutralise one molecule of the drug. (This is in great contrast to the sulphonamides, where one molecule of *p*-aminobenzoic acid neutralises over a thousand molecules of sulphanilamide.) The pantothenate utilisation of the chicken host is not nearly so easily upset as that of the parasite, and toxic effects do not begin to appear until more than 60 times the therapeutic dose is given in the daily diet. The symptoms produced by overdosage consist essentially in loss of weight and eventual death of the chicks; but in addition there is a striking increase in the proportion of immature erythrocytes in the circulating blood, though the total erythrocyte count is not changed.

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1. Seeler, A. O., Ott, W. H. *J. infect. Dis.* 1944, 75, 175.
2. McKee, R. W., Geiman, Q. M. *Proc. Soc. exp. Biol., N.Y.* 1946, 63, 313.
3. McIlwain, H., Hawking, F. *Lancet*, 1943, i, 440.
4. Brackett, S., Waletzky, E., Baker, M. *J. Parasit.* 1946, 32, 453.

These results, obtained with *P. gallinaceum* and chicks, are not directly applicable to man, for the vitamin requirements of the different species of parasite and of host are different. But they are of considerable scientific importance in teaching us to understand the metabolism of the malaria parasite; and it is heartening to learn that in these lean times even malaria parasites can be seriously inconvenienced by lack of their vitamins.

ANÆSTHESIA FOR THORACOPLASTY

OPINION is still divided on the best anæsthetic for thoracoplasty. At a recent joint meeting of the Tuberculosis Association and the anæsthetics section of the Royal Society of Medicine the advocates of local anæsthesia pointed to the advantages of retention of the cough reflex, absence of explosion risk, and low toxicity of the anæsthetic (though whether this holds true when large amounts are used may be doubted). Its opponents, on the other hand, spoke of the mental trauma suffered by the patient unless sedatives are given in doses large enough to produce virtually general anæsthesia.

The technique of local anæsthesia takes time and no little skill; the intercostal nerves must be blocked as well as the brachial plexus, while some operators block the cervical plexus and the vagi; and all this amounts to a searching anatomical exercise. General anæsthesia is less spectacular, but the patient is quiet, and he has no memory of what is otherwise at best an uncomfortable experience. Paradoxical movements can be controlled, secretions can be removed by suction, and hæmorrhage in the chest wall can be minimised by infiltration with adrenaline. It is evident that equally good results are obtained by local and general anæsthesia, so long as the methods are well used.

ELECTROCARDIOGRAM IN RHEUMATIC FEVER

WITH their strong clinical bias, physicians in this country have never paid much attention to the electrocardiogram in the investigation of rheumatic fever. Our American colleagues, though they have taken much more interest in the subject, are still undecided as to the incidence, and the significance, of the changes they have observed.

Among 6000 patients with rheumatic fever, most of them aged between 17 and 25, who were observed in a U.S. naval hospital, Filberbaum and his colleagues[1] found 898 with electrocardiographic changes. Arrhythmias were present in 119, including 18 with nodal extrasystoles, 2 with nodal tachycardia, and 1 with nodal rhythm. This relatively high incidence of nodal disturbances is attributed to increased irritability of the A-V node as a result of the rheumatic infection—a suggestion which is possibly supported by the observation of retrograde auricular contractions in a further 6 patients. The P-wave was altered in 98 patients; inversion of P, present in lead I on 9 occasions, in lead II on 10 occasions, and in lead III on 20 occasions, is attributed to a shift in the site of the pacemaker. The P-R interval was prolonged in 325 patients; but as prolongation was often seen in patients without rheumatic activity, its significance is questioned. Abnormal displacement of the S-T segment was found in 74 patients, in most of whom the displacement was permanent; only rarely was it associated with clinical evidence of acute pericarditis, and in view of its not uncommon occurrence in normal adults its significance in rheumatic fever is considered doubtful, except where it is associated with other electrocardiographic abnormality. Excluding cases where only T_3 was involved, changes in the T-wave were noted in 125 patients. These changes could not be correlated with variation in rheumatic activity, but the interesting suggestion is made that in young adults, in whom arteriosclerotic heart disease can be excluded, such changes may indicate involvement of the coronary arteries.

Another report[2] comes from a U.S. Air Force hospital and is based upon an electrocardiographic study of 60 successive cases of acute rheumatic fever. The most significant change was found to be in the P-wave, which was flattened or inverted, usually in leads II and III, in 8 patients. These changes are considered diagnostically significant, since in most the flattening or inversion coincided with periods of rheumatic activity. No correlation could be found between these changes and alterations in the P-R interval; so, unlike Filberbaum and his colleagues, these authors do not hold them to be due to alterations in the pacemaker.

These two groups of cases are not directly comparable, since relatively few of the first series were seen during the early weeks of the illness. Their implication for the clinician is twofold: in the first place the electrocardiogram must never be interpreted apart from the clinical picture; and secondly there is still need for a full and detailed study of the electrocardiographic changes in rheumatic fever.

THE INDIAN VILLAGER

IN 1944 the All-India Institute of Hygiene and Public Health carried out a sample survey of its "district," which is served by the Singur Health Centre. Apart from the standard vital statistics and the results of some special investigations, we have hardly any information, even approximate, on the extent and associations of ill health in India; so this survey is of more than local importance. Its main findings have now been set out in a rather hurried preliminary report.[3]

Singur Health Centre is situated in the Ganges delta, 21 miles from Calcutta, and serves an area of 33 square miles, including 68 villages with a population of 63,000 in 12,000 families. The economy is agricultural; more than half the men till their own lands, and almost a quarter are agricultural labourers. Industry, transport, distribution, and the professions thus account for less than a quarter of the men, while nearly all the women are housewives. Three-quarters of the population spend less than £15 a year, and 40% of the families are in debt. About 42% of the males over fifteen and 4% of the women are literate; a third of the boys and 5% of the girls attend school. The vital statistics carefully collected during 1944 provide an interesting check to the official records:

	Survey findings	*Local registration data*
Birth-rate	42·6 ..	30·5
Death-rate	22·8 ..	19·5
Natural increase	19·8 ..	11·0
Infant-mortality rate ..	137 ..	—

Local hygiene is described in familiar terms: there is gross overcrowding; most of the houses are badly lit and ventilated; only 7% of them have washing facilities and latrines; fly breeding is universal. Yet, despite this depressing environment, the majority of dwellings were judged "clean" or "moderately clean."

The most valuable part of the report is its account of morbidity at the time of the survey: 11·6% of the people were suffering from some illness—acute in 1·1%, chronic in 2·1%, and undifferentiated or undiagnosed in 8·4%, malaria and dysentery being the commonest recognised complaints. These figures were laboriously analysed in order to elucidate associations between ill health and economic status, occupation, marital state, educational opportunity, and the like. Unfortunately

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1. Filberbaum, M. B., Griffith, G. C., Solley, R. F., Leake, W. H. *Calif. West Med.* 1946, 64, 340.
2. Sampson, J. J., Kaplan, P. C. *Amer. J. med. Sci.* 1946, 212, 321.
3. All-India Institute of Hygiene and Public Health. General Health Survey, Singur Health Centre, Preliminary Report, 1944. Simla, 1946. Obtainable from the institute.

the smallness of the numbers, and insufficient standardisation for age and sex, detract from the significance of the results. But there is no gainsaying the main facts—this figure of 11·6%, and the other crucial finding that "wage-earners," whether cultivating their own land or otherwise employed, lost on an average 24·5 days in the year, or a full working month, because of sickness; which is well over twice the pre-war figure in this country. This appalling load of illness is a prime cause of the general poverty which in turn promotes illness—the vicious circle so characteristic of Indian life today.

The investigators also tried to analyse the "general family outlook" on the cause, prevention, and cure of disease; and the assessments remain instructive when every reservation is made for their difficulty and subjective nature. Already, it seems, about 40% of the families have a "rational" as opposed to a religious, fatalistic, or superstitious attitude. But the "rational" medical service provided does not suffice even for those families who are ready for it. During 1943 between £600 and £700 was spent on hospitals and dispensaries, which attended to only 3–4% of the estimated volume of ill health. By contrast the villagers themselves spent £12,000 on private practitioners, more than four out of every five of whom are described as unqualified quacks. The preventive health services are in similar case: less than one in twenty patients with notified infectious disease were visited. General experience agrees with this finding that public opinion in India is already in advance of the available health organisation; and here is still another reason for pressing vigorously ahead with the Government's plans for reform.

This pioneer survey was perhaps a little too ambitious in scope; but much of value has been learnt, and its successors will be awaited with interest. The Calcutta school is to be congratulated on setting an example which others should quickly follow.

CHRONIC TROPHŒDEMA

LOCALISED œdema due to abnormal reactions of the subcutaneous tissue seems to have become more common since the war. The cases originally described by Nonne,[1] Milroy,[2] and Meige[3] were familial; in 22 of the 24 cases in one family reported by Milroy the œdema was present at birth, whereas in Meige's cases it appeared between five and thirty years of age. Sporadic cases arise at any time between puberty and the age of thirty or over. Women are mainly affected. Usually a moderate swelling begins over one ankle and spreads very gradually until the lower part of one or both legs is involved in a hard pitting œdema. This is originally pale, but the skin may become red and inflamed and cause a burning sensation. Patients occasionally give a history of a preliminary swelling resembling angioneurotic œdema. Many of them have neurotic traits. Histologically there is a thickening of the skin and subcutaneous tissue which may develop into a definite hyperplasia in the course of years. There is no evidence of venous or lymphatic obstruction or of cardiac and renal or myxœdematous origin. Parkes Weber and Schlüter[4] saw two cases in sisters who had a moderate hypertension. Abnormal distributions of the œdema have been described. Sézary and Grenet[5] described a case in a boy of 14 months who had œdema of the forearms and left side of the face. Apart from the preliminary swelling, there may be attacks of low fever, with severe abdominal pain and even protracted vomiting, while the œdematous area becomes inflamed and irritating.[6] Some patients say that the œdema fluid oozes freely from slight scratch of the skin. The fluid is thin, colo and tastes extremely salty. It seems that when a certain concentration of the chlorides is reached the patient reacts with vomiting in order to get rid of the surplus.

These localised œdemas are at present grouped under the name chronic trophœdema, coined by Meige, which seems preferable to Milroy's disease, Meige's disease, and the like. Although the various factors mentioned influence the condition, its ætiology is by no means clear. Bauer's[7] view that it is a congenital localised tissue anomaly seems to be quite feasible. The mechanism is therefore related to, though not identical with, that of localised myxœdema. The treatment is entirely symptomatic and accordingly not very promising. Permanent bandaging is sometimes useful.

INVASIVENESS OF CANCER CELLS

EVERY student of pathology is familiar with the invasive character of cancer cells, infiltrating tissue spaces, permeating the lymphatics, and disseminating as lymphatic and vascular emboli. But what is the intimate mechanism of their invasiveness? Coman[8] has tried to interpret this characteristic faculty in terms of three physical and chemical differences from normal and benign tumour cells—decreased adhesiveness, amœboid movement, and the liberation of a spreading factor which acts on adjacent normal tissue.

By micromanipulation Coman has shown that attached pairs of squamous cancer cells are separated by a third or a quarter of the force required for normal squamous cells or those from simple skin papillomata. As a result of similar experiments repeated in media with diminished amounts of calcium salts, and from the known fact that cancerous tissue is abnormally low in calcium content, he correlates the reduced adhesiveness with this finding rather than with relative rates of growth and amounts of formed intercellular substance. Coman had previously[9] confirmed the earlier work of Lewis and Gey,[10] which showed that in tissue-cultures of human carcinoma and sarcoma individual cells become detached and show active amœboid movement; this provides the second difference and aligns malignant cells with macrophages, leucocytes, and lymphocytes. Given detachment and amœboid movement, infiltration of connective-tissue spaces would be facilitated if an enzyme were present to dissolve the cement substance of adjacent cells, and Coman has now extracted a spreading factor, a hyaluronidase, from several malignant tumours, though this is not identified as the specific product of the cancer cell. However, the invasiveness of transplantable sarcoma in mice was not increased either locally or distally by the injection of hyaluronidase; neither did the virus-induced benign papilloma of rabbits show a greater tendency to become malignant. Coman therefore admits that the source of the hyaluronidase may be bacterial infection of the tumour and that anti-enzymes may be formed. He is forced by the negative results of his experiments to conclude that this factor is not essential to invasiveness.

These are interesting preparatory studies in an all-important field in which the ability of a cancer growth to evoke lymphocytic accumulation and stroma formation, and to invade, may yet be correlated with some physicochemical property related to abnormal cell metabolism.

The next session of the General Medical Council will open on Tuesday, June 3, at 2 P.M., when Sir Herbert Eason, the president, will take the chair.

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4. Parkes Weber, F., Schlüter, A. *Proc. R. Soc. Med.* 1937, **30**, 933.
5. Sézary, A., Grenet, P. *Bull. Soc. franç. Derm. Syph.* 1939, p. 49.
6. Hope, W. B., French, H. *Quart. J. Med.* 1908, **1**, 312; *Guy's Hosp. Rep.* 1908, **62**, 5.
7. Bauer, J. Die Konstitutionelle Disposition zu innern Krankheiten, Berlin, 1924, p. 202.
8. Coman, D. R. *Science*, 1947, **105**, 347.
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Special Articles

HOSPITAL WARD PLANNING

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OF THE MEDICAL AND ARCHITECTURAL STAFF,
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A hospital, besides being the doctors' and nurses' workshop, is the patient's dwelling for the time being, and ought, therefore, to be so designed as to provide hygienic conditions of a high order.

Good natural lighting and abundance of fresh air are well-recognised essentials of hygiene, which we should not be content to see neglected in hospital plans. Not only is the effect of good lighting on the patient's spirits important, but direct light has a beneficial effect on the body and reduces the bacterial count of the air[1]—a matter of obvious importance in a hospital, where infections of various kinds are always present and often abundant.

The trend of opinion in recent years towards smaller wards has complicated the architect's task. Whatever the drawbacks of the traditional British pavilion, its long rectangular wards with windows on both sides have at least the advantages of cross-ventilation and excellent natural lighting. Small wards of, say, 4 to 8 beds are less easily provided with cross-ventilation. On the Continent, where the small ward has been the vogue for a good many years, cross-ventilation has been almost entirely abandoned, and the usual plan consists in a series of small wards, mostly of 4 or 6 beds, ranged along a corridor giving access to them on the one side and to service rooms on the other. The wards thus have windows on one side only, and the internal corridor is mainly or wholly dependent on borrowed or artificial light. This is no doubt a convenient and economical plan, but it falls below the high standard of natural lighting and ventilation which has been a feature of British practice. The purpose of this note is to report an attempt to combine small-ward planning (including a liberal proportion of single-bed rooms) with good natural lighting and ventilation. It is a purely personal contribution to the study of hospital planning, made in the hope of promoting criticism and discussion.

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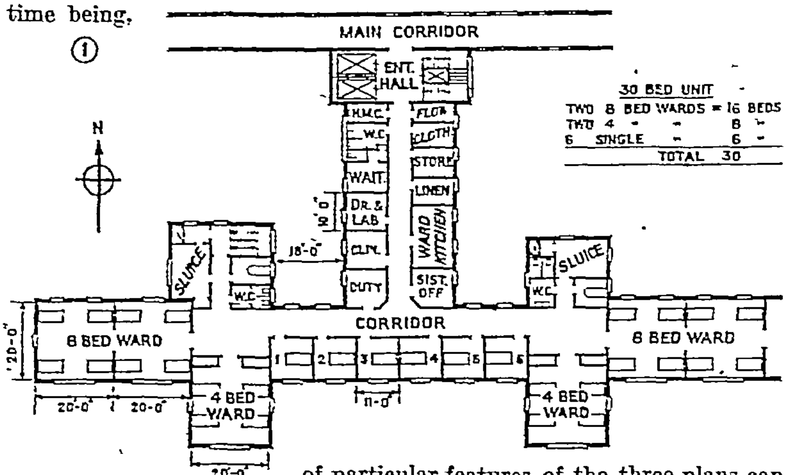

Plans 1–3 illustrate three variants of the same general design. Each shows a ward-unit of 30 beds, composed of single-bed rooms and wards of from 4 to 8 beds. All the multiple-bed wards are cross-ventilated, and the single-bed rooms open off a very well lighted and ventilated corridor. The number of single-bed rooms is six in plan 1 and nine in the other two. Only plan 2 includes a dayroom, but this could equally well have been included in the other plans, and other combinations of particular features of the three plans can readily be made. The sluice-rooms and patients' sanitary accommodation and bathrooms are separate from the other ancillary rooms; one of the aims has been to combine convenience for the nursing staff with avoidance of disturbance to the patients by noise from ancillary rooms.

The allotment of ancillary rooms seems to us reasonably comprehensive, but no special virtue is claimed for their number or size. The plan can be varied by shortening or lengthening the wing which contains the main group of ancillary rooms and the lifts and staircase. In fact one merit that we claim for the plan is its adaptability: it can be modified in a number of ways to suit individual requirements and tastes, without departing from the fundamental idea on which it is based. The constitution of the ward-unit (small

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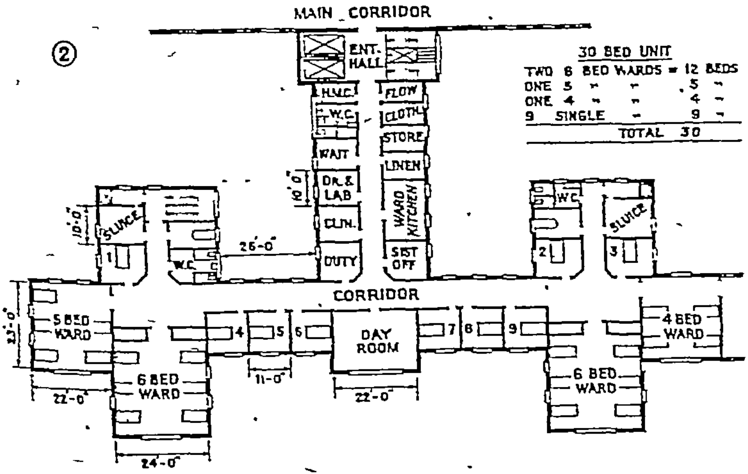

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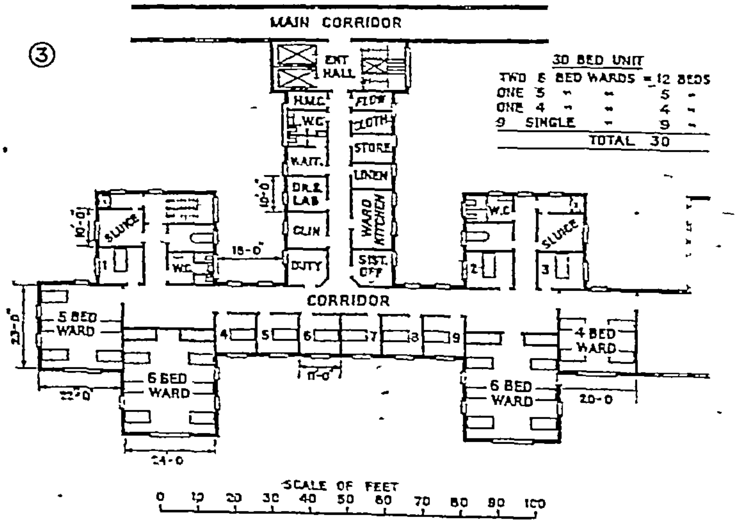

Abbreviations.—Ent. hall, entrance hall. H.M.C., housemaid's cupboard. Flow., flowers room. Cloth., clothes store. Wait., waiting-room. Dr. and lab., doctor's room and laboratory. Clin., clinical room. Sist. off., sister's office.

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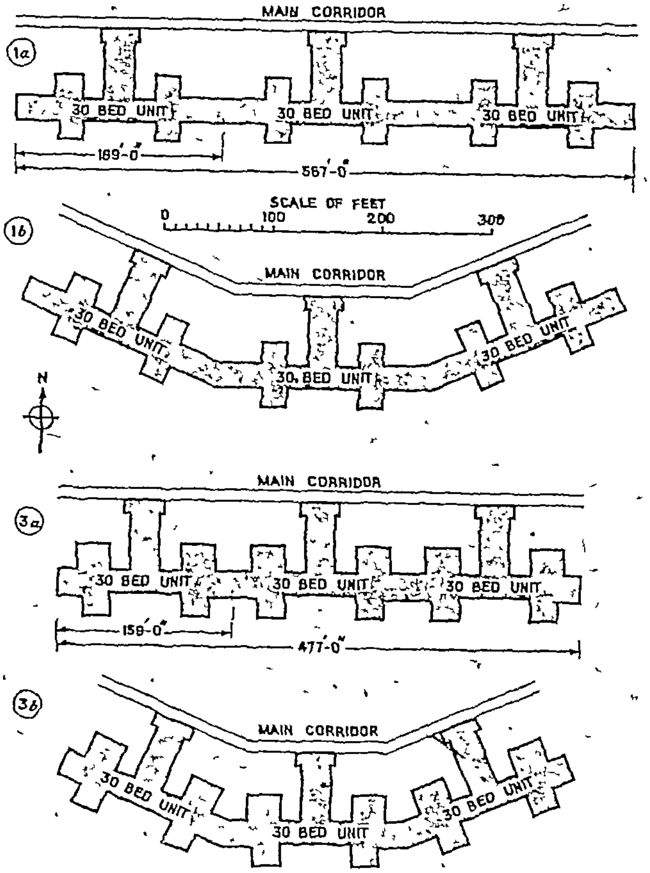
[1] Garrod, L. P. *Brit. med. J.* 1944, i, 245.

wards and numerous single-bed rooms) makes this form of planning eminently suitable for children. It is useful to be able to vary the use of parts of the hospital to meet varying demand.

A southerly aspect is assumed; due south would probably be best, but anything between south-east and south-west would be satisfactory. In plans 2 and 3, three of the nine single rooms have been sited on the north side of the ward-block, to avoid undue lengthening of the block. This may be no disadvantage since there would probably always be some patients for whom a southern aspect was not specially desirable.

Plans 1*a* and 1*b* (based on plan 1) and 3*a* and 3*b* (based on plan 3) show how the ward-blocks would be linked by a main corridor which would give access to the various central departments—offices, kitchen, laboratory, theatres, X-ray department, outpatient department, &c. Traffic in a hospital is mainly between the ward-units and the central departments, and little between one ward-unit and another. It would probably be unnecessary, therefore, to carry the main corridor above the ground floor; this would have the advantage that from the first floor upwards there would be no enclosed courts. The emergency doors which connect ward-units on the same level could be used by those members of the staff (e.g., doctors, matron, night superintendent) who have occasion to pass directly from one ward-unit to another.



A staircase is shown in one of the sanitary spurs of each detailed plan; this would provide an alternative means of escape in case of fire. It need only be provided at each end of a series of ward-blocks; the intervening ward-blocks would have an alternative escape at each end by the emergency doors leading directly into the wards of the adjoining blocks.

The plan is more suitable for a high than a low building, except in the case of small hospitals. Three ward-blocks of three stories would give 270 beds, and of six stories 540 beds. If a still larger hospital were required, three ward-blocks of eight stories or four ward-blocks of six stories would give 720 beds, and four ward-blocks of eight stories 960 beds.

Medicine and the Law

Damages against a Hospital for Alleged Negligence

THE facts established in the case of *Voller v. Portsmouth Corporation and others*, decided lately by Mr. Justice Birkett, will be studied with attention by hospital managements. A boy fractured his femur at football in 1944 and was taken off to St. Mary's Hospital at Portsmouth. Apparently it was not found possible so to manipulate the two pieces of bone as to bring them properly end to end, and it was decided to administer a spinal injection of 'Nupercaine.' This was done in the ward, not in the operating-theatre. A few days later meningitis was diagnosed. In the subsequent action for damages brought against the hospital it was stated that the patient is now permanently disabled; both legs are paralysed and he cannot retain his urine. According to the judge the defendants admitted that there could be no change for the better in the young man's condition and that this condition was entirely due to the spinal injection.

In spite of any such admissions, of course, the plaintiff would not succeed in his claim unless he could discharge the burden of proving that the defendants had been negligent and that their negligence had caused the loss and damage which he suffered. Besides the Portsmouth Corporation, sued as the hospital authority, three others had been cited as defendants—Dr. H. Hodges and Dr. S. F. Hans, both of the staff of the hospital, and Mr. A. G. Ord, visiting orthopædic surgeon. Mr. Justice Birkett found no evidence against these three and gave judgment in their favour. He found no evidence of any negligence in the treatment of the fracture, in the decision to administer a spinal injection, in the fact that the injection took place in the ward instead of in the theatre, or in the treatment of the patient after the meningitis was diagnosed. He was satisfied that the surface of the skin was properly cleaned before the operation and that Dr. Hans prepared himself in the approved manner by washing his hands and observing other requirements. How then had the unfortunate result occurred? After considering all possible sources of infection, the judge accepted the evidence of Mr. Hume Kendall (who was called on behalf of the plaintiff) that the bacillus must have entered the patient's body from outside at the moment of the injection and that there must have been some fault in the aseptic technique at the hospital. He thought that the hospital's technique in 1944 was adequate in this respect in the light of the knowledge then available. There must, he inferred, have been some fault in carrying it out. The evidence offered on this point by the hospital, he said, did not inspire him with confidence; it indicated a disturbing amount of confusion, forgetfulness, and carelessness on the part of the hospital staff for whom the Portsmouth Corporation were (under the ruling in *Gold v. Essex County Council* in 1942) legally responsible. The only possible source of infection was apparently in the apparatus used for the injection. There must have been a breach of the aseptic technique.

In giving judgment for £12,000 against the corporation, the judge observed that the plaintiff's loss had been calamitous. No money award could compensate him for his terrible disability. A stay of execution was granted with a view to an appeal. The court ordered the corporation to pay the costs of the three successful defendants, who were represented by Messrs. Hempsons on behalf of the Medical Defence Union.

The 1947 edition of the Register of Speech Therapists has now been published, and doctors, hospitals, and local authorities may obtain copies free of charge from the registrar of the Board of Registration of Medical Auxiliaries, B.M.A. House, Tavistock Square, London, W.C.1.

In England Now

A Running Commentary by Peripatetic Correspondents

PAINTING a doctor is rather like shooting a sitting bird. Their innocent confident faces beam across the galleries of this year's Royal Academy, announcing what they are from afar off. They range from James A. Grant's young surgeon, in pastel, grave and mild, through Dr. R. G. Abercrombie in John Wheatley's sinister yellows and purples, the universal Family Doctor of B. Fleetwood-Walker, and cosy Dr. William Crofton painted by John Y. Gilroy among some old books, to Vincent O'Sullivan, Esq., bagged by George Harcourt, and looking every inch the physician, surgeon, and gynæcologist his degrees in the catalogue proclaim him. These nearly exhaust the pictures of medical interest, for painters, tiring of wards and wounds and drips and rubber-tubing, have turned back to well-thumbed subjects—this under snow, that under sun, the market-place, the cornfield, the street, the bowl of flowers, and the occasional whopping nude.

Of course, it isn't what you paint, or even the jolly way you paint it, that makes a picture, I suppose; but something like a caged bird or a volcano which explodes out of the artist and gets on to the canvas. Perhaps eight years of war and peace are enough to stifle any volcano; and caged birds, fatigued by rationing, are too tame to leave the perch. But there was plenty of faint deliberate humour about, as well as some of the unconscious kind. Which was governing James Dawson when he painted two monstrous dogs and an attenuated man, and named it after the human? Derek Clarke's Connemara Family, with their glass-alley eyes, their red hair, their black hair, their long lips and thin legs, make their own jokes, even if they don't make a great painting; and the Sergeant-at-Mace of Gravesend, by Arnold H. Mason, provokes sympathetic smiles; the early cataract of his left eye proves on close inspection to be due to a trick of the lighting. With determined originality, Charles Ginner has painted the Albert Memorial.

When it comes to looking at pictures instead of subjects I am obliged to take further advice. The Nashes and the Pitchforths, I am told, are pleasant but not outstanding examples of these painters' watercolours; but I was distracted at the time by some Chinese geese. In missing the Churchills completely, though forewarned, I suppose I betray some deep-seated trouble with my œdipus situation. Conditioned, like my painted colleagues, by a professional bias, I found most pleasure in a picture called The Hospital Gate, by J. Leigh Pemberton. A stretcher-case was just going in, and since he had been brought in a cart and his legs were dangling over the sides of the stretcher, I am happy to report that this was not an English hospital. It was in fact a monkish Italian hospital of warm brick in a sun-ridden square, with a few inches of distant garden, shaded by cypresses, peering above its wall. Pigeons, a fountain, steps, and bronze lions no doubt place it for those who know Italy. I shall know it, when I see it, but more by the smell of the warm air and the sound of the fountain, I think, than by other marks of identification.

* * *

One of the snags in our department is the entertainment of Very Important People. Normally the laboratory is in an appalling state of untidiness but anything required is within easy reach. Petri dishes overflow with cigarette ends, meat pies sizzle in the incubator, and coffee cups lie strewn around. In this atmosphere the research worker, clad in stained flannels and filthy white coat or threadbare sports jacket, potters away happily hour after hour.

Suddenly all is changed. A V.I.P. is coming, he is *coming*, he is COMING! Far and wide is heard the cry, from the director to the lab. boy. The researcher shudders as a small army of grim-faced cleaners invades the laboratory. Gone are the pies, the Petri dishes, and the coffee cups. The laboratory is transformed into a cold impersonal spotless showpiece. Little work can be done for fear of exciting the wrath of the cleaners.

The great day arrives at last. The staff members are easily picked out as they huddle together in uncomfortable little groups, each worker resplendent in new suit and clean collar. The air is heavy with the odour of mothballs. The V.I.P. is duly impressed by the gleaming glasswork, and departs, convinced that much work is being done—and so it was, before his arrival. He has GONE, he has *gone*, he has gone! The cry is taken up joyously by all. The Petri dishes, the pies, and the coffee cups reappear and the researcher, clad in his oldest clothes, is again at peace with the world.

* * *

Whenever I read of allegations of inelegance or incompetence against the general practitioner in the domain of midwifery my mind goes back to one hot summer's day of 1928. I was acting as locum for Dr. S, who had a very large panel practice in an industrial town, and, during a hectic period of busy surgeries and visits, I was summoned to attend a well-to-do manufacturer's daughter in her first confinement.

My examination revealed an O.P. with a good deal of disproportion, and, after I had explained the position to the fussy and anxious parents, it was decided that I should call in a consultant obstetrician from the local university. The great man duly arrived, carrying his bare forceps under one arm and his gown over the other. His rubber gloves he produced from his pocket, and these, with the forceps, he handed to the midwife, with instructions to boil them. How she performed that task was not my business, for I was asked to get busy with the anæsthetic.

When the patient was fully anæsthetised and the obstetrician ready, I waited to see a masterly rotation performed, but no such thing was even attempted. He put on the forceps, and pulled and pulled, with his foot against the bed, until he succeeded in delivering the head, but not without causing a complete tear into the rectum; not even episiotomy did he perform. After the rest of the delivery, he turned to me and said that he thought he could safely leave me to undertake the repair. I, being young, could only meekly acquiesce and watch him depart, amid the plaudits of the relatives, with a fat cheque in his pocket.

This story should point a moral, but what it is I do not know.

* * *

In my train today there was a medical student, a tall untidy youth with a pale face. A medical textbook lay open on his knee, but his reading was half-hearted, and one gory illustration, in colour, remained displayed throughout the whole journey. As the train filled he was crowded into a corner, but the book stayed open though reading was then impossible. I watched with some amusement the efforts of at least three other passengers to see what was depicted—a sort of macabre fascination which they were at some pains to conceal. I was reminded of George.

George was in my year at medical school, a studious little man whose work, though intensive, always seemed misapplied. When we were preparing for the Second M.B. he was in the habit of carrying bits of his half skeleton about with him. One morning as he sat in the tram-car his right hand was absently playing with a scapula in his mackintosh pocket. The voice of the conductor roused him from his reverie, and, to his horror, he discovered that his thumb was stuck firmly between the acromion and the glenoid. He struggled for a little while and then grasped the bone with his other hand from the outside of the mackintosh while he pulled and pulled—all to no avail. The conductor looked at him curiously and said "Fares, *please*" in a louder voice. The other passengers began to take interest and poor George was in an agony of embarrassment. He couldn't face the idea of producing the bone, so he attempted the incredibly complicated manœuvre of taking money from his right-hand trouser pocket with his left hand. After a few wild moments which seemed like hours he succeeded and paid his fare, but the conductor went his way firmly convinced he had been dealing with a madman. I should dearly have liked to see George produce the scapula as a sort of gruesome appendage to his right hand. I can imagine the reaction of the passengers: the same sort of thrilled disgust as I saw today, the same mixture of curiosity and repugnance.

Letters to the Editor

THE CURRICULUM

Sir,—It is often said that, during the preclinical part of the medical curriculum, a complete interlocking of anatomy and physiology should be effected. But when the discussion turns to specific details rather than generalities it becomes clear that this ideal can only be partially attained, for in practice it is not always possible to equate the time spent teaching the anatomical and physiological aspects of an organic system. For instance the physiology of the circulation may occupy a whole term's course of lectures, while the study of the relevant features of the macroscopic and microscopic anatomy of the heart and main vessels may occupy not more than a few days. The study of the disposition and main attachments of the muscles of the body and of the structural mechanism of individual joints will occupy the student for many weeks; but, from the physiologist's point of view, the time devoted to the principles of muscle action and joint movement is very much shorter. Other difficulties arise from the fact that the more intimate study of anatomy by dissection of the human body proceeds in regions rather than in systems. The physiology of endocrine secretion, for example, may be dealt with in a single course of lectures, but the anatomy of the endocrine organs can hardly be studied in a single course of dissection.

This kind of limitation is obviously imposed by the practical methods of study which are employed in the medical curriculum, but it is difficult to see how it can be overcome. It means that, however much we should like to achieve the ideal of the simultaneous teaching of anatomy and physiology in respect of each functional system, in practice one or the other must come first (even if, in favourable cases, they are separated by little more than weeks or days). And, if this is so, which *should* come first?

For many years it seems to have been assumed, as I think erroneously, that the practical study of the anatomy of a system should logically precede the study of its physiology. But from the student's point of view this is altogether undesirable. The student who dissects the brain before he has studied its physiology tends to "learn it up" in bald terms of descriptive eminences and depressions, meaningless lumps of grey matter, and uncharted tracts of white matter. Or, if he studies the anatomy of the alimentary canal in the preserved cadaver before he has studied its movements during life, he inevitably gets a false impression of fixity and rigidity, however much the anatomist may try to persuade him otherwise.

Now suppose the student studies the physiology of these systems first. He does not need to have dissected a brain himself in order to understand and appreciate the principles of the elementary physiology of the central nervous system; the main topographical relationships which he requires to know in this connexion can quite easily be grasped by reference to dissected specimens, diagrams, and models. In the same way, he can perfectly well study the principles of the elementary physiology of the digestive system before completing a practical study of its anatomy. But if the anatomy of an organ is studied *after* some knowledge of its functions has been acquired the attitude of the student towards his dissection becomes quite different. To the intelligent student who has already studied the physiology of the nervous system the actual dissection of the brain becomes an interesting, and even an exciting, experience. For now he can display and trace out *for himself* structures such as the pyramidal tract, the medial fillet, the optic radiations, or the motor cortex, all of which will have acquired a real and vivid meaning for him. Similarly, in dissecting the stomach he will tend of his own initiative to look for those structures which now have for him a functional significance such as the disposition of the various muscular coats, the pyloric sphincter, the functional subdivisions of the stomach, and so forth.

It is in this connexion that a major criticism of Professor Zuckerman's plan for the Birmingham curriculum (*Lancet*, March 29, p. 395) may be suggested. Professor Zuckerman proposes to condense the whole of the dissection course into the first three terms of the preclinical period. But would it not be more reasonable to relegate it to the *latter* part of the period, by which time the student will have far more understanding of his subject and thus be able to derive much greater profit from his practical studies? Under the Birmingham scheme he will be compelled to dissect structures which, so early in his course, will mean little or nothing to him, and practical anatomy is likely to become for him an incredibly dull and dry subject. Another good reason for placing the dissection course towards the end of the preclinical curriculum is that, with surface anatomy and radiological anatomy (which should be studied concurrently with dissections), it leads naturally to the anatomical knowledge which he needs for the immediately following clinical part of his curriculum, and he will start his clinical work with this sort of knowledge still fairly fresh in his mind. In any case, it seems reasonable to deal with the general principles of anatomy in the early part of the preclinical period so as to give a general perspective of the subject, and to lead the student up to the more precise details of human anatomy later on.

Apart from other considerations, I am inclined to think it a psychological mistake to crowd the whole of topographical anatomy into an intensive course at the very beginning of the preclinical curriculum, as envisaged in the Birmingham scheme. The dissection of the upper and lower limbs and the thorax in the first term is specially open to criticism, since the average student, when embarking on a completely novel subject of the curriculum, does require a little time to settle down into it and to see it in its right perspective. It must also be recognised, I think, that there are definite temporal limits to the assimilative power of the human mind, particularly in its adolescent phase. While intensive courses can be tolerated quite well by the student in the later part of his curriculum, by which time his mind has become more mature, they are surely to be avoided in the early stages of a university type of education. It would appear preferable, on the whole, to space out the course of dissection over more than three terms; there seems no objection to this, provided the student's mind is not continually being distracted by having to learn and memorise masses of unnecessary details which have neither vocational nor educational value. The dissection course will then form a steady and somewhat leisurely, but quite fundamental, background to the more organised and integrated courses of instruction in which anatomy and physiology are brought into their proper relationship with each other. The student's knowledge of topography can be tested as he goes along, in this way eliminating as far as possible the necessity of memorising topographical details for the examination at the end of the preclinical period.

W. E. Le Gros Clark.

Department of Human Anatomy, Oxford.

SONNE DYSENTERY AND NON-SPECIFIC GASTRO-ENTERITIS

Sir,—The subject of Martin and Wilson's paper of April 26 is one in which I have been interested since I was stationed in southern Scotland in the 1944–45 winter. At that time both Sonne dysentery and so-called non-specific diarrhœa were a problem for civilian and Service doctors alike. The cause of the non-specific diarrhœa being completely unknown, it was difficult to advise anxious laymen on methods of prevention—to say nothing of one's own anxieties about the possibility of a big epidemic.

At first the two diseases appeared different, and I wrote in a report: "The first is a febrile disease with a good deal of abdominal pain and frank blood and mucus in the stools, from which *B. dysenteriæ* Sonne is usually grown. The second is an afebrile diarrhœa, without much pain, and with a watery stool containing no gross amount of blood, on which the pathologist reports 'No pathogenic organisms seen.'"

Suddenly, in May, 1945, an explosive epidemic occurred in a camp, probably started by a Sonne-carrier in the cook-house, involving 23% of the men in the camp. Both types of disease were seen—the Sonne-positive dysentery and the bacteriologically negative non-specific diarrhœa, and all gradations in between. The Sonne-positive cases were mostly in the first three days of the epidemic, which lasted fourteen days. All the specimens were collected, dispatched, and tested under the guidance of experienced pathologists.

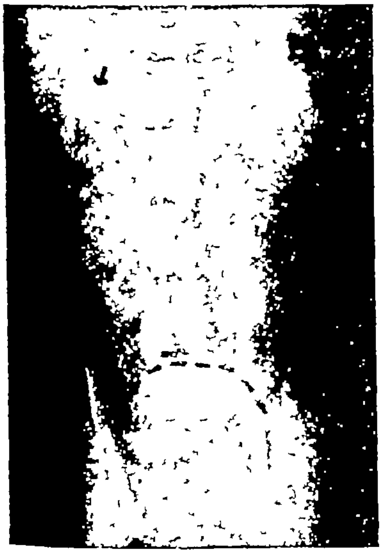
It is difficult to believe that two diseases with similar symptoms but different ætiology would break out at the same time in this way. Yet many think these are different diseases—particularly pathologists who have nowadays so much confidence in being able to isolate Sonne's bacillus.

London, E.C.2. I. D. MACDONALD.

PLACENTAL HORMONES AFTER DEATH OF FŒTUS

SIR,—Dr. Bernhard Zondek (Feb. 1) has shown that the placenta can continue to secrete hormones in a normal way for several weeks after the fœtus has died. On March 15 Mr. W. P. Hirsch reported a case of toxæmia with an eclamptic fit, all signs and symptoms having developed after death of the fœtus. Fœtal movements had been absent for four days, and on delivery a macerated fœtus was obtained and the placenta showed only small areas of old infarction.

Experimentally it has been shown [1] that the fœtus can be absent for months, even for the greater part of the normal length of gestation, without interrupting the state of pregnancy. For example, the fœtus was surgically removed from a rhesus monkey on the 73rd day of pregnancy while the placenta remained in place and functional, and the animal continued physiologically pregnant for the following 90 days, at the end of which time a viable infant would have been expected. Thus, in the monkey the duration of pregnancy and the onset of contractions associated with expulsion of the placenta were independent of the presence of the fœtus. Hormones in the urine were sustained at pregnancy level and did not drop until after spontaneous expulsion of the placenta.[2]



X-ray photograph showing distended ureter in a monkey on the 94th day of pregnancy. Interrupted line marks extent of uterus.

I wish to report an associated phenomenon. Hydro-ureter of pregnancy occurs in the monkey, as it does in women, during the latter part of pregnancy. The accompanying figure shows a distended ureter with urinary stasis in a monkey on the 94th day of pregnancy. The uterine shadow was not large enough to be compatible with a normal gestation of this length, nor was the fœtal skeleton to be seen. A hysterotomy was performed, and the uterine contents were removed as a whole. The placental size was comparable to that of a 60-day pregnancy; but, when the membranes were opened, no fœtus was found, though the point of attachment of the cord was clearly recognised. The amniotic fluid contained some debris.

In this instance, even after spontaneous absorption of the fœtus, the hydro-ureter persisted because of the presence of a functioning placenta. This conforms to our experimental findings, which show that a hydro-ureter can persist, or even arise, after removal of the fœtus early in pregnancy.[3] G. VAN WAGENEN.

Department of Obstetrics and Gynecology,
Yale University, New Haven.

SHORTAGE OF NURSES

SIR,—There is general apprehension that smooth functioning of the new health service, when it is introduced in 1948, may be hampered by shortage of nursing staff. Meantime the Ministry, the local authorities, and the voluntary hospitals are taking part in a campaign to recruit nurses to the hospitals.

It is generally agreed that one of the main reasons for the reluctance of girls to enter the profession is the persistence of old-fashioned restrictions, and the general tendency of the hospital authorities to interfere with the private life of the nurse. In order to overcome this obstacle to recruitment some local authorities have agreed that student as well as trained nurses may be non-resident. The General Nursing Council, in a circular dated April, 1946, state: "It is emphasised most strongly that the Council considers it to be to the disadvantage of a student nurse to be non-resident and every effort should therefore be made to arrange for her residence within the training school." In this the G.N.C. seem to take a stand which is directly opposed to modern tendencies, and wish to single out the student nurse from among most other students as being peculiarly unsuited to living away from her place of "study." Even in hospitals with the best of conditions there is no doubt that this policy turns away a number of potential applicants; but in many hospitals living conditions for nurses are highly unsatisfactory. In many mental hospitals noisy patients are liable to disturb even the soundest sleeper in the nurses' quarters, and the old custom of having nurses sleep in a side-room off the ward so that she may be available in an emergency has by no means been universally abandoned. Even in general hospitals a complete break with the institutional atmosphere once the period of duty is over is good for mental hygiene. The "student" nurse is primarily employed as a nurse and is only very secondarily a student; and since this position is unfortunately likely to continue for many years, its implications should be faced. In some hospitals compulsory residence (whether student nurses or trained staff) is as undesirable, and as unhealthy as compulsory residence at their place of work would be for factory workers.

St. Mary Cray, Kent. BRIAN H. KIRMAN.

BOOKS FOR MEDICAL "DISPLACED PERSONS"

SIR,—Excellent work is being done by our D.P. doctors in our hospitals, but they are greatly handicapped by shortage of textbooks describing the recent advances in the many branches and specialties of our profession. In Servatius Stift Hospital, Augsburg, of which I was medical director in the latter half of last year, there are 600 beds, five X-ray plants, and a chemical and a pathological laboratory, and all branches of medical and surgical work are encountered. Most of the doctors can read English and would welcome used textbooks or last editions but one. I am sure many of my colleagues have on their library shelves books which, though outdated by a couple of years, would nevertheless be very welcome to our doctors out here. All medical books are needed, but those on medicine and general surgery most urgently. I will gratefully acknowledge receipt of each book.

Area Team 1069, 390 UNRRA, B.A.O.R. P. J. SMITH.

AMPHETAMINE

SIR,—The article dealing with amphetamine in your issue of April 26 is doubtless based on a multitude of reports and must carry great weight the world over. Will you therefore once more allow a still small voice to register a minority report, and to record the following opinions and question?

1. The drug is useless in obesity because its power of diminishing appetite is lost after a very few doses.

2. It is most certainly not a specific cure for narcolepsy. It is perfectly true that a number of cases are very much relieved, but at a rough guess and as a clinical observer and not a research worker (that is all I can venture) it is effective in only half the cases.

3. Little or no mention is made of its possible toxic effects, and I feel strongly that the risk of these is still underrated. Since a previous communication which you published a few months ago (Jan. 4), I have seen yet

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1. van Wagenen, G., Newton, W. H. *Surg. Gynec. Obstet.* 1943, 77, 539.
2. Dorfman, R. I., van Wagenen, G. *Ibid*, 1941, 73, 545.
3. van Wagenen, G., Jenkins, R. H. *J. Urol.* 1939, 42, 1010.

another case that developed a definite toxic dermatitis after very small dosage.

4. Because, in my opinion, its use impairs reason, it is of no value in the treatment of alcoholism; and I have not seen or heard any case-reports where a chronic alcoholic has derived more than temporary benefit.

5. It is agreed that the drug produces an evanescent euphoria; but in my experience the law of diminishing returns applies to amphetamine more surely perhaps than to any other drug in the pharmacopœia.

6. Its use may become a social danger, for it increases the average individual's capacity for swallowing alcohol without untoward symptoms; but the alcohol is then ingested in larger doses and the final pitiable picture is a mixture of alcoholic stupor and amphetamine excitement. This condition, apparent to an experienced eye, is dangerous to the victim, often producing disastrous consequences.

7. Is there a reputable psychiatrist who places the slightest reliance on the drug in the treatment of any psychotic or neurotic disease?

London, W.1. CHRISTOPHER HOWARD.

DEATH AFTER DOG-BITE

SIR,—Your annotation last week states that a boy died from anaphylaxis after the injection of 2 c.cm. of gas-gangrene antiserum. Some years ago Lamson[1] reviewed 42 such cases in most of which death took place within ten minutes of an injection of antidiphtheritic serum; and many others have been reported. Sensitisation to horse-serum is very common, and it is estimated that this fatality is likely to occur in 1–70,000 cases. But it can easily be avoided by a skin test.

If a control puncture is made, say on the front of the forearm, with an empty hypodermic needle, and another one is made two inches away through a drop of the fluid to be injected, redness, irritation, and a weal will be seen for certain within a quarter of an hour, at the site of the second puncture, in any patient who is grossly sensitive. If in such a case it is essential to give the injection this can be done by commencing with a dose of 0·1 c.cm. and continuing at half-hourly intervals, doubling the dose each time and giving three minims of adrenaline with each to anchor the dose and slow down its absorption.

London, W.1. FRANK COKE.

HÆMOLYTIC DISEASE OF THE NEWBORN

SIR,—I have read with great interest your editorial of April 5, discussing substitution transfusion in the treatment of erythroblastosis fœtalis and the possible effect of that treatment on prognosis.

You are quite correct in stating that the value of this method is limited in that it can be applied only after the infant is born. It is also true that complete reliance upon antibody studies as indications for treatment will occasionally lead us astray. We have recently observed an instance in which there was an antibody titre of 1 : 4000 in the mother's serum and 1 : 512 in the fœtal-cord serum, with anæmia but no jaundice in the infant. Recovery took place after a single intratibial transfusion given at two weeks. We have also seen an instance where no antibody, either complete or incomplete, was demonstrable in either the mother's serum or the fœtal-cord blood in a second pregnancy. We expected no serious illness and were greatly chagrined when after twenty-four hours the infant developed a severe and fulminating jaundice, dying within a few hours despite the substitution transfusion instituted at that time. Autopsy indicated that the procedure performed one day earlier might have been life-saving; but we were lulled into a false sense of security by the apparent absence of antibodies. Such experiences, fortunately, are the exception rather than the rule.

I agree that many of the infants will be so damaged in utero as to make the substitution technique useless. I do feel, however, that in the large group which appear normal at birth and yet develop severe icterus gravis within the next twenty-four hours the method is not only life-saving but also preventative of the unfortunate sequelæ of brain and liver damage. In the comparatively small series studied to date we find a mortality-rate of less than 10%, compared to our former figures of 50%.

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[1] *J. Amer. med. Ass.* 1924, **82**, 1091.

There is no doubt in my mind that it is necessary to study a still larger series before the method can be properly evaluated.

In the long run, a procedure to prevent the formation of the maternal antibody will make all other methods of therapy obsolete. Until such a treatment is available the substitution transfusion appears to offer the best hope of a living and healthy baby to some families previously unable to anticipate that joy.

I wish to thank you for the favourable comment in your editorial, and to assure you and your readers that while we feel that some progress has been made in the treatment of the disease, there is still much to be done.

HARRY WALLERSTEIN

Erythroblastosis Fetalis Clinic, Jewish Memorial Hospital, New York. Director.

SURGICAL TREATMENT OF HYPERPIESIA

SIR,—In connection with your annotation of May 3, I suggest that the most dangerous complications are cerebral and retinal vascular accidents. They may depend upon the fact, often overlooked and not described, that the hyperpiesia is usually accompanied by spasm of the arterioles and capillaries, including those of the venous system. This spasm causes different degrees of hypertension in various parts of the vascular tree; a patient may have hypertension in the body, but hypotension in the brain. These cases are usually subject to myocardial failure or coronary thrombosis; and, if operated upon, they are liable to have cerebral hæmorrhage or thrombosis. The same applies to the retina.

A preliminary examination by Pachon's oscillometer and an estimation of retinal blood-pressure by Baillart's method would probably clarify the issue.

London, E.1. N. PINES.

ASCORBIC-ACID METABOLISM

SIR,—In their article (March 29) on the ascorbic-acid metabolism of Bantu soldiers, Professor Kekwick, Dr. Wright, and Dr. Raper express disagreement with several of the conclusions reached by us in a somewhat similar study published in 1940.[1]

It is unnecessary to discuss these divergences in detail, for some at least might be expected with groups whose circumstances and general levels of health are probably different. But we would like to stress that we have never supposed that the *ascorbic-acid requirements* of the Bantu differ from those of other races, or that the use of low daily intakes is to be condoned. Our main interest was to study the well-known fact that an extremely low daily intake of this vitamin may be found amongst persons doing hard work and apparently maintaining a high level of general health.

Obviously this type of experiment is open to many objections. The only reliable way by which extraneous factors can be excluded and the true *functions* and daily requirements of the vitamin established is by the study of healthy subjects consuming a diet believed to be adequate in all other respects. Such studies have now been made, and they have thrown much light on the subject; incidentally, they have fully confirmed the findings reported by us. The first of these was the classical experiment of Crandon[2] on himself, but several others may be mentioned—for example, the studies of Ancel Keys. Particularly relevant are two papers by Pijoan and Lozner[3] and Najjar, Holt, and Royston.[4]

The following conclusions may now be regarded as well established:

1. Ascorbic acid serves only two known purposes—the prevention of scurvy and the treatment of scurvy.

2. A healthy subject *initially saturated* with ascorbic acid, when placed on a diet devoid of this substance but otherwise adequate, will be protected against scurvy for as long as five or six months. The appearance of scorbutic symptoms —e.g., gum lesions and delayed healing of wounds—is sudden. (Until then the individual may be compared to someone approaching a precipice: though his danger is increasing

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[1] Fox, F. W., Dangerfield, L. F., Gottlich, S. F., Jokl, E. *Brit. med. J.* 1940, ii, 143; with Suzman, H. *Proc. Transv. Mine med. Offrs Ass.* 1940, **19**, 240.

[2] Crandon, J. H., Lund, C. C., Dill, D. B. *New Engl. J. Med.* 1940, **223**, 353.

[3] Pijoan, M., Lozner, E. L. *Bull. Johns Hopk. Hosp.* 1944, **75**, 303.

[4] Najjar, V. A., Holt, L. E., Royston, H. M. *Ibid*, 315.

with every step he remains completely sound until the last step has been taken.)

3. At present the minimum daily intake required to protect from scurvy may be defined as that which maintains a constant level of ascorbic acid in the white-cell platelets; this appears to be of the order of 20 mg.—possibly somewhat less.

4. Safe dietary allowances lie somewhere between this protective minimum and about 80 mg. per diem, when saturation and wastage occurs. For normal subjects any daily intake within this range may be regarded as protective; but naturally the more generous the allowance, the greater the margin of safety.

5. Plasma values are useful as an index of ascorbic-acid status; but they merely reflect the degree of positive economy that is being achieved. (Roughly they indicate the distance to the precipice.)

It must be emphasised that the above is strictly true only for the average healthy person adequately fed in other respects. There is good evidence that individual idiosyncrasies cannot be ruled out entirely. Experiments such as our own and those now reported, carried out on groups of persons whose health is influenced by many other factors, will yield results which deviate from the foregoing according to the nature and extent of these other factors.

We submit that a consideration of the reports which have appeared in many parts of the world during the war years will support these conclusions as to the action of this vitamin. F. W. FOX.

South African Institute for Medical Research,
Johannesburg.

THANKS TO NURSES

SIR,—Mr. Hugh Donovan concluded his interesting article of April 19 by expressing his admiration for the nursing staff who cared for his patients. Acknowledgment of the part played by nurses appears all too infrequently in articles, and one can only hope that the omission is in no way due to their efforts being taken for granted.

London, N.6. P. ALWYN-SMITH.

ANALGESIA IN LABOUR

SIR,—I quite agree with Dr. Elam (April 26) about the lack of medical interest in maternal analgesia.

On Sept. 23, 1944, you kindly published a letter of mine advocating a mixture of alcohol and chloral, which I had found highly effective. Since then I have endeavoured to interest a number of general practitioners in the method, but without much success. On bringing up the subject I generally receive one of two answers—either that women appreciate their babies much more if they have some pain during childbirth, or that they do not really suffer all that much anyway.

Possibly this indifferent attitude may be due partly to the chronic fatigue from which many busy practitioners suffer and partly to familiarity with the sight of pain.

I shall be pleased to send a copy of my letter of 1944 to any who are interested. Using this method no apparatus is needed, and the actual administration of the mixture, which is given by mouth, may be safely left to the midwife. I have now given alcohol and chloral in more than forty deliveries; but I am still delighted when a patient, especially when she is a primipara, wakes up after it is all over and says, "when am I going to have my baby, doctor?"

46, Court Way, London, N.W.9. SHAKESPEAR COOKE.

"... If the psychiatrist is lost in a morass of theory, there is great danger that his ideas of scientific advances will drift into the sphere of wishful thinking and fairy tales. A psychiatrist must first of all be a good physician.... Second, he must be a bit of a sociologist who is a constant student of the milieu in which his patient has lived and must live in the future. Third, he must be a psychologist who understands the workings of the human mind. Fourth, he must be a vocational guidance expert. . . . Most important of all, the psychiatrist must express himself in terms which can be understood by every medical practitioner, and psychiatry must be made an integral part of medicine. It does not take a great mind to make simple things complicated, but it takes a very great mind to make complicated things simple."—Dr. C. C. BURLINGAME, *J. Amer. med. Ass.*, April 5, p. 971.

Parliament

ON THE FLOOR OF THE HOUSE

THE debate on the Transport Bill has provided one of the greatest—and most vociferous—clashes of opinion in the House during this session. Beginning on Monday with protests by leaders of the Opposition about the number of amendments and the shortness of the time allotted, it went on until Wednesday when a back-bench Conservative revolt, led at first by Sir Alan Herbert, from 9.30 P.M. until after 1 A.M. kept the division bells ringing and members marching through the Aye and No lobbies in an almost continuous parade. The packed hundreds streaming through the Government lobby joked and sang the Red Flag, the Internationale, Boys of the Bulldog Breed, and songs of the Welsh hills. A Conservative, rather lonelily, attempted Land of Hope and Glory, and someone asked A.P.H. why should he expect to have two funny shows running in London at the same time.

The announcement during the week of the terms of compensation for members of Indian services, including of course the I.M.S., has disposed of a cause of uncertainty and indecision. Reliable reports have it that in India the I.M.S. had hoped to have an announcement by the end of last year. The present announcement and its terms should satisfy them, and in view of the conditions a number of these officers may be willing to remain in India. One effect of the new relations with India upon which we are now entering is the greater understanding and friendliness of the Indian leaders. And there is everything to be said for coöperation of Indian and British continuing on a purely voluntary basis in the future.

Political gossip is busy with a possible unification of the medical branches of Navy, Army, and Air Force. This would certainly make some economies of personnel and would be of especial benefit in the case of specialists. But the Air Force does not like the idea, and the Navy points out that its medical personnel are necessarily trained differently from those in the Army. The shortage of medical officers, and particularly of specialists, has in point of fact brought about a very close coöperation of the three medical branches in such places as Malta and Ceylon. One line of argument against amalgamation is that the three Services have special medical needs: for example, the R.A.F. is particularly interested in hearing and middle-ear conditions and the Navy in vision. But the strong feeling aroused by the suggested change has a deeper source in Service traditions.

The Liberal opposition to the National Service Bill is to be carried forward in a number of amendments. The Bill provides for a period of compulsory full-time service for doctors and dentists on the same terms as other people—except that members of these two professions will be called up as officers. There is also a further provision of service in the reserve, making a total of 7 years. The total period of reserve service is to be not more than 60 days, of which not more than 21 shall be in any one year. The reserve service is therefore to be very much on the lines of Territorial service before the war. As it will be the link joining medical and dental officers with the Armed Forces and keeping them up to date, it could not be dispensed with without creating difficulties.

The main feature of the National Service Bill will be the change from 18 months' service to 12, which may lead to other modifications. But if we are to meet possible emergencies, trained men are a necessity, and if the proposals for a United Nations force made by the military staff committees of the United Nations are realised, medical and dental officers will be necessary for that force also. It is hoped that the international police force will gradually do away with the necessity for national services of the present-day pattern.

MEDICUS, M.P.

FROM THE PRESS GALLERY

Scottish Bill in the Lords

In the House of Lords on May 1 Lord MORRISON moved the second reading of the National Health Service (Scotland) Bill, which has already passed through the House of Commons. In briefly reviewing the provisions of the Bill he said that in the new family-doctor service, which closely resembled the Highlands and Islands system, doctors would be encouraged to work in groups and provided with premises, equipment, and ancillary staff for their work. In Scotland the duty of providing these health centres was imposed on the Secretary of State. The second division of the Bill covered the services administered by the local authorities. Lord Morrison admitted that the transfer of hospitals from those authorities would diminish their direct interest in the treatment of disease. In future their most important functions would lie in the social and preventive side of health work.

There were three important points in the hospital organisation proposed for Scotland which differed from the English Bill. The ambulance service would be made the responsibility of the Secretary of State instead of the local authorities, which had smaller areas than in England. Again in Scotland all hospitals, including the teaching hospitals, would come under the regional boards. The special position of the teaching hospitals would be recognised by the inclusion on their boards of management of members nominated by the university and the teaching staff. The reason for this difference was that though the number of beds in Scotland was only about a tenth of the total for the United Kingdom, Scotland was training a third of the medical students. If standards of teaching were to be maintained the bulk of the clinical facilities must not be confined to a few hospitals. Yet if even the main teaching hospitals were excluded from the scope of the regional boards the core of their services would be removed. The third difference was the establishment of a Hospital Endowment Commission for Scotland, which would be charged with the duty of reviewing the allocation of endowments having regard to the spirit of intention of the donor.

The Earl of ROSEBERY criticised the proposal to place the responsibility for the health-centre development in the hands of the Secretary of State. He did not see why the local authorities should have this power taken away from them. He was glad that the Government had agreed that in Scotland there should be no ex-officio officers of the Scottish Health Services Council. On the other hand, the teaching hospitals were to be taken under the ægis of the Secretary of State, and the Bill went out of its way to destroy not only the independence of those hospitals, but also their prestige. It seemed ridiculous that the teaching hospitals in Scotland should be administered in the same way as a small cottage hospital in the Highlands. He hoped that the Government would allow the hospital staffs to be directly under the hospital management. In England endowments were to be left to the teaching hospitals and grants were to be given directly by the Minister. But in Scotland these endowments might be reallocated anywhere else. The endowments of teaching hospitals in Scotland should be allowed to remain, and if the Government wanted more money for some smaller hospitals they should give a grant out of national funds.

He also pleaded for a grant-in-aid for better dentistry. As the Bill stood there was provision only for a uniform standard of dentistry, and dentists felt that this would result in utility dentistry throughout the scheme. If there was to be only one standard of work, that would benefit the least conscientious type of dentist. The principle of bringing professional men down to a low average standard ran right through this Bill, and that was one of the reasons why it needed so much amendment.

The Earl of SELKIRK agreed that a regional system of hospitalisation in Scotland was inevitable, and that they could not have a regional scheme, particularly for the south-east, without including the Edinburgh Royal Infirmary. But it was vitally important that the position of the teaching staffs should be safeguarded, and Lord Selkirk thought that the universities were profoundly anxious about the situation. They saw no chance of ensuring that they would be able to appoint the teaching personnel which were necessary. They did not even know if they could appoint their own professors of surgery.

Part v of the Bill, which dealt with the Board of Control, could not by any stretch of imagination be said to disclose a comprehensive service. Were the members of the board to continue to hold royal commissions, he asked, and what was their position to be in relation to the Department of Health? Would the reports of the commissioners be available not only for the general board, but also for the hospital boards and the regional boards?

Replying to the debate, Lord MORRISON denied that any powers were being taken away from local authorities. If it was objected that the Secretary of State was taking too much power, it must be remembered that less than 5% of the cost of the service would be met from local rates. Nearly 20% would come from national insurance contributions, and the rest directly from the Exchequer. In a service which was centrally financed to this extent it was essential that there should not be areas where the standard of the service provided was much below the general level.

Briefly, the general principle of part v of the Bill was to assimilate the mental-health services with the rest of the health service. Some of the supervisory functions hitherto exercised by the board were extinguished for the responsibility of providing and running mental hospitals and mental-deficiency institutions would in future rest with the Secretary of State. In performing these functions he was required to consult the General Board of Control. The board would continue to exercise all its existing functions relating to the liberty of the subject and the interests of the patient as an individual. It would also continue to exercise supervisory functions relating to private mental institutions not taken over into the new hospital service. In practice a system of dual appointments was envisaged whereby the medical commissioners —that was. the medical members of the General Board of Control—and also the medical officers employed by the board would, at the same time, hold appointments as officers of the Department of Health.

Indian Services and Compensation

IN the House of Lords and House of Commons on April 30 statements were made on the compensation for the premature termination of their service in India to members of the civil services and to regular officers and British warrant officers of the Indian naval and military forces and the Indian medical services.

In the Commons Mr. ATTLEE said that the Government of India were anxious to avoid the loss of experienced officers and they were prepared to give to those members of the Secretary of State's services who continued to serve them the same terms as to scales of pay, leave, pension rights, and safeguards in matters of discipline as hitherto. Provincial governments were being asked to give a similar assurance. H.M. Government accepted the obligation to see that European officers, and those Indian officers in the three special categories, should receive compensation for the loss of their careers and prospects consequent on the transfer of power.

Mr. Attlee's statement and the announcement made by the Viceroy in New Delhi have been published together with tables on compensation as a white-paper (Cmd. 7116. H.M. Stationery Office. 3*d*.). Table II which applies to regular medical officers of the I.M.S. includes the following figures:

Age last birthday (years)	Amount	Age last birthday (years)	Amount	Age last birthday (years)	Amount
	£		£		£
24	375	35	4500	46	3375
25	750	36	4875	47	3000
26	1125	37	5250	48	2625
27	1500	38	5625	49	2250
28	1875	39	6000	50	1875
29	2250	40	5625	51	1500
30	2625	41	5250	52	1125
31	3000	42	4875	53	750
32	3375	43	4500	54	375
33	3750	44	4125	55	—
34	4125	45	3750		

Note.—Officers who transfer to the British Services will receive one quarter of the rates laid down.

Plight of Old People

On May 1, in calling attention to the plight of our old people Lord AMULREE asked whether the Government intended to carry out any of the recommendations of the Nuffield report published in January. In 1900, he said, there were about 1 million people who might be called old. By 1947 that figure had increased to about 5 million, and, if the present trend continued, by 1980 here would be about 9 million. Today if old people ook advantage of the various systems of pensions they ould provide themselves with an adequate but austere ompetence. Their real problem was not poverty but he general difficulty of carrying on their normal way f life. The number of people who were getting into he ranks of what one might call the medically, not nancially, destitute was increasing, largely because hey could not take care of themselves. Many were uffering to a greater or less degree from under-feeding, ot because the rations were inadequate but because hey could not stand in queues and carry home large undles. When these old people were admitted to a ome and were given a normal adequate diet their ealth improved enormously.

Could not local authorities, he asked, supply meals o old people's clubs? He also suggested that homes or old people should be brought under some form of nspection. In a recent circular the Ministry of Health had urged local authorities to provide for old people easonable homes, with 30–35 residents, complete freedom, nd frequent visiting hours. In conclusion Lord Amulree urged that all old people who need hospital treatment hould be admitted for investigation to a general hospital, nd that their treatment, even if carried out in a separate uilding, should be under the supervision of the expert staff of an acute hospital.

Lord **Henderson**, replying for the Government, said much had already been done. The increased pensions had at last brought real security to most old people. Their health needs would be met by the National Health Service. He welcomed the suggestion that hospitals for the long-term sick should be more closely linked with the acute general hospital. Under the new service many of the chronic-sick hospitals might well cease to exist and long-term patients be admitted to special wards of general hospitals. Under the National Health Service spectacles, artificial teeth, and hearing-aids would also become available without charge to old people who could not afford them. Family-doctor services would also be available, and, when the labour position became easier, local authorities would provide home helps. The provision of homes for the old must have a high place in our housing programme, and tenders for more than 10,000 one-bedroom dwellings had been approved by the Minister of Health.

QUESTION TIME

Food-supplies in Germany

Mr. T. C. **Skeffington-Lodge** asked the Secretary of State for Foreign Affairs for how long he expected it to be necessary to maintain the reduction of the bread ration from 5 lb. to 3 lb. weekly in the British zone of Germany; and whether the hardship thus inflicted could be offset by stepping up supplies of other foodstuffs.—Mr. E. **Bevin** replied: The reduction which was adopted on the recommendation of the German Executive Committee as a prudent measure during a period of low stocks, and which applies to both the British and United States zones, has at present been authorised only for the first week of the ration period. It is hoped that the full issue will be made up later in May. In the past potatoes have been used when necessary to supplement shortages of grain, but these are also in short supply.

Mr. **Skeffington-Lodge**: Is the Minister aware that supplies of milk to civilians in the British zone are almost nil; and that meat, fats, and potatoes are in such short supply that the normal ration cannot be honoured?—Mr. **Bevin**: Milk has been in short supply in the British zone, but it has been possible to meet the needs of priority consumers with a fair degree of success. The position should improve with the start of the new grazing season. Difficulties in providing full rations of meat, fats, and potatoes have been largely due to the failure of the local German authorities to collect and distribute these foodstuffs equitably throughout the British and American zones.

Heavy Workers' Calories

Sir **Arthur Salter** asked the Minister of Food if he would state the calorie value of the food rations allowed to miners at home and in mining-area canteens as compared with what was allowed to other heavy-industry workers and to the general public.—Mr. **John Strachey** replied: The calorie value of the ordinary domestic (including points and personal points, but of course excluding all unrationed foods) is about 1700 calories per day. Underground miners receive for consumption at home an extra 1*s.* worth of meat and 12 bread units per week. Other heavy industrial workers receive 6 extra B.U.s per week. The calorie value of their consumption of rationed foods at home is thus increased to 2700 calories per day for underground miners and to 2100 calories for other heavy workers. Category A industrial canteens are available for use by miners and other heavy industrial workers. If they take one main meal a day they can obtain a further 800 calories, making 3500 calories a day of rationed food for miners and 2900 for other heavy workers. The average calorie intake from all foods for the nation as a whole is 2900 calories per day.

Service Sanatoria Abroad

Mr. E. **Carson** asked the Minister of Pensions whether he would consider conversations with the French authorities with a view to obtaining facilities for British ex-Service men suffering from tuberculosis to go for cures in the French Alps and other suitable places in France.—Mr. J. B. **Hynd** replied: The beneficial results of institutional treatment for tuberculosis are normally best maintained when this treatment has been given in the country in which the patient lives and works. In certain exceptional cases, treatment abroad may have a special value, and consideration is already given to such cases. I do not feel, however, that a useful purpose would be served by initiating formal conversations with the French authorities on the lines suggested.

Naturopaths and Sickness Benefits

Mr. G. **House** asked the Minister of National Insurance whether he had considered the case of a panel doctor at Birmingham influencing the non-payment of national health benefit to a patient and removing the patient's name from the list of his panel because the latter, immediately after an accident, consulted a qualified naturopath, and refused to follow the treatment the panel doctor subsequently prescribed; and if the Minister would alter his regulations to enable naturopaths to certify for National Insurance sickness benefit.—Mr. T. **Steele** replied: Sickness benefit is only payable on proof of incapacity for work. In considering whether this condition is satisfied in a particular case approved societies are not tied to the form of evidence they may accept, and my hon. Friend has been advised as to the steps the patient should take if he wishes to pursue his claim for sickness benefit.

Public Health

Smallpox

After nearly a fortnight's interval a further case was reported from Bilston, Staffs. The patient, an unvaccinated labourer, aged 69, was taken ill on April 25; a rash developed on April 29; and he was removed on May 1 to hospital, where he died the following day. Laboratory tests were positive for variola. This patient was not a contact of any known previous case. No further cases have been reported from Scunthorpe.

In New York the outbreak has been checked. Since it began, in March, 5,055,000 people have been vaccinated; this, says a *Times* correspondent, is the greatest mass smallpox immunisation of all time.

Infectious Disease in England and Wales

WEEK ENDED APRIL 26

Notifications.—Smallpox, 0; scarlet fever, 892; whooping-cough, 2044; diphtheria, 175; paratyphoid, 1; typhoid, 6; measles (excluding rubella), 7962; pneumonia (primary or influenzal), 647; cerebrospinal fever, 64; poliomyelitis, 6; polioencephalitis, 1; encephalitis lethargica, 0; dysentery, 61; puerperal pyrexia, 136; ophthalmia neonatorum, 75. No case of cholera, plague, or typhus was notified during the week.

Deaths.—In 126 great towns there were no deaths from enteric fever or scarlet fever, 1 (0) from diphtheria, 9 (1) from measles, 15 (2) from whooping-cough, 72 (9) from diarrhœa and enteritis under two years, and 21 (5) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 266 (corresponding to a rate of 26 per thousand total births), including 33 in London.

Obituary

ALMROTH EDWARD WRIGHT

K.B.E., C.B., M.D. DUBL., D.SC., LL.D., F.R.C.P., F.R.S.

ONE of his pupils, Carmalt Jones, has written: "For me the world consists of two kinds of people—Sir Almroth Wright and all others." That may sound a fulsome judgment, but many of those who knew and worked with Wright will understand and share it. In the early days of the century he opened a new world to them.

The impact of his ideas and personality is seen in the two accounts of him which follow—the first a memoir by Dr. Colebrook, an associate for many years, and the second an appreciation by Professor Greenwood.

* * *

He was born in 1861, in Yorkshire, of a Swedish mother—Ebba, the daughter of N. W. Almroth, governor of the mint in Stockholm and a friend of Berzelius. His father was an Irishman, the Rev. C. H. H. Wright, a considerable Hebrew scholar, who lived in his son's memory chiefly as an old man banging his fist on the table in angry denunciation of "Rome." Most of the first nine years of Wright's life were spent in Dresden and Boulogne, where his father held livings; and there no doubt he acquired some of his remarkable fluency in German and French.

For the next fifteen years he was in Ireland, first with a tutor in Belfast and later at Trinity College, Dublin, taking degrees in arts and medicine. A Grocers' travelling scholarship took him next to Germany, where he worked for several months at Leipzig, and with Kulz, at Marburg, on phloridzin. Returning to England and finding the prospect of medical practice unattractive, he launched out into law with a view to the bar. This also did not satisfy him and he accepted a clerkship in the Admiralty, presumably as a means to bread-and-butter; but as the clock struck 4 he was off to the Brown Institution, Wandsworth, where Wooldridge was working on the coagulation of blood and on diabetes, and Victor Horsley on the thyroid gland. His chiefs at the Admiralty (Carmalt Jones tells us) were in some doubt as to whether they should promote him for his ability or dismiss him for his want of diligence; but he took the choice out of their hands by accepting a demonstratorship in pathology at Cambridge. He found there, however, an atmosphere of respectability and conventionality which was uncongenial: "they did not take me at my own valuation," he told an old friend, "so I went away"—this time to Australia, where he became demonstrator in physiology at Sydney in 1889.

On his return two years later, "by the best stroke of luck that man ever had" he was offered the professorship of pathology at the Army Medical School at Netley, and here perhaps his scientific life may be said to have really begun. He found a group of young men, recently qualified and free from the cares of practice, training for the Army and the Indian medical services. Contact with Wright soon showed them that the whole of medicine was not to be found between the covers of textbooks; his adventurous mind and enthusiasm awakened them to a world of progress based on "delving below the surface of things." Leishman, Burt, George Lamb, Semple, Liston, W. F. Harvey, and Lyle Cummins were among those whose scientific careers began, and were greatly influenced by Wright, at Netley.

One of his earliest publications, based on observation of his own children and experimental work, dealt with the advantage of citrating cows' milk for infant feeding. His main interest, however, quickly became centred on typhoid fever, which had always been a scourge of armies in the field. The idea of preventive immunisation had taken shape a few years earlier in the fertile mind of Pasteur, and had already borne fruit in connexion with anthrax in cattle and hydrophobia in man. On this foundation, and on the more recent work of Haffkine with cholera in India, Wright began to build in about 1895. Pasteur's results had been obtained by the inoculation of living but attenuated cultures, or of virus-containing tissues; and Pfeiffer had shown that the blood of animals inoculated with sublethal doses of such living cultures acquired the power to dissolve and kill great numbers of cholera bacilli in the animal body. Wright, looking ahead, decided that the inoculation of living microbes to produce immunity in human beings was not going to be practicable on any large scale; and, further, he "saw with his mind" that a killed culture should be as effective as a living one. By means of new and ingenious laboratory devices, requiring many months of hard work to perfect, he was able to show that, following the inoculation of a killed typhoid culture into animals, and also into himself and his fellow-workers, the blood-serum was able to destroy living typhoid bacilli as it did in Pfeiffer's animals inoculated with living cholera. To Wright this was as good as proof that the inoculation of soldiers with killed typhoid culture would protect them against typhoid fever. But when he proposed this inoculation to the Army authorities he came up against the conservative official mind: some of those in authority disliked the novel idea of introducing microbes, whether dead or alive, into the human body, and were blinded by that dislike to all the great lessons of Pasteur's work.

There most men would have left it; but Wright saw that even bigger issues were at stake than typhoid fever—and that was big enough. The Irishman in him was aroused and he fought for his views. So powerful was the opposition that he had to resign the post he loved. Yet the fight was not lost: a supply of the vaccine was dispatched with the troops bound for the Boer War, though without a clear official blessing. Some of it was dumped overboard in Southampton Water, lest it cause disease, and was returned to Wright by the coastguards; some was inoculated in grossly excessive doses by mistake and caused severe reactions; but some was used in the doses Wright had prescribed, and statistical evidence of its prophylactic value against typhoid fever was obtained. A few years later much better evidence was derived from experience with the Army in India. On the strength of this the inoculation was adopted by the War Office as a routine procedure some years before 1914, with the result that Britain alone entered the first world war with most of her troops protected against typhoid fever. In face of an epidemic in Flanders in January, 1915, the Germans followed suit. There can be little doubt that, but for Wright's strenuous advocacy of this measure, typhoid fever would have taken an enormous toll of human life during the war of 1914–18.

Great as this achievement was, it gave Wright less satisfaction than much of his other work which resulted in "more substantial intellectual gains." "Previous work had made the circuit all ready to be completed," he would say; his was only the hand that put in the switch. Despite the remarkable success of antityphoid inoculation, his mind never became obsessed with the conventional view that prevention offers more hope than cure. In this as in some other questions, his ideas were at variance with the general trend of medical opinion during the past fifty years.

From Netley he went to India in 1898, to serve on the Plague Commission and he took a large part in the drafting of its reports. While engaged in this work he came in contact with Captain Stewart Douglas, of the Indian Medical Service, who was associated with him for many years afterwards at St. Mary's Hospital, where in 1902 Wright was appointed pathologist.

In a small underground room they embarked upon a task which was to occupy Wright's mind for forty years—the possibility of controlling bacterial diseases already in progress by the inoculation of killed cultures (vaccines). As always, he was not content to go to work blindfold, nor to judge the value of inoculation by "far-off and ambiguous clinical effects": he must know whether after each inoculation the patient's blood gave any indication that the uninfected regions of the body really had responded by an increased production of "protective substances"; he must know which doses led to such a response, and which did not; and after what interval he ought to reinoculate in order to maintain a high level of antimicrobic activity.

For all this, new technical procedures had to be developed—for the measurement of phagocytosis and of bactericidal power. The ingenious *Technique of the Teat and Capillary Glass Tube* which slowly evolved was published in book form in 1912. It was the first step—and a very considerable one—in the application of iicrotechnique to bacteriology, and must surely rank s one of his greatest contributions. Scoffers dismissed ; as just "laboratory tricks"; but Wright, with his irger vision, saw that "die Methode ist alles"; and to im these new technical procedures were essential as eking out the inadequate skill of our hands by the ontributory work of our brain." By means of them he 'as able to demonstrate the opsonic effect of serum; he far-reaching principle of autoinoculation in bacterial ifections: the bactericidal efficiency of whole blood nd of leucocytes; the influence of the antitryptic power f the serum on the rowth of microbes; nd many other 'sub-perceptible" lefence mechansms.

[From the portrait by Sir Gerald Kelly, R.A.

In this work Vright was greatly ielped by a band f men—Freeman, Iatthews, Fleming, Tohn Wells, Noon, Iayden, and others —who were soon ttracted to the St. Mary's laboratory as it expanded; nany of whom emained to build ip the Inoculation Department as it xists today. For ears before the first vorld war these men vorked far into the iight nearly every lay of the week, ounting opsonic ilms, devising new xperiments and iew technique—kept going only y their regard for 'the Old Man" as he was called even then, though he was still under fifty), and by his own never-flagging enthusiasm. About midnight someone would brew strong tea and we would knock off for a few minutes to discuss (with mighty little restraint) the day's work, or the shortcomings of the female intellect, or Wright's latest excursions in the domain of intellectual morality. With his gift for good conversation he dominated these talks, but there was always a hearing for anybody who could formulate an idea clearly: nebulous thinking got little mercy.

The 1914–18 war brought Wright's mind to grips with new problems—wound infection, gas-gangrene, shock. "Pain in the mind," which had always oppressed him until the problem he was engaged upon became sharply focused, was all the more acute during these war years, because, like Pasteur, he suffered more than most of us from the sight of suffering. To get to his laboratory at the Casino in Boulogne he had to go through wards full of wounded or sick men, and he never got used to it. Every working hour he toiled to find means to mitigate the horrors of sepsis, and in his sleep he was seldom free from them. All men's thoughts were turned at that time to antiseptics—the dream of "something out of a bottle" which would kill all the microbes in a wound. Wright alone saw that salvation was not to be had by any such short cut. He believed that antiseptics such as perchloride of mercury and carbolic killed microbes only by virtue of their being general protoplasmic poisons, and that, when introduced into an infected wound, they would inevitably be quenched by destructive combination with the greater mass of protoplasm. He saw too that we were quite in the dark as to the defensive mechanism involved in wound infections: we knew scarcely anything about the leucocytes—what conditions favoured their phagocytic activities and what hindered them; why some wounds become "corrupt," with every kind of microbe flourishing in them, while others remained clean. "To find out these essential sub-perceptible things, we must get down to the simplest elements": our unaided senses could tell us very little—apparatus and technique were necessary. The apparatus and technique did not exist, so Wright set to work again upon "laboratory tricks." Gradually he came to understand many of the things which had been obscure. He showed that some of the bacteria which commonly infect wounds, particularly staphylococci and streptococci, can grow in unaltered serum or serous exudate, but grow much more freely when the exudate or serum has been changed—e.g., by reduction of its normal antitryptic power or of its alkalinity. This reduction commonly occurred in infected war wounds; in such a "corrupt" wound, as he called it, not only could the staphylococci and streptococci grow very freely, but also a host of other organisms, such as coliform bacilli, *B. proteus*, and *Ps. pyocyanea*, most of which perished in unaltered serum or exudate. With hypertonic salt solution he sought to induce a flow of normal serum through the infected tissues towards the cavity of the wound; he regarded that flow as the essential feature of surgical drainage.

By very beautiful experiments he demonstrated in vitro the amazing capacity of healthy leucocytes to kill pyogenic cocci, and the conditions necessary for this killing. His advocacy of early closure of infected war wounds was based on these observations at his bench, and on others made by Fleming who was working with him. The surgeons were seeking to "sterilise in order to suture": Wright held that they should "suture in order to sterilise."

Some of his most illuminating work was that on gas-gangrene. To obtain the necessary anaerobic conditions he again had to devise new cultural methods. With their help it was soon made clear how the acid produced in injured muscle (or muscle deprived of its blood-supply) favoured the explosive outbreak of gas-gangrene by reducing the alkalinity of the tissue-fluid. As more muscle came to be killed by the infective process, so much acid found its way into the general circulation as to seriously deplete the body's alkali reserve, causing what Wright termed a "condition of acidæmia" which in his view was largely responsible for the patient's deterioration and death. With this process in mind he advocated treatment (when acidæmia was present) by bicarbonate or lactate of soda, and he felt justified by the clinical results (*Lancet*, 1918, i, 205). Strangely enough, very little of this work has yet found its way into textbooks, but I would hazard a guess that within the next fifty years it will be rediscovered and will be given an outstanding place in the literature of wound infections.

What I have written above touches only the fringes of his intellectual activities. In Wright's own judgment his most important work was done not at the laboratory bench, nor in his copious writings upon medical scientific problems, but in his efforts to clarify philosophical questions. "I have suffered," he once said, 'only from urticaria and philosophic doubt, and the latter was much the worse of the two." For him this work on philosophic problems was no mere intellectual diversion, as some have supposed. He did it—often with great weariness of spirit—out of a deep conviction that conditions in the rapidly changing modern world have created many problems to which the formal logic of earlier times is quite inapplicable; and because he believed that many of our social, political, and economic ills (as well as the slow progress of medicine) can only be remedied if they are approached de novo by minds illuminated by the newer knowledge of human physiology.

From 1895 he began to formulate his ideas in a study of physiological psychology which he proposed to call "The Physiology of Belief." He aimed to show how ultimately all our mental processes are bound up with physiological functions. In about 1903, I am told, the manuscript was ready for publication, but the book as he originally conceived it was never published: his mind went on unceasingly changing and improving it. It became in turn "A Dictionary of Principles," "A Treatise on Intellectual Morality," and "A System of Logic as Applied to Medicine." Only three sections of this work were issued: *The Unexpurgated Case Against Woman's Suffrage* (1913); *Prolegomena to the Logic which Searches for Truth* (1941); and *On Induction* (1943). He has, however, left a large mass of manuscript more or less ready for publication.

The characteristics of his great intellect which seem to stand out most sharply in retrospect are his "pain in the mind," which drove him on to work harder than any of the rest of us; his capacity to see where he was going and to advance steadily from one viewpoint to another; his readiness to drop a belief if new facts showed it to be false; and his indifference to any fear that he might be wrong. In his laboratory work particularly he hated loose thinking and the mere collection of isolated facts; he was always intent upon big generalisations and was not ashamed to use methods which were not completely accurate if, by repetition, they could put him on the right track. Occasionally, perhaps, they let him down.

At the age of 75, after long days of work on medical science or philosophy, he set himself to learn Russian as a recreation, and he came to read it with fair ease. Of the Bible, and of Shakespeare, Milton, Dante, and many other poets, he retained long passages learned in his youth; and he used to say that he would have given all his scientific work to have written *Romeo and Juliet*. As a public speaker and conversationalist he had few equals, agreeing with Shaw that to attract attention it is necessary to overstate the case. Sometimes, perhaps, he overdid the overstatement.

I have written of Wright only as a great intellectual force; but the report is incomplete, for in his kindliness, his essential simplicity, and all that goes to make a man lovable, he was also of no ordinary stature.

L. C.

* * *

I first saw Almroth Wright in 1906 or 1907 at a meeting of the Medical Research Club in his laboratory. I read a trivial paper which he treated with more kindness than it deserved, and after the meeting was encouraged to linger among his cronies and listen to him and Bulloch adding up the eminent men of the day and making the sum a very small integer. I had found another hero. His mere appearance, highly suggestive of Tenniel's illustration of the Lion in *Alice Through the Looking-Glass*, a kindly, dishevelled, but formidable, creature, was fascinating. Soon after that my hero-worship was deflected by a violent controversy: those were the palmy days of the opsonic index. But youthful vanity and wrath are soon dispelled by such a magician as Wright was; when I heard him speak at the presentation in 1930 his spell was as powerful as in 1907.

I cannot make any definition of a great man which would not cover Almroth Wright. I am sure at least that he was so great that one may bid him farewell with candid words.

It is easy to think of him—his likeness to Tenniel's Lion suggests it—as the dear old absent-minded German professor of sentimental comedy, whose horizon is the wall of his laboratory. Consciously or unconsciously he encouraged that belief. No professor of Shavian comedy denounced more vehemently clinicians untrained in laboratories or spoke in higher terms of science. But I suspect that Wright did not really respect laboratory-workers much more than clinicians, and that his intellectual affinity was with a Thomas Aquinas rather than with a John Hunter. In his later years he rather bored such audiences as the Medical Research Club with dialectics, and his projected treatise on logic came to be regarded as of the breed of Casaubon's key to all the mythologies in *Middlemarch*. I think, however, this was much more than a pose or a whim, that, indeed it was the kindly-old-professor attitude which had a touch of the theatrical. I should say that, like the great Schoolmen, he had far more faith in dialectics and the possibility of reaching truth by mere force of reasoning than most men of science, and that he had a considerable intellectual contempt for the ideals and methods of most of his scientific contemporaries. One of the weaknesses of the dialectical method is that it often has the appearance—even, perhaps, the reality—of treating mere "facts" rather lightly. Wright was not free from that weakness; in controversy he sometimes gave an impression of disingenuousness, of seeking to evade a real objection by means of verbalism; but this is a fault which after all can be found with Socrates himself. It was, I think, this turn of mind which impaired Wright's influence on his contemporaries. He secured personal affection but hardly inspired confidence, because his intellectual processes seemed odd to the ordinary Englishman. Like some other men of genius, he was a dangerous model.

I am of course speaking of Wright only as I knew him, and my intellectual contact with him was limited to the evaluation of results by measurement and counting. For the ostensibly precise methods of evaluation which are loosely called statistical he had an almost passionate dislike. I am sure that one element of that dislike was intrinsically sound. The notion that a person who perhaps had never done an experiment at all, and who knew nothing of the difficulties of laboratory work, should sit in judgment upon the conclusions of an adept was hateful to him. But his emotions carried him beyond that point; he condemned not only the abuse but the use of statistical method, and his principles of reasoning employed by baser spirits were quite as dangerous to intellectual honesty as anything he had stigmatised among the clinicians of forty years ago. The fact that most laboratory workers use the methods he condemned is not proof that he was on the wrong tack; he was a genius. It is proof that he was not in tune with his generation. Who was right and who wrong, some future historian will decide. We have not to wait for that historian to be sure that many of us have lost a friend.

M. G.

As a Dublin student Almroth Wright won a gold medal in modern literature and a medical travelling prize. After qualification he held a studentship at the Inns of Court in jurisprudence and Roman and international law. He was elected F.R.S. in 1906, and knighted in the same year, his work during the first world war being recognised by appointment as C.B. in 1915 and K.B.E. in 1918. An honorary fellow of the two Irish Royal Colleges, and of Trinity College, Dublin, he received honorary degrees from the universities of Dublin, Edinburgh, Belfast, Leeds, and Paris, and was an honorary burgess of Belfast. He was awarded the Hungarian prize of the International Medical Congress in 1913, the Leconte prize of the Académie des Sciences in 1913, and the gold medal of the Royal Society of Medicine in 1920, and was a corresponding member of the Institute of France. As principal of the institute of pathology and research at St. Mary's Hospital, he held a chair of experimental pathology in the University of London.

He died on April 30 at his home at Farnham Common, in Buckinghamshire, aged 85. Lady Wright, who died in 1926, was a daughter of R. M. Wilson, J.P., of Coolcarrigan, Kildare, and they had a son and a daughter.

DR. H. A. MOODY

C. E. A. B. writes: As a South Londoner may I support your tribute last week to the late Dr. Moody. Not only was he beloved by his patients but he was greatly respected by all sections of the community. His public services were many and far-reaching, and should, I feel, have received official recognition.

Notes and News

VISUAL STANDARDS FOR CANDIDATES FOR THE TEACHING PROFESSION

THE following recommendations have been made by the aculty of Ophthalmologists, at the request of the Ministry f Education :

Visual acuity, with correcting glasses, should not be less than 6/12 in the better eye.

At the age of 18 no refractive error should debar a candidate from training, but all cases in which the vision in either eye is less than 6/9 uncorrected must be referred for an ophthalmic surgeon's report and prognosis.

On reference to an ophthalmic surgeon, information is required on :

The nature and extent of the defect.
Whether it can be corrected by glasses satisfactorily for the project in view.
Whether it is progressive.
Whether the existence of the defect is likely to interfere with the candidate's efficiency as a teacher.

DISORDERS IN ATOMIC WORKERS

WORKERS at an atomic research centre in the north-west of England are alleged to have developed symptoms attributed by them to their employment. Mr. Bob Edwards, assistant general secretary of the Chemical Workers' Union, is reported in the *Daily Mirror* (April 11) as saying that the symptoms are lassitude, skin rashes, or impotence ; of 250 men at the plant, 20, he said, are complaining of impotence. The complaints are being investigated by the Ministry of Labour factory inspectorate. Meanwhile a Ministry of Supply spokesman has claimed that, in this or other plants, the only instance of disorder due to radioactivity has been one case of dermatitis ; and Prof. N. F. Mott, F.R.S., president of the Atomic Scientists Association, has stated that "methods of protection for these workers are so easily applied and so strictly enforced that it is inconceivable that the workers could be affected." Impotence and sterility of which radar workers commonly complained during the war were apparently not of occupational origin.

IODISED OIL IN RADIOLOGY

ADDRESSING the Devon and Exeter Medico-Chirurgical Society on April 17, Dr. Charles Wroth said that for the radiological demonstration of sinuses and fistulæ with iodised oil a short-necked syringe should not be used, since the catheter is liable to slip off and spray the patient's skin and clothing. Proprietary preparations of the oil are usually heavier than water, and before injection the patient should be placed so that the sinus is pointing upwards. An opaque indicator should be applied to mark the point on the skin where the sinus opens. Before films are taken the skin should be wiped clean and surplus tubing should be moved out of the way. Screening is valuable ; and at least two views, at right-angles, should be taken.

University of Cambridge

On April 26 the following degrees were conferred :

M.Chir.—W. W. Wiggins-Davies (in person).

M.B., B.Chir.—J. M. Childs, R. D. Eastham, J. H. H. Glyn, Robert Hodgkinson, D. N. Lawson, J. G. Mathewson, Edward Pringle, S. K. K. Sze (by proxy).

Royal College of Obstetricians and Gynæcologists

At recent examinations for the diploma in obstetrics the following were successful :

J. R. Ballantyne, A. C. Barthels, D. C. A. Bevis, G. R. Bourne, Kathleen A C. Bowen, J. A. Bowen-Jones, Leonard Boyars, Elizabeth C. M. Brunyate, Joyce B. Burke, H. C. Burnell, J. P. Bush, W. E. Chapman, F. J. Cockersole, D. P. Cocks, Edward Cope, G. H. R. Curnock, Alice Davies, Margaret E. Davies, J. E. Drabble, Patricia M. Elliott, Geraldine W. Everett, S. C. J. Falkman, M. R. Fell, H. J. Fisher, B. J. Frankenberg, Jean M. Frazer, G. B. Gibson, L. S. Glass, C. J. Griffin, G. N. Grose, Elizabeth M. Harper, David Hay, J. A. Henderson, G. S. Hopkins, Jean A. Horne, B. G. Isaacs, A. G. Jones, G. D. Kelly, Janet F. Kennedy, N. A. King, D. V. Latham, Christopher Lowthwaite, G. I. Louisson, Carmichael Mackie, A. T. McNeil, Betty E. A. Magill, David Mander, Edith M. Metcalfe, R. T. Michael, C. E. Miller, Albert Milton, Doreen Mitchell, Annapurna Mukherji, M. R. Nealy, G. F. Newbold, Dennis Nixon, Helen M. Noble, Margaret B. Noble, Barbara D. Oakley, A. D. Parsons, S. D. Perchard, F. C. R. Picton, E. D. Pond, K. I. Price, S. W. Price, Margaret Randell, E. N. Rees, Rachel Richards, L. F. Richards, J. G. Rountree, W. S. Russell, Ruth Sabel, T. J. Scannell, Charlotte Sommer-Hirsch, Kathleen H. Stewart, Bahman Sohrabji Surti, O. W. Sweetnam, Sheila R. Tangye, Mary E. Tighe, St. J. M. A. Tolhurst, E. F. Twiss, M. J. Twomey, W. A. Walker, Winifred I. Watson, Constance M. Watt, C. T. H. Whiteside, Roberta Williams, J. K. Wilson, Sau Haan Wong, Elizabeth Younger.

Royal Society of Medicine

Sir Edward Mellanby, F.R.S., Dr. C. M. Wenyon, F.R.S., Prof. Einar Key (Stockholm), and Prof. Naguib Mahfouz Pasha (Cairo) will be proposed for the honorary fellowship of the society on May 20.

North Middlesex County Hospital

Mr. T. H. Benians, F.R.C.S., has been appointed honorary consulting pathologist to the hospital on his retirement. Mr. Benians has been part-time pathologist to the hospital since 1925.

Royal Institute of Public Health and Hygiene

On Thursday, July 17, at 3 P.M. at the institute, 28, Portland Place, London, W.1, Dr. I. W. Magill will deliver the first Bengué memorial lecture. His subject will be a Review of Modern Anæsthesia.

War-time Decline in Dental Caries

A survey of Swedish school-children has shown that during the war the incidence of dental caries fell by about 15%. The cause of this decline is to be investigated, with special reference to changes in diet.

Institute of Social Medicine, Oxford

Mrs. Alice Stewart, F.R.C.P., has been appointed assistant director of the institute. A member of the pneumoconiosis research unit of the Medical Research Council and secretary of the industrial pulmonary diseases committee of the council, Dr. Stewart was formerly first assistant in the Nuffield department of clinical medicine at Oxford.

Tudor Edwards Memorial

A committee has been formed, under the chairmanship of Lord Horder, which will shortly launch an appeal for a memorial to the late Mr. Arthur Tudor Edwards, F.R.C.S. The members of the committee are Lord Dudley, Lord Courtauld-Thomson, Sir Max Page, Sir Stanford Cade, Dr. R. A. Young, Dr. Geoffrey Marshall, Dr. T. Jenner Hoskin, Dr. Ivan Magill, Dr. Horace Evans, Dr. Geoffrey Todd, Dr. D. T. Davies, and Mr. C. Price Thomas and Mr. F. G. Rouvray (secretaries).

Committee on Industrial Disease

The Minister of National Insurance has appointed a committee to review the policy adopted in scheduling industrial diseases under the Workmen's Compensation Acts, and to advise on the principles which should govern the selection of diseases for insurance under the National Insurance (Industrial Injuries) Act. The members include Prof. R. E. Lane, F.R.C.P., Dr. J. A. L. Vaughan Jones, Dr. E. R. A. Merewether, and Dr. Albertine Winner. Evidence should be submitted in writing to the secretary, 6, Curzon Street, London, W.1.

The Hospitals Budget

A forecast of what our hospitals will cost in the first year of the National Health Service must be prepared for inclusion in the Parliamentary estimates this autumn. The Minister of Health thinks it improbable that the new boards of governors, regional hospital boards, and hospital management committees will be in a position to submit estimates in time, and he has therefore asked the existing authorities to send him details of what their hospital has cost during the past year. This information, he adds, will not prejudice the administration of the hospital under the service, and the new authorities will later submit formal estimates for the first financial year based on their experience of working the early part of the year.

Joint Tuberculosis Council

The question of the liability of hospital and sanatorium nurses and domestics to contract tuberculosis continues to occupy the attention of this council's nursing committee. For some time it has been trying to initiate a statistical inquiry, but it has been advised that it would be necessary to study 1000 new entrants for ten years (or 2000 annually for five years) in order to get reliable data. The council have reluctantly concluded that an inquiry on this scale is at present out of the question, but the committee will neglect no opportunity of collecting useful information.

The council have protested to the Minister of Health about his announcement in Parliament that he had told the General Nursing Council of his readiness to approve rules introducing State registration for tuberculosis nurses. They hold that State registration of tuberculosis nurses should not be conditional on previous membership of the General Nursing Register.

General Medical Council

The result of the voting at the recent election was as follows:

Dr. James Brown	14,035
Dr. J. E. Outhwaite	4527
Dr. Isaac Rose	695

Dr. Brown was therefore elected a direct representative of the medical profession in England.

Emergency Artificial Respirator

Mr. E. O. Cartwright, chief engineer of the Austin Hospital for Cancer and Chronic Diseases, Melbourne, Australia, has designed a non-electric emergency respirator which works off the ordinary domestic water-supply. The apparatus can be built from a standardised design for about £70, and Mr. Cartwright will supply plans of his invention free of charge to anyone who is in need of it.

Dr. G. Carmichael Low has been appointed a member of the Committee on Bird Sanctuaries in the Royal Parks, which has lately been reconstituted.

Diary of the Week

MAY 11 TO 17

Monday, 12th

Royal College of Surgeons, Lincoln's Inn Fields, W.C.2
6.15 P.M. Mr. Julian Taylor: Cerebrospinal Rhinorrhœa.
Medical Society of London, 11, Chandos Street, W.1
8 P.M. Mr. W. E. Tanner: Guy's Worthies in the Early Days of the Medical Society of London. (Annual oration.)

Tuesday, 13th

Royal College of Surgeons
6.15 P.M. Mr. J. I. Munro Black: Nasopharyngeal Tumours.
Royal Society of Medicine, 1, Wimpole Street, W.1
5 P.M. *Experimental Medicine and Therapeutics.* Dr. J. F. Wilkinson: Folic Acid.
8 P.M. *Psychiatry.* Dr. Myer Fortes: Points of Contact between Social Anthropology and Psychiatry.
Edinburgh Postgraduate Board for Medicine
5 P.M. (Royal Infirmary.) Prof. F. A. E. Crew, F.R.S.: Biology of Polytocy.

Wednesday, 14th

Royal College of Surgeons
5 P.M. Prof. F. Wood Jones, F.R.S.: Hallmarks of Humanity. (Arris and Gale lecture.)
6.15 P.M. Mr. W. M. Mollison: Acute Otitis Media.
Royal College of Obstetricians and Gynæcologists, 58, Queen Anne Street, W.1
5 P.M. Dr. Linton Snaith: Tubal Occlusion. (Blair-Bell lecture.)
Royal Society of Medicine
5 P.M. *Proctology.* Prof. John Kirk, Prof. R. A. Willis, Mr. J. P. Lockhart-Mummery, Mr. Denis Browne: Congenital Anomalies of the Anorectal Region.
Royal Sanitary Institute, 90, Buckingham Palace Road, S.W.1
3 P.M. Dr. W. H. Bradley: Control of Smallpox.

Thursday, 15th

Royal College of Surgeons
5 P.M. Mr. Rodney Smith: Intestinal Decompression in the Treatment of Acute Obstruction. (Hunterian lecture.)
6.15 P.M. Mr. R. D. Owen: Laryngeal Stridor and Tracheotomy.
Royal Society of Medicine
5 P.M. *Dermatology.* Dr. Emil Petracek: Dermatological Experiences in Prague during World Wars I and II.
Royal Medico-Psychological Association
11 A.M. (Barnwood House, Gloucester.) Dr. E. L. Hutton and Mrs. Bassett: Prefrontal Leucotomy—Effect on Creative Personality. Dr. R. Sessions Hodge and Mrs. Y. Golla: Urethral Smears in Mental Disorder.
2.15 P.M. *Dr. W. R. Ashby: Brain Metabolism. Prof. F. L. Golla*: Electroconvulsion Therapy.
Royal Society of Tropical Medicine and Hygiene, 26, Portland Place, W.1
8 P.M. Dr. C. M. Wenyon, F.R.S.: Amœbiasis.
Institute of Laryngology and Otology, 330, Gray's Inn Road, W.C.1
11 A.M. Prof. Geoffrey Jefferson, F.R.S.: Brain Abscess.
2.30 P.M. Professor Jefferson: Posterior Fossa Tumour.
Edinburgh Postgraduate Board for Medicine
4.30 P.M. (Royal Infirmary, Edinburgh.) Dr. James Innes: Chemotherapy of Benign Tertian Malaria. (Honyman Gillespie Lecture.)

Friday, 16th

Royal College of Surgeons
5 P.M. Prof. Harry Platt: Primary Malignant Tumours of Bone.
Royal Society of Medicine
8.15 P.M. *Obstetrics and Gynæcology and Radiology.* Prof. Subodh Mitra, Mr. Charles Read, Mr. Frank Cook, Dr. G. E. Richards, Dr. G. Blomfield: Surgical and Radiological Treatment of Carcinoma of the Cervix.
Faculty of Radiologists
2.30 P.M. (Royal College of Surgeons.) Dr. G. E. Richards: Place of Surgery and of Radiotherapy in the Management of Mammary Cancer. (Skinner lecture.)
Tuberculosis Association
3.30 P.M. (26, Portland Place, W.1.) Dr. W. Santon Gilmour: Tuberculosis in China. Dr. Marc Daniels: UNRRA and Tuberculosis in Europe.

Appointments

Allan, Malcolm, M.B. Glasg., D.P.H.: M.O.H., Repton and Swadlincote, Derbyshire.
Buchanan, W. D., M.B. Glasg., D.P.H.: H.M. inspector of factories.
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Munro, M. J., L.R.C.P.E: Swanscombe, Kent.
Pellow, R. J. N., M.C., M.B. Lond.: Luton, Beds.
Prideaux, Mary, M.R.C.S.: Warminster, Wilts.

Births, Marriages, and Deaths

BIRTHS

Bailey.—On April 28, at Taunton, the wife of Dr. K. C. Bailey—a son.

Bangham.—On May 1, in London, the wife of Dr. Alec Bangham—a son.

Carter.—On March 26, at Bournemouth, the wife of Dr. Cedric Carter—a son.

Felton.—On April 30, in London, the wife of Dr. W. F. Felton—a son.

Girdwood.—On May 3, at Edinburgh, the wife of Dr. Ronald Haxton Girdwood—a son.

Gold.—On April 25, at Bishop's Stortford, the wife of Dr. Stephen Gold—a son.

Hatton.—On April 26, at Eastbourne, the wife of Dr. P. L. S. Hatton—a daughter.

Hegarty.—On April 27, the wife of Dr. A. G. Hegarty—a daughter.

Kennedy.—On April 27, in London, the wife of Dr. D. P. Kennedy—a daughter.

Lane.—On April 29, at Maidenhead, the wife of Dr. Roger Lane—a son.

Matheson.—On April 29, the wife of Mr. Iain Matheson, F.R.C.S.—a daughter.

Reinhold.—On April 28, in London, the wife of Dr. J. D. L. Reinhold—a daughter.

Semple.—On April 28, at Aberdeen, the wife of Dr. Robert Semple—a son.

Whitehead.—On April 25, the wife of Dr. B. L. Whitehead—a daughter.

MARRIAGES

Haynes—Kirk.—On April 30, in London, W. N. L. Haynes, M.R.C.S., major R.A.M.C. (retired), to Helen Kirk, M.R.C.S.

DEATHS

Fenn.—On April 30, at Kew, Charles Edward Fenn, M.D. Durh.

Harper.—On April 30, at Barnstaple, John Robinson Harper, C.B.E., M.R.C.S., aged 79.

Joseph.—On April 26, at Llandudno, Arthur Hill Joseph, M.D. Lond., M.D. Brist., aged 83.

Leader.—On April 28, at Sheffield, Harold Leader, M.B. Lond., aged 77.

Nuttall.—On May 4, at Sandgate, Kent, Walter Wingfield Nuttall, M.D. Durh., J.P., aged 80.

Reid.—On April 30, in London, John McGregor Hartley Reid, M.B. Aberd., D.P.H., aged 55.

Wright.—On April 30, at Farnham Common, Sir Almroth Wright, K.B.E., C.B., M.D. Dubl., F.R.C.P., F.R.S., aged 85.

CHILD GUIDANCE IN OLD AGE

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DURING the past twenty years or so we have heard a great deal about child guidance, and an interesting technique has been developed for the treatment of behaviour problems. The child-guidance team, led by psychiatrist, psychologist, and psychiatric social worker, has made valuable contributions to both research and therapy. Much has been learned about the causes of antisocial conduct in children, and this knowledge is of wide pplication to the general care of children.

So far, little attention has been given to the behaviour roblems of old age, in spite of an increasing devotion o the medical and social care of the aged and infirm. t is common knowledge that many old people become ust as "difficult" as troublesome children, but we are hy of facing the problem squarely. The reasons for our iffidence are clear enough: the dignity of age, the long radition of reverence sanctioned by creed and custom, the authority which the old exercise over the young, the reputed wisdom of experience—these and other qualities tend to prevent us from studying and analysing some less desirable features. It is embarrassing even to talk about the egoism, the obstinate clinging to power, the petulance, the readiness to take offence, and the utter childishness which sometimes mar the grave countenance of age. We have around us a number of noble ruins which deserve preservation, but at the same time require to be trimmed and kept in order.

It is much easier to criticise what we have been than to look with clear, discerning eyes at what we may become. As we grow older, self-criticism tends to become somewhat blunted, and the comic spirit fails us when we take the stage as elders of the people. In a characteristic passage Meredith[1] proposes a useful test:

> "You may estimate your capacity for comic perception by being able to detect the ridicule of them you love, without loving them less; and more by being able to see yourself somewhat ridiculous in dear eyes, and accepting the correction their image of you proposes."

Elderly folk, especially men, find difficulty in accepting that correction. They hate to be comic figures; their minds are not quickened through laughter.

> "You will find learned men undoubtedly, professors, reputed philosophers, and illustrious dilettanti. They have in them every element composing light, except the Comic. They read verse, they discourse of art, but their eminent faculties are not under that vigilant sense of a collective supervision, spiritual and present, which we have taken note of. They build a temple of arrogance; they speak much in the voice of oracles. . . . Insufficiency of sight in the eye looking outward has deprived them of the eye that should look inward. They have never weighed themselves in the delicate balance of the Comic idea so as to obtain a suspicion of the rights and dues of the world: and they have, in consequence, an irritable personality."

TREATMENT AND PREVENTION

The behaviour problems of the aged are sometimes acute and distressing; yet they are seldom tackled seriously, unless the victim is suffering from a blatant dementia. It has been shown recently that the aged and infirm respond well to careful physical treatment, and there is reason to believe that the response to sound psychological treatment would be equally good. It has even been suggested that a special school, preferably residential, might be set up for the re-education of difficult ancients. The word "school" may sound queer, but the idea behind it is not in the least fantastic. Many elderly folk would profit immensely, both physically and mentally, by training for an occupation suitable to their age and capacity especially when the alternative is to hang grimly on to a job that has become too heavy—or to rust unburnished.

A fair trial might be given to preventive measures. One method is to write a letter to one's own old age, to be opened on the sixty-fifth birthday. I cannot remember accurately the details of my letter, deposited these ten years with the Westminster Bank, but the gist of it is as follows:

> "My dear Mackintosh,
>
> I hesitate to call you by your Christian name, as I hardly know you. All the same, I think you may profit by a few words of friendly advice. Certain undesirable tendencies in your character and outlook are already apparent and I have little doubt that they will become more marked as you grow older, just as they did with your father. (Here follow some intimate details with which I need not trouble the reader.)
>
> "The main thing to remember, however, is that you are now 65 and on the point of retirement. For heaven's sake retire, and do not persuade yourself that you are a special case. If you have kept mind and body active, a whole world of new interests lies before you; if not, you have no business to cling to office, or indeed to any of the voluntary or other services you now undertake. Clear out. Do not rationalise by saying that you 'want to see this thing through.' That is just another barnacle argument: what you really want is to cling. . . ."

And so the letter ran on. The real question is whether it will be effective, or merely cast aside with an indulgent smile. There is no more reason to suppose that age will take advice from youth than that the young will accept the counsel of their elders. It is in fact less likely, for the law of libel prevents us from saying what we think about our elders, and their contemporaries are reluctant to interfere, because they themselves are vulnerable.

Throughout the centuries there has been much philosophical discussion about old age, and literature and the arts are rich in description of its beauty and serenity:

Sophocles, Plato, Socrates,
Gentlemen,
Pythagoras, Thucydides,
Herodotus and Homer,—yea,
Clement, Augustin, Origen,
Burnt brightlier towards their setting-day,
Gentlemen.[2]

Sympathy with the sorrows of age has not been wanting. "Lights of infinite pity star the grey dusk of our days"[3]; but George Russell wrote in the same poem:

If our thought has changed to dream, our will unto desire,
As smoke we vanish though the fire may burn.

APPROPRIATE WORK

The application of medicine to the problems of old age should be considered in a serious spirit. We should be able to establish principles of treatment for behaviour difficulties in the elderly, especially at the present time when they are forming an increasingly large proportion of the community. In our pressing economic stresses we cannot afford to waste their talents and their working capacity; nor can we allow them, for sentimental or other reasons, to retain positions for which they are no longer fitted—mentally or physically, as the case may be. Many ageing people might welcome a system of psychological selection of the kind which was so successful in dealing with Army recruits, a job-analysis to give encouragement, and a prospect of usefulness in the great team-work that lies before us in this country. A relatively simple analysis would show that there are many occupations particularly suitable for the men and women who have reached the age of retirement, according to their intelligence and experience. For many the curse of oneliness could be exorcised, and the days and years renewed with vigour and interest. The selection procedure should of course be positive, based on capacities and not on disabilities. In dealing with the disabled this system has been effective, indicating the type of work that the applicant can do rather than setting out the range of jobs for which he is unfit.

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[1] George Meredith. Essay on Comedy.

[2] Thomas Hardy. An Ancient to Ancients.

[3] Poems by Æ (George Russell).

The whole subject is a delicate one in which we have to tread warily; but it is urgent and serious enough to be regarded with clear eyes, unclouded by either misplaced frivolity or befuddled sentimentality:

> I have not writ this letter of divining
> To make a glory of thy silent pining,
> A triumph of thy mute and strange declining.

So spoke Alice Meynell in "A Letter from a Girl to her own Old Age"; and the neglected Browning put the whole matter in a nutshell thus:

> And the whole is well worth thinking o'er
> When autumn comes: which I mean to do
> One day, as I said before.[4]

BIOCHEMISTRY OF INFLAMMATION

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INFLAMMATION is a fundamental process in higher animals, which involves lymphatics, blood-vessels, and the locally affected tissue, and is initiated by a disturbance in the fluid exchange. The normal capillary filtration equilibrium is upset, one important change being an increase in capillary permeability, which is readily demonstrable by the seepage of material introduced into the circulation. Diazo dyes (such as trypan blue), ferric chloride, graphite particles, and bacteria will readily concentrate from the circulation into acutely inflamed foci (Menkin 1940a). Since this increased capillary permeability is an initial stage of inflammation, knowledge of its mechanism is essential to the understanding of subsequent developments.

LEUKOTAXINE

The early work of Lewis (1927) postulated that the increased capillary permeability in inflammation was primarily due to the presence in weal fluid of a hypothetical H-substance, which was presumed to be histamine. I have not been able to confirm this (Menkin 1936); in fact, the following observation suggests the liberation into inflammatory exudate of a substance which seems to have no direct biological relation to histamine (Menkin 1938a).

If inflammatory exudate is injected into the normal skin of a rabbit, and this is immediately followed by the intravenous injection of trypan blue, the dye rapidly accumulates in the treated area of the skin, indicating the probable presence in the exudate of a factor which increases permeability. This factor is absent from blood-serum, and the reaction is not elicited by physiological saline. The active substance, "leukotaxine," is thermostable and diffusible through a 'Cellophane' membrane. By treating inflammatory exudate with pyridine and then acetone to remove proteins a crystalline-like active material can be recovered in a butyl alcohol mother liquor. Leukotaxine can also be precipitated by treating the exudate with ammonium sulphate to half saturation.

Various methods have been devised to extract this active factor (Menkin 1940a). The present method, somewhat modified from the original scheme, is as follows:

Exudate
Pyridine (1 : 1)
Centrifuge
Supernatant
Acetone (1 : 1)
Supernatant
Dried on steam bath at about 70°C
Butyl alcohol (0·5 : 1 part of acetone supernatant)
Stir for 24 hours
Concentrate to $^1/_{10}$ vol. on steam bath at about 70°C
Partially dry by freezing with CO$_2$ snow
Crystalline-like material (leukotaxine)

The active factor, leukotaxine, is biuret-negative but ninhydrin-positive. The Millon test is negative, but the Adamkiewicz colour-reaction for the indole nucleus is positive. The xanthoproteic test for the phenyl group is likewise positive. Chemically, leukotaxine seems to be a relatively simple polypeptide to which there may be attached an unidentified prosthetic group, but this has not yet been established. Studies on the enzymatic effect of crystalline trypsin on an otherwise inert serum albumin or whole serum support the view that the biological activity may largely be confined to the peptide linkage (Menkin 1938b). Finally, amino-nitrogen measurement before and after hydrolysis indicates the possibility that the active principle be a relatively simple peptide.

Leukotaxine not only increases capillary permeability but also induces the migration of polymorphs through the capillary walls. This chemotactic property can be demonstrated both in vitro and in vivo (Menkin 1940a). The liberation of leukotaxine is therefore a reasonable explanation of the increased capillary permeability and migration of leucocytes in inflammation. The yield of leukotaxine from inflammatory exudates is relatively small, but its activity is well marked. Workers in England have confirmed the presence of leukotaxine in such exudates (Cullumbine and Rydon 1946), using a somewhat different technique of extraction. Further, these workers have pointed out the abundance of leukotaxine in the succus entericus of the rabbit. In Japan, Minami and Inugami (1940) have also found leukotaxine in inflammatory exudates.

Recent studies indicate that leukotaxine or a similar substance can sometimes be recovered from various other body fluids, such as those in ovarian cysts, craniopharyngiomata, and gliomata (astroblastomata). It is conceivable that the formation of fluid in these pathological conditions is partly due to the local production of leukotaxine.

Increased capillary permeability, caused by the liberation of leukotaxine, allows the free passage of plasma proteins from the circulation into the extracapillary spaces. Fibrinogen is converted into fibrin, with the release of thrombokinase, after injury to cellular structures. A network of fibrin is formed in tissue distended with œdema, and lymphatic channels become plugged with fibrin. This early lymphatic obstruction prevents the ready dissemination of material or micro-organisms from a focus of acute inflammation. This discovery adds to our understanding of the rôle of inflammation in immunity (Menkin 1938c).

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[4] Robert Browning. By the Fireside.

LEUCOCYTOSIS-PROMOTING FACTOR

Leukotaxine is responsible for the local migration or diapedesis of leucocytes to the site of injury; it does not affect the number of circulating leucocytes. Yet leucocytosis often accompanies inflammation or infection. Now, injection of inflammatory exudate from an animal or a man with leucocytosis into the blood-stream of an otherwise normal dog or guineapig can cause leucocytosis. It is reasonable to conclude that the inflammatory exudate contains a leucocytosis-promoting factor liberated by injured cells (Menkin 1940b, Menkin et al. 1946). This leucocytosis-promoting factor (L.P.F.) has, indeed, been found; it is non-diffusible and thermolabile, and resembles a protein. It is obtained from the exudate by treating it with ammonium sulphate to half saturation after removal of the euglobulin fraction (Menkin 1940c 1946a, Menkin and Kadish 1943), and seems to be either a pseudoglobulin or at least closely associated with that fraction of the exudate. Unpublished studies in collaboration with Gerald Cooper, of Duke University school of medicine, using a Tiselius apparatus, indicate that the L.P.F. is closely associated with the alpha globulins of inflammatory exudates.

The L.P.F. induces not only a discharge of immature leucocytes from the bone-marrow but also hyperplasia of granulocytes and megacaryocytes in the bone-marrow (Menkin 1943a). The presence of the L.P.F. is demonstrable only in the serum of an animal with acute inflammation, and not in a normal animal's blood-serum. The liberation of the L.P.F. into inflammatory exudate and its absorption into the circulation offer a reasonable explanation of the leucocytosis associated with inflammation.

The apparent and essential non-antigenicity of the L.P.F. (Menkin 1944) and its property of stimulating the production of leucocytes in the bone-marrow suggest definite clinical applications, especially since it is well known that the prognosis of numerous infections depends largely on the number of circulating leucocytes. Recent studies at Duke University have demonstrated that the intravenous injection of canine L.P.F. into human beings is both innocuous and effective. The doses used ranged from 18 to 230 mg. The injection of the material into human beings is followed by a discharge of immature granulocytes into the circulation (Menkin 1946a). The clinical implications of these studies are obvious. Already a patient with a persistent leucopenia has responded favourably for short periods to the intravenous injections of relatively low doses of the L.P.F. Similar studies are now in progress.

NECROSIN

Inflammation is a manifestation of severe cellular injury. Neither leukotaxine nor the L.P.F. per se can reproduce that injury. The injury seems to be due to the liberation of a substance located in or associated with the euglobulin fraction of the exudate, particularly when the exudate has an acid reaction when withdrawn from the site of inflammation. This substance has been termed necrosin (Menkin 1943b).

The injection of necrosin into the skin of a rabbit is followed within several minutes by swelling and fusion of the collagenous bundles; this type of response cannot be induced by the injection of the euglobulin fraction of normal blood-serum. After a longer interval inflammation develops, with intense redness, œdema, and superficial necrosis. An abundance of leucocytes may be found in such areas. Lymphatics are occluded by fibrin, and blood-vessels may be thrombosed. The euglobulin fraction of normal blood-serum does not induce lymphatic obstruction, which in turn is evidence of severe damage.

The intravenous injection of necrosin may be followed by the formation of fluid in the chest cavities or by hæmorrhages all along the gastro-intestinal tract; but more constantly focal necrosis of the liver develops. Sometimes, after several intravenous injections of necrosin, one finds a considerable deposition of fat in the liver; at other times the hepatic tissue is strewn with large amounts of glycogen. The injection of necrosin into the blood-stream is accompanied by a relatively small rise in the blood-sugar level (Menkin 1946b), averaging about 20% after a single injection. The kidneys may also show foci of leucocytic infiltration as a result of the introduction of necrosin into the circulating blood. Such infiltrations are found interspersed among tubules that show fuzziness of their epithelial lining and vacuolation of the cells. The glomeruli at times have a curious colloid-like material occluding the capsular space of Bowman.

Necrosin is absent from normal blood, but may be present in that of an animal with inflammation (Menkin 1943b). The fact that necrosin penetrates from an area of injury into the blood-stream and then damages essential organs may prove of clinical significance in focal infections.

Necrosin is also lethal to mice, in contrast with other protein fractions of inflammatory exudate. Finally, in collaboration with Frederick Bernheim, of Duke University, it has been found that necrosin exerts a mild proteolytic effect.

PYREXIN

It was observed that the whole euglobulin fraction of inflammatory exudate would not only reproduce the cellular injury of inflammation but also, when injected intravenously, would lead to fever and leucopenia. This whole euglobulin fraction was at first named necrosin (Menkin 1943b), and its presence in inflammatory exudate was confirmed by Smith and Smith (1945) and Tanturi et al. (1945). Subsequently, however, it has been found that, whereas necrosin is thermolabile, its components that induce fever and leucopenia are thermostable.

It was soon recognised that the euglobulin fraction of the exudate had a component insoluble in the presence of electrolytes. By differential solubility this component was dissociated from a true euglobulin which in turn behaved like necrosin, damaging the skin of rabbits and proving lethal to mice. After purification necrosin was found to be essentially non-pyrogenic. It is true that at times it is difficult to obtain clear-cut separation between the injury factor (necrosin) and the pyrogenic component, which has been termed "pyrexin." The intravenous injection of pyrexin induces fever in the rabbit (Menkin 1943c, 1945). It is therefore reasonable to suppose that its absorption is the cause of the fever that accompanies inflammation.

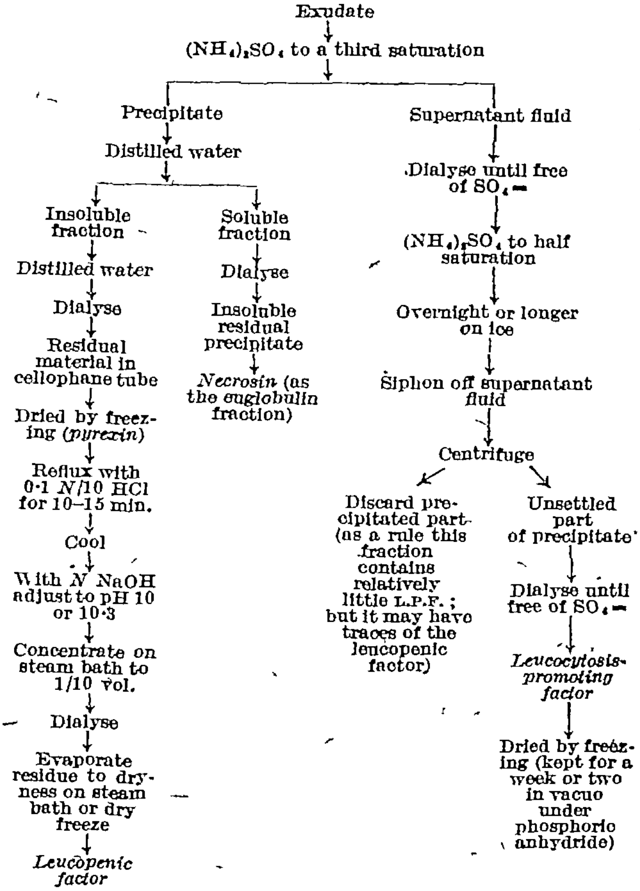
Pyrexin is thermostable. Boiling does not essentially alter its activity. It seems to be excreted, at least in part, in the urine. Its exact chemical composition is unknown. The biuret reaction is positive only in minute trace. The xanthoproteic test is positive. The ninhydrin test is positive, except when pyrexin is recovered from urine. Pyrexin gives a positive Molisch test. Observations made in collaboration with Frederick Bernheim, indicate that pyrexin may be a relatively simple polypeptide. In view of the constant presence of a carbohydrate grouping (as indicated by the positive Molisch test), pyrexin may prove to be a glycopeptide.

LEUCOPENIC FACTOR

As mentioned above, the whole euglobulin fraction of inflammatory exudate induces leucopenia. Vomiting, diarrhœa, and general apathy are also not infrequent. Studies have been undertaken to determine, if possible, the mechanism of leucopenia, which often accompanies inflammation. An inflammatory exudate, particularly if acid on withdrawal, tends to induce a transitory leucopenia when injected in a normal dog. The same result is obtained by injecting the whole euglobulin fraction of the exudate. There is evidence that this effect is not due to necrosin but to a leucopenic factor closely, but apparently not invariably, associated with pyrexin. This leucopenic factor seems to be a polypeptide (Menkin 1946c). The leucopenia appears to be due to a trapping of the leucocytes in lungs, liver, and spleen. This accumulation of leucocytes may help to explain the acute enlargement of the spleen in inflammatory conditions (Menkin 1946d).

COMMENTS

The leucocytosis-promoting factor, necrosin, pyrexin, and the leucopenic factor can be recovered from an inflammatory exudate as follows:


Exudate
$(NH_4)_2SO_4$ to a third saturation
Precipitate
Distilled water
Insoluble fraction
Distilled water
Dialyse
Residual material in cellophane tube
Dried by freezing (*pyrexin*)
Reflux with 0·1 *N*/10 HCl for 10–15 min.
Cool
With *N* NaOH adjust to pH 10 or 10·3
Concentrate on steam bath to 1/10 vol.
Dialyse
Evaporate residue to dryness on steam bath or dry freeze
Leucopenic factor
Soluble fraction
Dialyse
Insoluble residual precipitate
Necrosin (as the *euglobulin* fraction)
Supernatant fluid
Dialyse until free of $SO_4^{=}$
$(NH_4)_2SO_4$ to half saturation
Overnight or longer on ice
Siphon off supernatant fluid
Centrifuge
Discard precipitated part (as a rule this fraction contains relatively little L.P.F.; but it may have traces of the leucopenic factor)
Unsettled part of precipitate
Dialyse until free of $SO_4^{=}$
Leucocytosis-promoting factor
Dried by freezing (kept for a week or two in vacuo under phosphoric anhydride)

These biochemical substances present in inflammatory exudate help to explain some of the major sequences in the development of inflammation. There are doubtless other factors to be discovered. For instance, it has been shown that any injured cell is potentially gluconeogenetic, a fact which may partly explain why inflammation exerts a bad influence on diabetes (Menkin 1941a, 1943d). It is also conceivable that the end-stage of inflammation or repair may depend on the liberation of one or more growth-promoting factors at the site of injury (Menkin 1941b).

SUMMARY

The altered chemistry of injured cells liberates into the inflammatory exudate various biochemical substances which are responsible for the clinical features of inflammation.

Five of such substances are described: leukotaxine, a leucocytosis-promoting factor, necrosin, pyrexin, and a leucopenic factor.

Leukotaxine increases local capillary permeability diapedesis of leucocytes.

The leucocytosis-promoting factor induces a discharge of immature leucocytes from, and hyperplasia of granulocytes and megacaryocytes in, bone-marrow.

Necrosin exerts a necrotic effect on local cells and, after absorption into the blood-stream, on distant organs.

Pyrexin induces fever.

The leucopenic factor induces leucopenia, the leucocytes apparently being trapped in lungs, liver, and spleen.

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PHYSICAL BASIS OF CONTINUOUS INTRAVENOUS INFUSIONS

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THE administration of intravenous fluid is now a common procedure, and on occasions its use is a clinical necessity for correcting the dehydration and circulatory failure which accompany many diseases of infancy and early childhood. A measure of agreement has been reached on the nature and amount of fluid required in different conditions (Coller and Maddock 1935, Arnott and Young 1942), but in view of the technical difficulties and the hazards of intravenous infusions it is surprising that so little attention has been given to the physical factors that govern and affect them. Those who watch over the "drip" know how capricious its behaviour may be, and such apparent caprice may be a serious matter for the infant, who may be "drowned" by a moderate excess of intravenous fluid. Is the behaviour of the "drip" due mainly to varying factors in the patient, or to the essential nature of the apparatus used? This paper describes laboratory experiments designed to furnish an answer to the second question and suggests some of the practical measures which follow.

The apparatus (fig. 1) used in the experiments consists of two reservoirs *a* and *b*, a standard interceptor *c*, two adjustable clips *d* and *e* for rubber tubing, a Bateman needle *f*, and a measuring cylinder *g*. Except for the measuring cylinder, which was necessary for these experiments, the apparatus was the standard instruments used in the children's department at this hospital. The graduated 100 c.cm. cylinder *b* is a particular feature of this apparatus. It allows accurate measurement of the quantity of fluid administered, and it is also a safety device, for, even if the drip ran more quickly than was expected, no more than 100 c.cm. of fluid would run through the apparatus.

THE EXPERIMENTS

If the times taken to give a known volume of fluid at varying rates are in indirect proportion, it should be possible to calculate these rates once a single reading has been taken. This will only hold good, however, if the size of each individual drop remains constant in every case. Several factors may affect the size of drop: (i) the nozzle diameter of the interceptor, (ii) the viscosity and specific gravity of the fluid, (iii) the fluid pressure above the nozzle, (iv) the rate of flow, and (v) the resistance in the needle and the circulation beyond. If experimentally it is possible to keep any four of these factors constant, it should be possible to decide which among them affects the size of the individual drop, and to determine a series of standard rates of flow for the administration of different volumes over different periods of time.

All the following experiments were carried out in the same room with the same apparatus, and the length of rubber tubing and the height of the reservoir from the floor were kept constant.

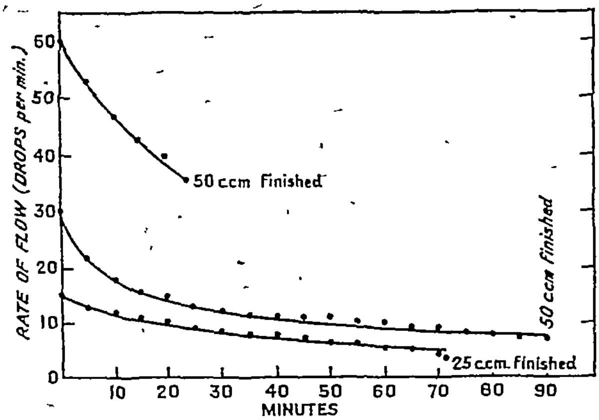

Fig. 2—Decrease in rate of flow.

Experiment I

Exactly 50 c.cm. of fluid (*N*/5 saline + 4·1% dextrose) was poured into *a*, and *b* was filled with similar fluid up to about 1 in. above the level *h*. This level *h* was previously fixed at the level of 50 c.cm. of fluid in *b*. While the flow was controlled with tap *e*, the tubing down to *f* was filled with fluid and the rate of flow was adjusted to 60 drops per min. As soon as the level in *b* had reached *h*, the needle *f* was transferred to another measuring cylinder: the time was noted, and fluid was dropped in from *a* so as to keep the level in *b* constant at *h*. The fluid was left to flow through the apparatus until *a* was empty, and therefore 50 c.cm. had flowed through the apparatus. This was checked by the reading in *g*, which was 50 c.cm. The time at which this occurred was noted exactly. Throughout the experiment the rate of flow was checked every 5 min. by counting the number of drops in 60 sec. The experiment was repeated with different rates of flow.

The results (fig. 2) suggest that, though the drip was initially adjusted for a constant speed and all the other factors remained constant, the rate of flow steadily and appreciably diminished. The apparatus was then carefully overhauled and the experiment repeated. The results were identical.

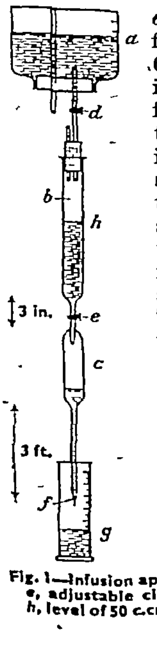

Fig. 1—Infusion apparatus: *a* and *b*, reservoirs; *c*, interceptor; *d* and *e*, adjustable clips; *f*, Bateman needle; *g*, measuring cylinder; *h*, level of 50 c.cm. of fluid in *b*.

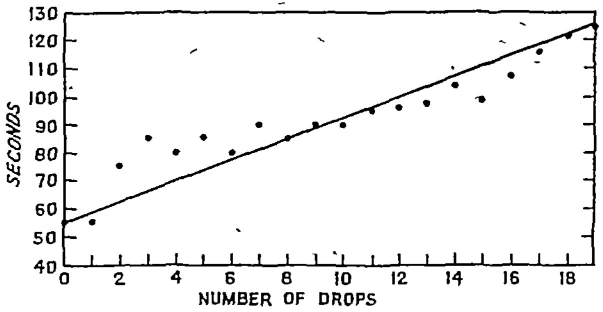

Fig. 3—Increase in time taken for each drop.

Experiment Ia

The drip was then set flowing as slowly as possible, and the exact length of time required for each drop was measured (fig. 3). The time taken for each drop gradually increased, and eventually the flow stopped. When the apparatus was cleaned and filled with water a similar result was obtained.

It is clear from these observations that, with the apparatus described and with fixed amounts of water or of saline-dextrose, the drip, when adjusted to flow at a given speed, slows down and eventually stops. The practical corollary is that, if a constant rate of flow is to be maintained, frequent supervision and readjustment will be necessary.

Experiment II

The initial experiment was repeated, the rate of flow being kept constant by frequent adjustment. The times taken for a given volume to pass at different rates are given in table I. It appears from this table, which shows a steady increase in the number of drops per c.cm. and hence a steady decrease in the size of the drop as the rates get slower, that the rate of flow affects the size of the drop.

From the results in table I obtained by practical observations it is possible to calculate the time taken for multiples of the amount used (50 c.cm.) to pass through the apparatus. Results obtained in this manner are shown in table II and fig. 4.

TABLE I—EFFECT OF CONSTANT RATE OF FLOW ON SIZE OF DROPS

Volume of fluid	Rate of flow (drops/min.)	Time taken (min.)	Drops/c.cm.
50 c.cm.	90	11	20
	60	18	21
	30	38	23
	15	78	23
	10	120	24
	5	245	25
	1	1275	26

Experiment III

Besides the variation of the size of drop with the rate of flow, it is necessary to determine the relation between the size of drop and the diameter of the nozzle of the interceptor, using the same saline-dextrose solution and the standard volume and speed.

Experiment I was repeated with (i) interceptor B in which the diameter of the nozzle was much smaller than the standard A (diameter 2·25 mm.), and (ii) four interceptors C, D, E, and F (diameter 2·0–2·25 mm.) regarded as identical with A and taken as random samples from the hospital store.

Table III shows, as expected, that the volume of the drop is affected considerably by variations in the diameter of the nozzle of the interceptor. With interceptor A as the standard, a factor can readily be calculated

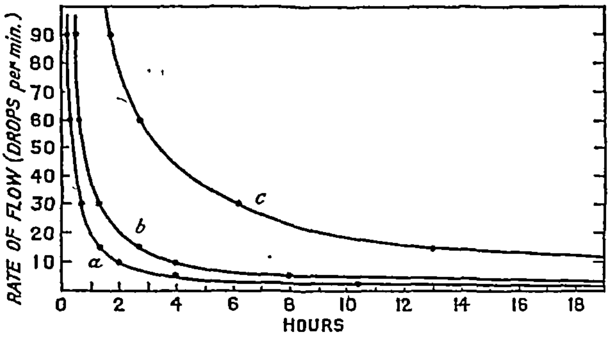

Fig. 4—Rate of flow necessary to infuse a given volume of fluid in a given time; *a*, graph for 50 c.cm. of *N*/5 saline plus 4·1 % dextrose; *b*, graph for 100 c.cm.; *c*, graph for 500 c.cm.

for each of the others and the times in table II modified accordingly. This is unnecessary in practice, provided the interceptors in all infusion sets have a common diameter or at least show no greater variation than C to F in the experiment. Accepting this range, table II can be modified as shown in table IV.

Experiment IV

The standard experiment was now repeated with human blood and blood-plasma and gave the following results:

Fluid	Time (min.) taken by 50 c.cm. at— 30 drops per min.	60 drops per min.
Saline-dextrose	38	18
Blood	50	21
Plasma	48	20

Therefore blood takes about 5/4 times, and plasma 6/5 times, as long as saline-dextrose.

The character of the fluid clearly affects the size of drop, the more viscous fluids, blood and plasma, having smaller drops and slowing more quickly than saline-dextrose. In fact, if blood was set flowing at 10 drops a minute it

TABLE II—APPROXIMATE TIMES TAKEN AT DIFFERENT RATES OF FLOW FOR DIFFERENT VOLUMES OF $N/5$ SALINE + DEXTROSE TO PASS THROUGH APPARATUS

Vol. of fluid (c.cm.)	Rate of flow (drops/min.) 90	60	30	15	10	5	1
50	11 min.	18 min.	40 min.	80 min.	2 hr.	4 hr.	21¼ hr.
100	22 min.	35 min.	80 min.	160 min.	4 hr.	8 hr.	42 hr.
200	45 min.	70 min.	2½ hr.	5¼ hr.	8 hr.	16¼ hr.	85 hr.
500	1¾ hr.	2¾ hr.	6¼ hr.	13 hr.	20 hr.	40 hr.	9 days

ppeu very quickly. To find the times taken at given es for these fluids to pass through the apparatus the ues given in table IV should be multiplied by 5/4 blood and 6/5 for plasma. These factors will apply all volumes since the physical nature of the fluid nains constant.

xperiment V

The standard experiment was fi… The reserv… ifferent heads of fluid in *b*. The reserv… an…peated with bove the 0 mark in *b* with saline-dextrose When the level reach…ed to oing at 60 drops a minute. he needle *f* was transferred to a fresh measuring cylinder, and the times taken for the first, second, third, and fourth amounts of 20 c.cm. to flow through were noted. The rate was constantly adjusted to 60 drops a minute, and the fact that [illegible] flow through while the level fell from [illegible] another was checked by taki[illegible] cylinder *g*. [illegible] and so the [illegible] too.

Thus the level [illegible] head of pressure [illegible]

The time taken for the four separate volumes was identical; hence the head of pressure in *b* does not materially affect the size of the drop. However, the rate of flow needed adjustment more often to 60 drops a minute at the lower levels; so it seems probable that at lower pressures the drip tends to slow more readily.

It must be remembered, however, that raising or lowering the cylinder *b* in relation to the Bateman needle makes an appreciable difference to the rate of flow. This variable factor can be eliminated by making the length of each drip apparatus that of the standard; and, if in each case the cylinder is raised to the maximum above the needle, the results given in the tables and figures will hold good.

COMMENT

It is clear that there is an inherent tendency in the infusion system described for the rate of flow to slow down. This means in practice that the amount of fluid reaching the patient in the prescribed period may be far less than the estimated requirement, leading to a continuance of the dehydration or circulatory failure. On the other hand, if this difficulty is overcome by the use of high rates of flow, excessive water retention with dangerous or even fatal results may follow. To avoid these difficulties the following suggestions are made:

TABLE III—EFFECT OF DIAMETER OF NOZZLE OF INTERCEPTOR ON VOLUME OF DROP

Type of interceptor	A	B	C	D	E	F
Time (min.) for 50 c cm. to pass at 60 drops/min.	18	25	20	18	20	18

A, standard; B, small diam.; C, D, E, F, considered similar to A.

(1) An adequate number of standard infusion sets identical with the one used in these experiments should be provided, so that the figures given in table IV and fig. 4 can be applied.

(2) The rate of flow should be frequently adjusted to the initial figure.

(3) The amount of fluid given should be accurately recorded, special charts for this purpose being provided and kept with the case-notes.

If the nurse is told how often the 100 c.cm. cylinder should be refilled, and with what fluid, and if the rate of flow required to give this quantity is noted from fig. 4 there should be no danger of inadequate or excessive therapy.

Practical experience shows, however, that the problem is not confined to the apparatus. Variable factors arising in the patient are also operative. This aspect has been carefully investigated by Pugsley and Farquharson (1944), who found that the main human and other factors influencing the efficiency of flow were:

TABLE IV—LIMITS OF VARIATION IN TIMES TAKEN AT DIFFERENT RATES OF FLOW FOR DIFFERENT VOLUMES OF SALINE-DEXTROSE SOLUTION TO PASS THROUGH APPARATUS

Vol. of fluid (c.cm.)	Rate of flow (drops/min.) 90	60	30	15	10	5	1
50	11-12½ min.	18-20 min.	40-45 min.	80-90 min.	2-2¼ hr.	4-4½ hr.	21-24 hr.
100	22-25 min.	35-40 min.	80-90 min.	2¼-3 hr.	4-4½ hr.	8-9 hr.	42-48 hr.
200	45-50 min.	70-80 min.	2½-2¾ hr.	5¼-6 hr.	8-9 hr.	16-18 hr.	85-95 hr
500	1¾-2 hr.	2¾-3 hr.	6¼-7 hr.	13-14 hr.	20-23 hr.	40-47 hr.	9-10 days

(1) The size of the vein at the site of the infusion.

(2) The nature of the infusion (some fluids, notably serum and plasma, produce vasoconstriction).

(3) The temperature of the fluid as it enters the vein.

(4) The pressure of fluid.

In infants these and other potential resistances are often encountered and can be overcome in various ways.

It is not my purpose to describe the technique of venesection in infants, though this has a great bearing on the efficiency of the drip; nor is it to discuss in detail the further potential resistances which arise, but the following facts may be usefully noted. The internal saphenous vein at the ankle has been used routinely as first choice. The effective immobilisation of the limb has been secured by a simple posterior plaster splint made immediately after venesection, and applied with the foot in plantar flexion. The upper end of this splint should reach well above the popliteal fossa, and tight bandaging must be avoided. The leg is then raised on a pillow. Heat from a hot-water bottle round the lower part of the tubing is often helpful. Should initial vasoconstriction be severe it can be overcome by positive pressure applied with a syringe and three-way tap set introduced between the lower end of the tubing and the Bateman cannula.

SUMMARY

In the standard infusion system described the rate of flow tends to slow down and stop, though no cause for this could be found.

The size of each drop varies with the rate of flow, the diameter of the interceptor nozzle, and the viscosity of the fluid used. It is not materially affected by the head of pressure in the secondary reservoir.

The practical applications in the ward are briefly described.

I wish to thank Prof. J. C. Spence for his encouragement, Dr. Brenda Morrison for initial suggestions, Dr. Donald Court for his advice, and Dr. D. S. Thomson, Dr. J. Oldfield, and Mr. J. Andrews for assistance.

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GENERAL PARALYSIS OF THE INSANE

TREATED WITH PENICILLIN

REPORT ON 7 CASES

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PROMISING results in general paralysis of the insane have been described in the United States, following intramuscular and intrathecal injections of the sodium and calcium salts of penicillin.

Stokes et al. (1944) suggested that in late syphilis, including neuro-syphilis, penicillin produces clinical and serological results which are equal, if not superior, to those obtained with arsenicals and heavy metals. General paralysis and taboparesis responded well to intramuscular penicillin.

Goldman (1945) reported that of 18 patients with dementia paralytica treated with penicillin 16 definitely improved. In this series 11 patients were each given a total of 800,000 units of penicillin intramuscularly in doses of 20,000 or 25,000 units every four hours. At the same time intrathecal injections of 10,000 units were given daily for the first two days and of 20,000 units daily for four subsequent days. A month later, intramuscular penicillin alone was given in doses of 20,000 and 25,000 units every four hours until 1,000,000 units had been administered. Of these 11 patients 3 apparently recovered, 3 were much improved, 3 improved, and 2 died. The remaining 7 patients were treated with about thirty hours' fever, induced by diathermy induction current and an insulating blanket in sessions of $2^1/_2$–3 hours at 105°F or over, three times weekly for four weeks. After the third or fourth fever treatment penicillin 20,000 or 25,000 units every four hours to a total of 1,000,000 units was given. After a month 1,000,000 units was injected in a similar manner without further fever treatment. Of these 7 patients 2 apparently recovered, 3 were much improved, and 2 were improved.

Gammon et al. (1945) published observations on the blood and cerebrospinal fluid in 89 cases of neurosyphilis treated with penicillin. The sodium salt in aqueous solution was given intramuscularly every three or four hours for eight days to a total of 1,200,000 or 2,400,000 units; a few patients received 3,000,000 or 4,000,000 units. A favourable effect on the blood and cerebrospinal-fluid reactions was noted with this dosage.

Neymann et al. (1945) treated with penicillin 5 cases of chronic dementia paralytica in which mental symptoms had been present for 1–10 years. Eight different modes of treatment were used: intramuscular, intravenous, intravenous with sodium dehydrocholate, intravenous with fever, intracisternal plus intravenous plus fever, intracisternal plus intramuscular plus phenarsone sulphoxylate, intracisternal, and intracisternal plus intramuscular. Only 1 patient improved after having intracisternal penicillin in three doses of 20,000 units and fifteen doses of 30,000 units over a period of more than three weeks. The last ten injections of 30,000 units were given daily. Of the other patients 2 died in coma from penicillin encephalopathy, 1 died as a result of exhaustion two weeks after the end of treatment, and 1 showed no improvement. Since the patients showed no improvement with intramuscular and intravenous penicillin, and the substance was not found in the cerebrospinal fluid, they conclude that "the intravenous and intramuscular injection of penicillin is ineffective because the hematoencephalic barrier cannot be breached."

ADMINISTRATION OF PENICILLIN

Dosage.—Stokes et al. (1944) treated neurosyphilis with intramuscular penicillin, using two grades of dosage: (1) 1,200,000 units or less, usually given as 25,000 units every three or four hours, day and night; and (2) 2,400,000–4,000,000 units or more, usually given as 25,000–50,000 units every two to four hours, day and night. They state that "off hand there was no striking difference recognisable between the effect of shorter time intervals or larger doses except the induction of Herxheimer reactions, which could be avoided by reduction in the dosage."

It was decided to treat the cases in my series with a total dose of 1,280,000 units of penicillin intramuscularly in doses of 20,000 units every three hours day and night, and to repeat this course at the end of a month. The first 4 patients had been given their initial course of penicillin, when a report published by Gammon et al. (1945) came to hand in which they concluded, from observations on the blood and cerebrospinal fluids of patients with neurosyphilis treated with penicillin, that "when a comparison of the results of treatment was made in two groups of patients, one receiving a low dose of 1·2 million units and the other receiving a high dose of 2·4 million units no difference was shown between them, but when the time element was taken into account—that is, when the cases were followed long enough to obtain the maximum effect—there appeared to be a slightly better response in the higher dosage group." It was decided, therefore, to increase the dose of penicillin to 50,000 units intramuscularly every four hours day and night until a total of 2,400,000 units had been given in the fresh cases and to repeat this course after a month. It was also decided to give the first 4 patients this increased dosage for their second course of treatment.

Route.—Intermittent intramuscular administration was chosen in all the cases. Only one of the patients refused to have the night injections towards the end of the second course of treatment; these were stopped, but the total amount of penicillin was given by continuing the treatment for a few days longer. None of the patients complained of any pain or irritation at the sites of injection.

Concentration in Blood and Cerebrospinal Fluid.—Studies of the penicillin content of the blood-serum after intramuscular injection were in general agreement with those reported by Fleming et al. (1944) and others. The agar-plate method of biological assay, with *Staph. aureus* as the test organism, was used. With doses of 20,000 units traces of penicillin were found in the blood at the end of three hours, and with doses of 50,000 units at the end of four hours.

No penicillin was found in the cerebrospinal fluid in my cases after 20,000 units or 50,000 units.

TOXIC EFFECTS

In this series the following toxic reactions to penicillin have been observed:

Febrile Reactions

All the patients during treatment had their temperatures recorded every four hours. In case 1 on the first day of treatment the temperature, which was normal to begin with, rose to 101°F at 2 P.M., fell to 99·5°F by 6 P.M., and became normal at night. Next day the temperature rose from normal in the morning to 99°F at 2 P.M., but at 10 P.M. returned to normal and remained so for the remainder of the treatment. In case 3 the temperature during the first day of treatment was normal, but rose to 100°F at 2 P.M. on the second day, became normal in the evening, and stayed normal for the remainder of the course. During the second course, temperatures of 100°F at 10 P.M., 102°F at 2 P.M., and 99·8°F at 6 P.M. were recorded on the 4th, 5th, and 6th days respectively, but returned to normal next day and stayed normal until treatment was completed. In cases 2, 4, 5, 6, and 7 no abnormal temperatures were noted. Cases 1 and 2 were treated at the same time, each received the same preparation and dosage of penicillin, yet one became febrile while the other remained non-febrile.

Skin Reactions

Only one patient exhibited a skin reaction. On the eighth day of treatment case 2 developed an urticarial rash on the face, neck, chest, and back. The rash on the face was red and blotchy, but on the neck, chest, and back it consisted of pale pink patches 2–3 in. in diameter, with the central part of the patches raised in weals and dead white. Fresh crops appeared at intervals during the next twenty-four hours, while the older patches slowly faded. This rash gradually disappeared when treatment ceased.

Jarisch-Herxheimer Reactions

At 12.30 A.M. on the eighth day of treatment case 2 became mentally disturbed. Previously he had been well behaved and coöperated with the staff in his treatment. He became noisy and restless and said that persons in the roof were calling him vile names and spraying poisonous gases on him. Next day he was still acutely disturbed and complained bitterly about his persecutors. He was then found to have the rash described above. Next morning he was given the last injection of penicillin at 9 o'clock; by the afternoon the hallucinations of smell had cleared, and by the following day the hallucinations of hearing had disappeared. No reactions developed during the second course of treatment.

Case 6 became mentally disturbed on the seventh day of treatment. Before and during the early part of his treatment he was quiet, but later he became abusive to the staff, accusing them of all forms of criminal intent. He paced the ward glancing furtively round and at night became noisy. Next day he was talkative and at night was so noisy that the night injections were withheld. As he was more settled the following morning, treatment was resumed, and he completed the treatment without further reaction.

BLOOD AND CEREBROSPINAL FLUID AFTER TREATMENT

Table I summarises the findings in the blood and cerebrospinal fluid before and 2–18 weeks after treatment. The findings in the 6 surviving patients 9–13 months after treatment are set out in table II; none of these has required re-treatment.

Cerebrospinal Fluid.—A decrease in cells was an early feature noted in all the cases. The cells became normal in 5 cases. A lowered protein content was also an early change observed in all the cases. This change took place simultaneously with the decrease in cellular content. The colloidal-gold reaction appears to be somewhat resistant to the treatment given. The Wassermann reaction in 5 cases remained unchanged within the observation period.

Blood.—In 5 cases the Wassermann reaction of the sera remained unchanged after two courses of treatment.

CLINICAL NOTES

Some improvement has been observed in every case.

Case 1.—A man, aged 49, with six weeks' history, was admitted on June 7, 1945, being restless, confused, auditorily hallucinated, ataxic, with tremulous limbs and spastic dysarthria, and doubly incontinent. He remained in this state until the sixth day of penicillin treatment, when his confusion and restlessness began to clear, and he regained control of the bladder and bowel. No further change was noted after the second course of treatment. A year after treatment he is demented and auditorily hallucinated, but his gait and articulation are normal. He is in hospital but does work under supervision.

Case 2.—A man, aged 44, with six months' history, was admitted on June 8, 1945, being elated, euphoric, deluded, and disoriented in time and space, with tremulous lips and tongue, slurring articulation, tremulous limbs, ataxic gait, and illegible and tremulous handwriting. On the eighth day of treatment he became mentally disturbed, and a rash appeared on his face, neck, chest, and back. After penicillin treatment ended, his mental condition improved and the rash cleared. Two weeks later the tremulousness of the lips, tongue, and limbs disappeared. He became oriented in time and space and was employed in occupational therapy rug-

TABLE I—EFFECT OF CALCIUM PENICILLIN ON THE BLOOD AND THE PARETIC FORMULA

Case no.	Before treatment					Interval (days)	After treatment				
	Blood W.R.	Cerebrospinal fluid					Blood W.R.	Cerebrospinal fluid			
		W.R.	Protein (mg. per 100 c.cm.)	Lange reaction	Cells (per c.mm.)			W.R.	Protein (mg. per 100 c.cm.)	Lange reaction	Cells (per c.mm.)
1	+1 in 8	+++	140	5555555421	8	129	+1 in 8	+++	50	5544100000	2
2	+1 in 8	+++	120	5555554210	66	129	+1 in 8	++½	60	5554331100	2
3	+1 in 6	±	120	5555544210	blood	92	+1 in 8	++½	50	4443221100	blood
4	+1 in 2	+++	90	5555431000	blood	59	+1 in 4	++ −	60	4443220000	16
5	+1 in 8	+++	100	5555544100	42	56	+1 in 8	+++	60	5555442000	3
6	+1 in 8	+++	100	5554433100	84	15	+1 in 8	+++	50	4553320000	8
7	+1 in 8	+++	140	5555554210	83	58	+1 in 8	+++	90	5555554110	

TABLE II—FINDINGS IN BLOOD AND CEREBROSPINAL FLUID IN THE 6 SURVIVING PATIENTS AFTER 9–13 MONTHS' INTERVAL.

Case no.	Interval (months)	Blood W.R.	Cerebrospinal fluid			
			W.R.	Protein (mg. per 100 c.cm.)	Lange reaction	Cells (per c.mm.)
1	12	+ 1 in 8	+++	55	5554410000	3
2	11	+ 1 in 8	+	35	5544322000	2
3	12	—	—	50	3444100000	5
4	9	± 1 in 2	+	130	4444431000	10
5	10	+ 1 in 6	+	60	5554331000	4
7	13	Not done	+++	50	5554331000	2

making. The second course of penicillin was given without the appearance of any toxic reaction. He was granted parole on Oct. 31, was discharged from the hospital, fit and well, on Dec. 1, and has remained well. Eleven months after treatment he is at work.

Case 3.—A man, aged 48, with six months' history, was admitted on June 1, 1945, being slovenly, untidy, elated, and fatuous. His gait was unsteady, handwriting tremulous, and articulation slurring. After the second course of treatment he became neat and tidy, and his gait and handwriting became normal. His elation disappeared, and his articulation improved. He left the hospital fit and well on Sept. 29, and has remained so ever since. A year after treatment he is at work.

Case 4.—A man, aged 51, with four weeks' history, was admitted on July 27, 1945, being dull, apathetic, and demented, with poor memory and retardation of thought. His gait was ataxic and his articulation slurring. After two courses of penicillin his gait improved, but his mental condition has remained unchanged. He left the hospital on Nov. 24. Nine months after treatment he is still demented and unable to work.

Case 5.—A man, aged 46, with twelve months' history. On admission on Sept. 8, 1945, he was elated, euphoric, and hypomanic, with spastic dysarthria, unstable emotions, and impaired memory. After treatment his mood became normal and his articulation improved, but his memory is slightly impaired. He was discharged from hospital on Feb. 2, 1946, and ten months after treatment is at work.

Case 6.—A man, aged 56, with three weeks' history, was admitted on Sept. 14, 1945, being elated, euphoric, and full of grandiose ideas about solving the housing problem. On the seventh day of treatment he became mentally disturbed, but when the course ended he became more composed. His elation and euphoria disappeared, but the grandiose delusions persisted. Three weeks later he developed lobar pneumonia, from which he died. Necropsy showed thickened meninges and ependymitis in the fourth and lateral ventricles. The brain has been prepared for histopathological study.

Case 7.—A man, aged 56, with six weeks' history, was admitted on Oct. 23, 1945, being garrulous, elated, and grandiose, with delusions of great wealth. After penicillin therapy he became less talkative, and the euphoria disappeared. His handwriting, which was tremulous before treatment, has improved, and the delusions have disappeared. He was discharged on March 30, 1946, and thirteen months after treatment he is at work.

COMMENT

It might be argued that failure to detect penicillin in the cerebrospinal fluid after moderate doses should be regarded as a contra-indication to its use in general paralysis of the insane. However, Lourie (1943) says: "While it remains true that a compound found in the cerebrospinal fluid has not necessarily traversed the tissue spaces of the brain, yet it may to some slight extent have done so. There can likewise be no unequivocal interpretation of a failure to detect the compound in the cerebrospinal fluid. While this might well mean that it had not passed the blood-brain barrier, there does remain the possibility that it may in fact have been in effective concentration in the minute perivascular spaces of the brain, but on reaching the subarachnoid space it may have become so diluted in the bulk of fluid formed at the choroid plexuses as to be no longer detectable."

The clinical and serological results in this series suggest that penicillin may have penetrated into the brain in this way.

SUMMARY

Seven patients with general paralysis of the insane have been treated with calcium penicillin intramuscularly.* Cases 1, 2, 3, and 4 had a first course of 20,000 units three-hourly day and night for a total of 1,280,000 units, followed at an interval of a month or longer by a second course of 50,000 units four-hourly day and night for a total of 2,400,000 units. Cases 5 and 7 were given two courses of 50,000 units four-hourly day and night until a total of 2,400,000 units had been given. The second course was given a month after the end of the first. Case 6 had one course of treatment of 2,400,000 units.

No penicillin was found in the spinal fluid with such dosage.

A skin reaction developed in case 2, febrile reactions in cases 1 and 3, and Jarisch-Herxheimer reactions in cases 2 and 6.

Serological results in the spinal fluid were improved with regard to cells and protein, but the colloidal-gold and Wassermann reactions were more resistant. The blood Wassermann reactions were unchanged.

Clinical results have been encouraging: 4 patients have made a social recovery, 1 has greatly improved, 1 is not improved, and 1 died.

My thanks are due to Dr. J. D. Silverston, medical superintendent of the hospital, for permission to publish this paper; Mr. A. T. Rennie, laboratory technician at the hospital, for his kind assistance; and Mr. H. Lewty, pharmacist at the hospital, and his assistants for the preparation of the aqueous penicillin solutions for injection. The Wassermann reactions of the blood and cerebrospinal fluid were kindly carried out at the Public Health Laboratory, Manchester, under the direction of Prof. H. B. Maitland, to whom my thanks are also due.

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* Since this paper was submitted for publication, 10 other patients have been treated with penicillin alone. The results will be published later.

"... may fail to adapt successfully to the problem of advancing age.... The patient alternates between hope and despair, or becomes peevish and irritable, and begins to lose affection even for his sons and daughters. Shutting himself up in his own room, he begins to lead a solitary, introspective, selfish life. The hobbies and occupations which had interested him once cease to give satisfaction. He loses interest in external affairs, does not look at the papers, stops reading books. His life has been a failure and a waste of time. Death is approaching, and he is afraid of death, miserable, making his family miserable as well. Then the intellect may start to fail. He begins to have hallucinations and delusions, imagining mistakes and failures in his past. Thus the mind may give way before the body starts to decline, in the same way that the schizophrenic fails on the threshold of adult life.

"Most grow old with better grace.... Reacting intellectually rather than emotionally to the experience of growing old, they realise that it is better to be interested in all the seasons than to remain in perpetual love with the spring."—Dr. A. E. CLARK-KENNEDY in *Medicine*. (Edinburgh: E. & S. Livingstone, 1947, vol. i, p. 320.)

DIPHTHERIA AND STREPTOCOCCAL CARRIERS IN LONDON SCHOOL-CHILDREN

MEMBERS OF THE STAFF OF THE PUBLIC-HEALTH DEPARTMENT, LONDON COUNTY COUNCIL

THE data here presented are the results of surveys carried out in September, 1942, and February and March, 1943, to estimate the diphtheria and streptococcal carrier-rate in London school-children.

TABLE I—NUMBER OF CHILDREN EXAMINED

School medical division	Male (yr.)		Female (yr.)		Total
	Under 10	10 and over	Under 10	10 and over	
September, 1942					
North ..	117	74	108	101	400
North-west ..	105	132	94	61	392
North-east ..	85	100	91	125	401
South-east ..	73	112	74	136	395
Total ..	380	418	367	423	1588
February and March, 1943					
North-west ..	135	105	123	69	432
North ..	132	124	116	108	480
North-east ..	37	101	37	144	319
South-east ..	87	108	93	122	410
South-west ..	99	133	83	92	407
Total ..	490	571	452	535	2048

The full significance of the findings can be measured only in the light of further surveys associated with the epidemic trends of diphtheria and streptococcal infections during the periods of observation. The findings in these surveys are, however, of sufficient importance to justify publication in their present form.

Method

An attempt was made to examine 1500–2000 school-children in each survey. Since additional staff was not available, the work was divided between several doctors, and this enabled the surveys to cover all parts of London within a relatively short time, though it introduced the possibility of variation in the technique of swabbing. London is divided into five administrative divisions for school medical work, and wherever possible only one school doctor took swabs in each division. From a given date these doctors took swabs from all children seen by them in the mornings at routine medical inspection in elementary schools until the required number of swabs was obtained. The time required was usually four or five weeks. Swabs taken in the morning were delivered at the laboratory at the end of the morning session.

TABLE II—NUMBER OF CHILDREN FOUND TO BE IMMUNISED AGAINST DIPHTHERIA

Age (yr.) and sex	No. examined	Immunised	Standard deviation of percentage
September, 1942			
Under 10:			
Males	380	210 (*55·3%*)	2·6
Females ..	367	204 (*55·6%*)	2·6
Total ..	747	414 (*55·4%*)	1·8
10 and over:			
Males	418	219 (*52·4%*)	2·4
Females ..	423	220 (*52·0%*)	2·4
Total ..	841	439 (*52·2%*)	1·7
Grand total ..	1588	853 (*53·7%*)	1·3
February and March, 1943			
Under 10:			
Males	490	311 (*63·5%*)	2·2
Females ..	452	267 (*59·1%*)	2·3
Total ..	942	578 (*61·4%*)	1·6
10 and over:			
Males	571	391 (*68·5%*)	1·9
Females ..	535	341 (*63·7%*)	2·1
Total ..	1106	732 (*66·2%*)	1·4
Grand total ..	2048	1310 (*64·0%*)	1·1

For convenience of working, the bacteriological examinations were carried out in five laboratories. Swabs were plated on a tellurite-blood or serum-agar medium and on plain blood-agar. Gravis and intermediate strains of *C. diphtheriæ* were accepted as toxigenic. Mitis strains were tested for virulence.

In the first survey the doctors were asked to note the clinical condition of the nose and throat. This did not produce results that could be analysed statistically. For the second survey a "yes" or "no" was obtained concerning the following three conditions:

(1) Enlarged or unhealthy tonsils; history of sore throat.
(2) Adenoids or nasal catarrh.
(3) History of tonsillectomy.

This questionnaire gave results of some value, but the accurate assessment of abnormalities of the nose and throat is extremely difficult and depends to a great extent on personal opinions.

Results

The results are summarised in tables I-V.

It was impossible to include the south-western division in the first survey. The 1943 survey, however, covered the whole of the county area. It is seen that the method used for selection of children achieved a fair distribution between the sexes and age-groups.

TABLE III—STREPTOCOCCAL CARRIERS

Age (yr.) and sex	No. examined	Hæmolytic streptococcus found			
		Nose	Throat	Nose and throat	All sites
September, 1942					
Under 10:					
Males ..	275	7 (*2·5%*)	27 (*9·8%*)	7 (*2·5%*)	41 (*14·9%*)
Females	273	9 (*3·3%*)	27 (*9·9%*)	7 (*2·6%*)	43 (*15·8%*)
Total ..	548	16 (*2·9%*)	54 (*9·9%*)	14 (*2·6%*)	84 (*15·3%*)
10 and over:					
Males ..	286	9 (*3·1%*)	36 (*12·6%*)	9 (*3·1%*)	54 (*18·9%*)
Females	362	10 (*2·8%*)	43 (*11·9%*)	3 (*0·8%*)	56 (*15·5%*)
Total ..	648	19 (*2·9%*)	79 (*12·2%*)	12 (*1·9%*)	110 (*17·0%*)
Grand total	1196	35 (*2·9%*)	133 (*11·1%*)	26 (*2·2%*)	194 (*16·2%*)
February and March, 1943					
Under 10:					
Males ..	490	11 (*2·2%*)	60 (*12·2%*)	11 (*2·2%*)	82 (*16·7%*)
Females	452	10 (*2·2%*)	45 (*10·0%*)	6 (*1·3%*)	61 (*13·5%*)
Total ..	942	21 (*2·2%*)	105 (*11·1%*)	17 (*1·8%*)	143 (*15·2%*)
10 and over:					
Males ..	571	9 (*1·6%*)	50 (*8·8%*)	3 (*0·5%*)	62 (*10·9%*)
Females	535	6 (*1·1%*)	59 (*11·0%*)	3 (*0·6%*)	68 (*12·7%*)
Total ..	1106	15 (*1·4%*)	109 (*9·9%*)	6 (*0·5%*)	130 (*11·7%*)
Grand total	2048	36 (*1·8%*)	214 (*10·4%*)	23 (*1·1%*)	273 (*13·3%*)

During the period in which the surveys were made an immunisation drive was taking place in the schools, and the improved figures in 1943 show the progress of the campaign. Evidence from other sources suggests that the percentages in table II were representative of the state of immunisation of London school-children at the times of the surveys. This table demonstrates the value of the small-scale sample survey as a means of providing a close estimate of such measurable characteristics in the population.

The swabs examined for diphtheria gave the following results:

September, 1942:

No. of children examined	1588
Positive, virulent	6 (*0·38%*)
Positive, non-virulent	8 (*0·50%*)
Total positive ..	14 (*0·88%*)

(Of the 14 positives, 7 had been immunised and 7 had not.)

February and March, 1943:

No. of children examined	2048
Positive, virulent	4 (0·19%)
Positive, non-virulent	2 (0·10%)
Total positive ..	6 (0·29%)

(Of the 6 positives, 5 had been immunised and 1 had not.)

The diphtheria carrier-rates were unexpectedly low and certainly much lower than estimates made at various times in pre-war years. Some past estimates have been based on the results of swabbing selected groups of children (including diphtheria contacts) and for this reason were too high. Forbes,[1] referring to the systematic swabbing of children in *affected* class-rooms on the chance of finding the elusive carrier, states: "Since 1903 records of such investigations deal with over 74,000 more or less selected children, among whom the carrier-rates in the following 25 years have shown considerable variation, the highest being 19·3% in 1916 and the lowest 3·3% in 1919, with averages for various periods of 6·3% from 1903 to 1909, 12·2% from 1910 to 1919, and subsequently 6–7%. The proportion of carriers to the total population in England has been estimated[2] at 4·6%." Tellurite media will give a higher incidence than Loeffler. Moreover, for various reasons, the incidence of diphtheria in London was considerably lower during the war years than in pre-war years.

TABLE IV—GROUPS OF HÆMOLYTIC STREPTOCOCCI FOUND

Lancefield group	1942	1943
A	159 (79·6%)	211 (77·1%)
B	—	—
C	25 (12·5%)	25 (9·2%)
G	1 (0·5%)	1 (0·4%)
Not grouped ..	15 (7·7%)	35 (12·7%)

It is interesting to view the carrier-rate figures in the light of the immunisation campaign. The danger that immunisation will lead to an increase in the carrier-rate may not be so great as was thought. It can be stated as a result of these surveys that immunisation of two-thirds of the child population between five and fourteen years of age is compatible with a diphtheria carrier-rate of considerably less than 1%.

Table III shows that not all the children in the first survey were examined for hæmolytic streptococci.

TABLE V—PRESENCE OF HÆMOLYTIC STREPTOCOCCI (H.S.) AND ABNORMALITIES OF NOSE AND THROAT

	Hæmolytic streptococcus				H.S. not found	Total	% with H.S.
	Nose	Throat	Nose and throat	Total			
Adenoids or nasal catarrh	7	25	5	37	191	228	16·2
History of sore throat or enlarged or unhealthy tonsils	7	45	3	55	257	312	17·6
History of tonsillectomy ..	5	12	2	19	226	245	7·8
No abnormality ..	17	131	13	161	931	1092	14·7

The peak of an epidemic of scarlet fever came between the times of the two surveys, and the relation between the attack-rate of scarlet fever and the streptococcal carrier-rate may be expressed as follows:

	Children aged 5–14 yr. Attack-rate of scarlet fever per 1000 per week	*Incidence of hæmolytic streptococcus %*
During 1942 survey ..	0·22	16·2
During 1943 survey .	0·26	13·3

Table IV shows the results of grouping the streptococci found. The highest incidence of hæmolytic streptococci (table V) was found in the children with unhealthy tonsils, but the figures for these children are not greatly in excess of those in the children with no clinical abnormality of the nose and throat. The incidence of hæmolytic streptococci in children with a history of tonsillectomy was, however, significantly lower than in all other groups.

The results shown are based on swabs taken on only one occasion from each child. There is nothing to show which of the positives were persistent carriers, and which were purely temporary carriers. The results therefore shed no light on the relation between unhealthy conditions of the nose and throat and the persistent carrier state.

The investigation was planned and supervised by Dr. Ian Taylor. The swabbing and examination of children was undertaken by medical officers of the school medical service, and the bacteriological examinations by the staff of the group laboratories. The statistical work was performed by Mr. B. Benjamin. The surveys were carried out with the permission and encouragement of Sir Allen Daley.

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TREATMENT OF THYROTOXICOSIS WITH PROPYL THIOURACIL

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THAT thyrotoxicosis can be effectively controlled with thiouracil or methyl thiouracil has been established by the many reports from Europe and the U.S.A. In a quest for more potent and less toxic compounds Astwood et al. (1945) tested some 300 substances for anti-thyroid activity and showed that in the rat propyl thiouracil exerts a longer effect and is ten times more potent than thiouracil. This has been confirmed for the rat by Bavin and Goodchild (1946) and for the chick by Vanderlaan (1945). In a clinical trial thyrotoxicosis was rapidly controlled with propyl thiouracil without any untoward reactions (Astwood and Vanderlaan 1945). Further, some patients who had previously reacted adversely to other anti-thyroid substances did not do so to propyl thiouracil.

We summarise here our experience with propyl thiouracil in treating 16 patients with thyrotoxicosis. All of them presented the typical signs and symptoms of hyperthyroidism, which had lasted from two months to nine years. In no instance had iodine been given for at least four months before treatment with propyl thiouracil. The therapeutic value of the drug was assessed by the criteria already described (Wilson 1946).

TREATMENT

From the results of the animal experiments already cited it was estimated that the initial dose of propyl thiouracil necessary for control of thyrotoxicosis would be about 80 mg. daily. Preliminary observations on two patients given 75 mg. daily indicated that full response was not effected for at least three weeks. It was therefore decided to use a daily dose of 150 mg. given as two 25-mg. tablets three times daily till full control of signs and symptoms was evident. Thereafter the dose was reduced to 75 mg. daily and later to 50 mg. or 25 mg. daily. White-cell counts were done on an average three times a week till the maintenance dose was reached. The patients were then discharged to the outpatient department for observation at intervals of three or four weeks.

RESULTS

The order of the disappearance of signs and symptoms after the beginning of treatment is indicated in table I.

TABLE I—RELIEF OF SIGNS AND SYMPTOMS IN DAYS AFTER START OF TREATMENT

Signs and symptoms	Thiouracil 1000–1800 mg. daily	Methyl thiouracil 600 mg. daily	Propyl thiouracil 150 mg. daily
Subjective improvement; restlessness relieved	4–8	3–5	3–9
Sweating and skin flush controlled	6–14	4–7	4–13
Tremor diminished ..	10–20	5–12	5–18
Gain in body-weight	10–25	7–15	6–18
Tachycardia controlled	15–30	9–17	4–30
Serum-cholesterol increased, or basal metabolic rate reduced	10–20	6–12	10–20

The results obtained with propyl thiouracil are compared with the observations previously made on patients treated with thiouracil and with methyl thiouracil. The control of thyrotoxicosis is more rapid with propyl thiouracil than with thiouracil. Apart from the smaller dose of propyl thiouracil, the lag between the beginning of treatment and response is not less than was observed in patients treated with methyl thiouracil. Thus, though propyl thiouracil is about four times as potent as methyl thiouracil, it does not control thyrotoxicosis more rapidly.

Primary and Secondary Goitre

It is often said that patients with primary thyrotoxicosis respond to treatment with the anti-thyroid substances more effectively than do patients with secondary goitre. This has not been our experience in a large series of patients treated with thiouracil or with methyl thiouracil. Particular attention was paid to this aspect during the trial with propyl thiouracil, and the observations made on 5 cases of primary and 6 cases of secondary thyrotoxicosis are set out in table II. The results indicate that the response to treatment is more rapid in patients with secondary goitre. This may partly be explained by the fact that the precipitating factor of anxiety is initially more difficult to control and the restoration of the normal pulse-rate is usually more delayed.

Toxic Effects

Though there were periodic fluctuations in the white-cell counts, particularly during the first two weeks' treatment, in no instance did the total white-cell count fall to less than 4500 per c.mm. Granulopenia was not observed.

One patient developed an irritating rash on the hands, thighs, and buttocks seven weeks after beginning treatment. She did not report to hospital at once but continued taking her tablets for three weeks.

On examination there was a papular lichenoid eruption on the thighs, and an acute cheiropompholyx on the hands, which bore the signs of an acute toxic dermatitis. There was no splenomegaly, icterus, or lymphadenopathy. No fetor; no sore throat. White cells 8800 per c.mm. (polymorphs 51%, eosinophils 6%). Previous eosinophil counts had never been more than 1%. The thyrotoxicosis was still well controlled, and there was no enlargement of the adenoma.

When the rash developed she was taking 50 mg. daily and had had a total dosage of 3·8 g.

On her readmission to hospital propyl thiouracil was withdrawn, and after local treatment with diatomite lotion the skin lesion gradually disappeared without further incident.

DISCUSSION

There is no doubt that propyl thiouracil is effective in controlling thyrotoxicosis. The potency of propyl thiouracil is about four times that of methyl thiouracil, and, on the whole, the lag between the beginning of treatment and response is about the same with both drugs. Astwood and Vanderlaan (1945), who used smaller doses, concluded that on a weight basis propyl thiouracil was about five times as potent as thiouracil.

The therapeutic efficacy of propyl thiouracil is further reflected in its ability to restore to normal sinus rhythm 4 of 6 patients with auricular fibrillation. These results are comparable with the effects already described for thiouracil (Wilson 1946). Evidence is increasing that the anti-thyroid substances offer a reasonable chance of restoring normal rhythm in such patients; and, in view of the relatively poor results with digitalis in cases unsuitable for operation, the thiouracil derivatives merit further trial.

In the present trial, which included 2 patients with retrosternal goitre, no thyroid hyperplasia has been seen as a result of treatment. Due appreciation of the mechanism of thyroid hyperplasia should be reflected in the avoidance of overdosage with the thiouracil derivatives.

The range of maintenance dosage so far used is 25–75 mg. daily. It is possible that continuous treatment for a longer period than has been used in these patients will lead to the use of a smaller daily dose. At present this range is about the same as that found to be effective by Astwood and Vanderlaan (1945).

Toxic effects have been observed in one patient treated with propyl thiouracil, but the number of cases is smaller and has been observed for a shorter period than those treated with methyl thiouracil. There is thus no outstanding point of difference between these two anti-thyroid substances; and, if consideration is given to the fact that propyl thiouracil is more difficult to manufacture (Bavin 1947), there is at present no indication that propyl thiouracil should replace methyl thiouracil in the treatment of thyrotoxicosis.

TABLE II—COMPARISON OF RELIEF OF SIGNS AND SYMPTOMS OF PRIMARY AND SECONDARY THYROTOXICOSIS IN DAYS AFTER TREATMENT WITH PROPYL THIOURACIL 150 MG. DAILY

Signs and symptoms	Primary (5 cases)		Secondary (6 cases)	
	Average	Range	Average	Range
Subjective improvement; restlessness relieved	5	4–9	4	3–5
Skin flush controlled	8	4–13	5	4–6
Sweating controlled ..	10	6–13	6	4–9
Tremor diminished ..	10	7–17	9	5–18
Gain in body-weight..	8	6–10	13	7–18
Tachycardia controlled	13	4–30	11	4–23

SUMMARY

The results of treating 16 cases of thyrotoxicosis with propyl thiouracil for periods of up to nine months have shown that this drug is about four times as potent as methyl thiouracil.

The response to propyl thiouracil is not more rapid than that to methyl thiouracil, and the maintenance dose is slightly greater for propyl thiouracil.

Thyroid hyperplasia has not been observed with the doses used.

Toxic effects on the skin were seen in one patient after seven weeks' treatment with propyl thiouracil.

There is no evidence that patients with secondary thyrotoxicosis respond less effectively than do those with primary thyrotoxicosis.

There is no evidence that propyl thiouracil has any outstanding advantage over methyl thiouracil in the treatment of thyrotoxicosis.

We wish to thank Prof. E. J. Wayne for the opportunities of studying the cases under his care; Prof. A. E. Barnes, Dr. A. G. Yates, Dr H. P. Brody, and Dr. A. W. Leishman for their valuable coöperation; and Messrs. Genatosan Ltd. for supplies of propyl thiouracil. Part of the expenses of this research were defrayed by a grant from the Medical Research Council to one of us (A. W.).

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TREATMENT OF FISTULA IN ANO

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When reviewing the cases which have come under my care during some forty years of surgical practice, I was struck by the fact that, of all the different conditions with which I have been called on to deal, fistula in ano has always ranked as one of the most difficult and tedious. This is largely because there is no certain means of curing it, and success can be achieved only by patience and close attention to detail. This mainly applies to bad cases of fistula, of which no doubt I have had a disproportionate number.

The treatment of fistula in ano has never received the attention it seems to deserve in surgical textbooks and in the teaching of the medical schools. In the early days of surgery it was considered incurable, and even today, judging from the many cases operated on several times without success, it seems that the treatment is still far from satisfactory and the principles of successful treatment not well understood.

The first known treatise on a special surgical subject was one dealing with fistula in ano—a small book, or rather parchment, written by John of Arderne in A.D. 1349 at the time of the Black Prince. John of Arderne practised at Newark. He was a bold and able surgeon with a considerable reputation. He describes his method of dealing with fistula in great detail and recounts the steps of the operation by which he cured Sir Adam Everingham of a grievous fistula. His fee was £70, and the purchasing power of money was then much greater than it is today. Arderne's operation was sound in principle, even judged by modern standards. He did not use the actual cautery or caustic dressings as did many of his contemporaries.

In the early part of last century the treatment of fistula was so unsatisfactory in the general hospitals of London that David Salmon was induced to found St. Mark's Hospital (at that time in Aldersgate Street) for the special purpose of relieving poor persons afflicted with the condition.

PRINCIPLES OF OPERATION

A bad case of fistula in ano presents the surgeon with one of his most tricky problems. There is no set operation, so each case has to be studied and a suitable procedure planned. The personal attention of the surgeon who performs the operation should be given to the after-treatment of the case. I have never undertaken an operation for fistula unless the circumstances allowed of my being able to supervise personally the postoperative treatment.

There are some general principles which should be carefully observed. First, it is very unwise to operate for the cure of a fistula when any acute sepsis or an undrained abscess is present. The proper procedure is to lay open and thoroughly drain any abscesses or septic foci and postpone the real operation until all acute sepsis has subsided. This means delay, and it should be explained to the patient that the cure of a fistula is a slow process and cannot be hurried.

Unless the fistula is a simple one, the main track communicating with the rectum, which, however complicated the whole lesion may be, is almost invariably single, should be left to be divided at a subsequent operation, attention being confined to freely opening up all the secondary tracks to provide free drainage throughout the healing process. All tracks should be made to communicate with each other to form one large open wound. It is often difficult because of their complexity to trace the fistulous tracks with a probe, and a better method is to feel for them in the thickness of the tissues with one finger in the rectum.

A very careful search should be made to discover if there is a deep cross track behind the anal canal. Such a track is often present, and if it remains undetected and undrained is a common cause of non-healing of the wound.

There should be no hesitation in cutting away unhealthy tissue or overhanging skin edges. Deformity of the parts is much more likely to result from not cutting away enough skin than from cutting away too much.

If the tracks are freely opened and the skin edges and all unhealthy tissue cut away to provide really free drainage, there is no necessity to pack the wounds with wool or gauze at the end of the operation. They are best left wide open to drain into a large flat dressing. Hæmorrhage must be stopped with ligatures or by the application of hot swabs. This procedure does away with the subsequent necessity of pulling out a lot of adherent packing, and besides saving the patient much pain and discomfort allows the granulating surfaces to form without disturbance. After the wound has granulated, light packing with wool may be used. It should be placed in position dry and then damped with castor oil. The dressing should be done twice daily after all packing has been removed and the patient has had a soak in a hot bath. There is no point in using antiseptics at this stage; they delay healing by damaging the granulations. The use of sulphanilamide powder at the time of operation may, however, check sepsis and hasten the formation of healthy granulations.

At the end of a fortnight or three weeks the patient should be again anæsthetised and the main track communicating with the rectum freely divided to leave a free opening between the wound and the interior of the anal canal.

The surgeon should himself do the dressing at least once a week to satisfy himself that the deep parts of the wound are healing correctly and that no pockets have formed. Any pockets or fresh tracks which form during healing should be at once opened and drained.

In the vast majority of fistulæ the deep track communicating with the rectum is single and situated on the posterior wall of the anal canal. I once saw a patient at St. Mark's Hospital with eighteen external fistulous openings spread about all over both buttocks, but there was only one track communicating with the bowel posteriorly. Very occasionally the deep track is situated to one side of the bowel and passes deep to the external sphincter. In such a case the muscle must not be divided at the first operation, or the ends will be drawn apart, and serious and probably permanent incontinence will result. The external tracks should be divided and the muscle left bridging the wound. After two or three weeks the muscle ends will be firmly held in the scar tissue and the muscle may be divided without fear of the ends retracting.

Except for getting up daily for a bath, &c., the patient should stay in bed till all the wounds are healed. If he is allowed to get up too soon, healing will probably be greatly delayed.

INCURABLE FISTULÆ

Not all fistulæ are curable, though the great majority are. In a long experience I have met with only two really incurable cases. In both there was a deep track some 6 in. long passing up to one side of the rectum and communicating with an abscess cavity inside the prostatic capsule. There was in both cases reason to believe that the original lesion was a prostatic abscess. Without removing the greater part of the prostatic gland an operation to cure the condition was not possible, and in neither case was it attempted. The subsidiary tracks were dealt with in the usual way and the prostatic track opened up as much as possible to allow a large-bore drainage tube to be introduced. This tube was arranged so as to be self-retaining and was kept in place for several years, *being changed twice daily*. The ultimate result in both cases was that the prostatic track became completely lined with epithelium and formed a permanent drain which required no attention. Though this may not seem an ideal method of dealing with such a fistula it resulted in a patient who had previously suffered from constant attacks of acute sepsis and abscess remaining quite comfortable and free from such attacks.

NEOANTERGAN IN THE TREATMENT OF URTICARIA

REPORT ON 14 CASES

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THE work of Best, Dale, Dudley, and Thorpe (1927) established beyond reasonable doubt that normal living tissues contain histamine. Since similar symptoms were produced by a histamine injection and by an anaphylactic reaction Dale (1929) argued that histamine was probably the cause of anaphylaxis, the source of the histamine being the tissues themselves. Lewis's (1927) studies of the blood-vessels of the human skin and their responses led him to conclude that as the result of irritation a histamine-like substance was released from living cells. Since then repeated efforts have been made to discover histamine antagonists in the twofold hope that they would counteract the effects of anaphylaxis and allergy and increase our knowledge of these states.

The early anti-histamine compounds (Fourneau and Bovet 1933, Staub and Bovet 1937, Staub 1939) were all too toxic for clinical use, but in 1942 Halpern described results with a new series of compounds, the most active of which were labelled '2325 R.P.' and '2339 R.P.' The latter was named 'Antergan' and found to be much more specific against histamine than any previously discovered compound. Halpern found that very small amounts inhibited the contraction of guineapig gut induced by histamine, and he postulated that the drug does not prevent the release of histamine or influence its destruction, but modifies the tissues so that histamine is incapable of producing its customary effects.

Antergan was used by Gaté et al. (1942) with good results in urticaria, eczema, and asthma, but mild toxic effects were noted in some cases, mainly nausea, headache, vertigo, and rarely vomiting.

In 1944 Bovet reported experimental findings with a pyridine derivative of antergan ('2786 R.P.'), called by the manufacturers 'Neoantergan.' The drug used in the study reported here is the malleate of neoantergan—'Anthisan' (M. & B.).

Dews and Graham (1946) confirmed Bovet's main findings and noted several other actions of neoantergan. It is a local anæsthetic three times as potent as procaine. It has a quinidine-like action on the auricle twice as strong as that of quinidine, and it abolishes the stimulant action of histamine on cardiac tissue, the dilator action of the drug on coronary vessels, and its constrictor effect on the vessels of the rabbit's ear. Neoantergan is also a mild analgesic and is a feeble antagonist to acetylcholine on the rabbit's intestine.

Pellerat (1946), reviewing the clinical use of anti-histamine substances, states that benefit may be evident on the first, second, or third day after the beginning of treatment. If there is no improvement after three days the drug should be stopped. He found that children tolerated anti-histamine drugs very well, and gave infants 0·15 g. per day, children under five years 0·15–0·3 g., and children over five years, 0·3–0·6 g. He gave adults 0·6 to 1 g. in the twenty-four hours. Of the urticarias in his series 80–90% were "cured," and with neoantergan a well-marked improvement in 45% of cases of asthma was claimed. Cases of hay-fever and rhinorrhœa were strikingly benefited. The main side-effects noted were anorexia or nausea, which could be minimised by giving the drug with sugar and water or with sodium bicarbonate. Other side-effects were headache, dizziness, lassitude, sleepiness, palpitation, and slight anxiety; rarely vomiting or drug fever. Decour (1945) found that neoantergan had no effect on the hydrochloric acid content of the gastric juice, or on the gastric response to histamine. His patients were given neoantergan in full dosage for several months without untoward results

We have used anthisan (neoantergan malleate) in the treatment of allergic conditions since November, 1946. Only the effects in selected cases of urticaria and angioneurotic œdema will be discussed here; its use in the treatment of asthma and other presumed allergic states will be published later.

CASE-RECORDS

Case 1.—A married woman, aged 47, developed urticaria for no obvious reason in December, 1946. From then until her admission to hospital in March, 1947, she was never free from urticarial lesions. The condition was very much worse at night, and whereas at first it only affected her limbs and trunk it later involved her face, eyes, ears, and tongue *There was no family history of allergy.* In 1945 a subtotal thyroidectomy had been performed for thyrotoxicosis, with good result.

Electrocardiographic examinations carried out before antihistamine treatment was begun and again while the patient was having 0·5 g. of anthisan daily gave no evidence of a quinidine-like effect. The patient had a histamine fast achlorhydria. The anthisan had no effect on the blood-pressure or on the differential white-cell count. There was no eosinophilia at any time.

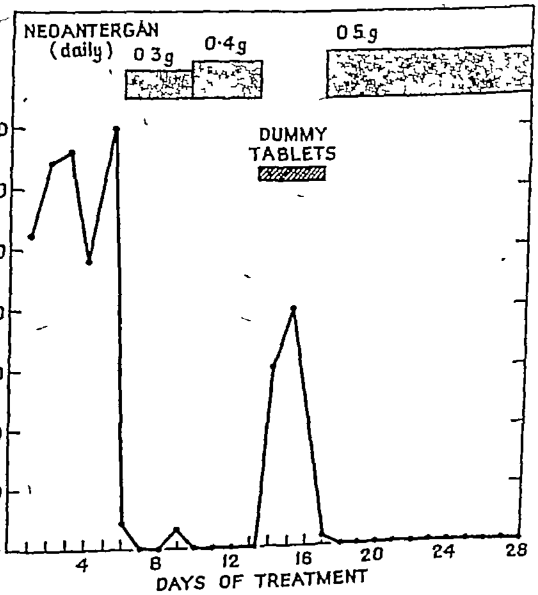

Fig. 1—Case 1. Urticaria treated with anthisan: note recurrence when dummy tablets were substituted.

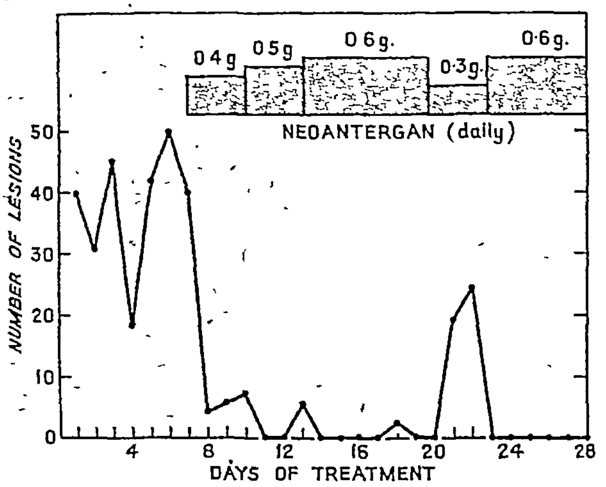

Fig. 2—Case 2. Urticaria treated with anthisan. A daily dosage of 0·6 g. was required for complete relief.

The patient continued taking 0·5 g. of anthisan daily for a month with no increased tolerance to the drug. The effect on the lesions is shown in fig. 1. When she was put on dummy tablets the lesions seemed to be more severe than they had been before treatment. During the second month of treatment she had only 4 small urticarial patches which came out at 8 A.M. on the days when she was late in taking her morning dose.

She was sleepy on the first day of anthisan treatment, but otherwise there were no side-effects.

Case 2.—A married woman, aged 49, had an attack of urticaria in 1917 and again in 1921, both seemingly precipitated by tinned milk. Thereafter by avoiding tinned milk she kept free from urticaria until April, 1946, when she had a severe attack which lasted for ten days. On this occasion there was no possible association with milk, and thorough investigation revealed no cause for the attack. Her general health had been good, though she had gone through a period of nervous strain because of the sudden serious illness of her husband. Further urticarial attacks occurred in June, 1946, and from that time until her admission to hospital on March 4, 1947, she was never free from lesions for more than an hour day or night. During these months she had been given autohæmotherapy, bowel wash-outs, and ephedrine without result. An attempt to desensitise her with a histamine azoprotein ('Lertigon') was made without benefit. After this, 'Benadryl,' in a dosage of 50 mg. three times a day for six weeks, produced no improvement.

During treatment with anthisan no abnormality of white cells was noted, and an electrocardiogram done before and during anti-histamine treatment showed no quinidine-like effect. The effect on the lesions is shown in fig. 2. The lesions which appeared while the patient was taking anthisan were not itchy, and were retrogressive, fading within an hour or two. The patient's final dosage was 0·6 g. daily. When seen a month later she had had small retrogressive urticarial patches on two occasions only.

The patient had some transient nausea for two days after leaving hospital. She had one attack of breathlessness during treatment associated with some bronchial spasm which lasted for two hours. No other side-effects were noted apart from a slight lassitude.

Case 3.—A man, aged 52, developed angioneurotic œdema in 1938. Before that he had suffered from severe hay-fever. The attacks of angioneurotic œdema became more frequent and severe, until by 1945 lesions were appearing every two or three days in all parts of the body including the tongue and eyes. Sometimes the patient's whole arm would be swollen right down to the finger-tips, and he found that pressure on the skin by sock-suspenders or tight clothing would bring out a lesion in that area; excitement and nervous strain had the same result. Between 1945 and 1947 he had various forms of treatment. Ephedrine and adrenaline modified the condition, but he was never entirely free from symptoms and severe lesions would appear at intervals of three days to three weeks. A course of autohæmotherapy and bowel wash-outs produced little improvement but there was some definite improvement with lertigon. After 11 injections, however, he began to have so sharp local reactions to lertigon that this treatment had to be stopped.

Anthisan was strikingly successful in this case (fig. 3). When the patient had been entirely free from urticaria for a month as the result of treatment with the drug as an outpatient he was admitted to hospital and treatment was stopped. There was an immediate recurrence of angioneurotic œdema within 17 hours. Dermatographism was pronounced when he was taking dummy tablets. When anthisan was resumed he felt slightly sleepy and his mouth was dry, but there were no other side-effects. The dosage required to keep this patient completely free varies from 0·6 g. to 0·8 g. daily.

The other 5 cases of chronic urticaria treated with anthisan were all improved. Three were completely controlled with 0·6 g. anthisan a day. These patients received 0·1 g. at 8 A.M., 0·2 g. at 2 P.M., 0·1 g. at 5 P.M., and 0·2 g. at 10.30 P.M. It was found that complete control could be achieved with the minimum amount of drug if the dosage was spaced out in this way. These patients manifested the same mild side-effects which have already been mentioned. In addition one of them had a single asthmatic attack during the second month of treatment; she had never previously suffered from asthma. In the fourth case the lesions were modified in number and size with 0·3 g. a day, but the patient had so much dizziness and nausea that the drug could not be given in larger dosage. The fifth case was partially controlled with 0·8 g. anthisan in the day.

Six cases of acute urticaria were treated with definite and even dramatic results. In 2 of these benadryl in full dosage had previously produced no benefit. Five of them were cases of penicillin urticaria and in 2 of these treatment was successful even though the penicillin was continued. They required between 0·6 and 0·8 g. anthisan a day. Skin irritation disappeared within an hour and the urticaria had practically gone within three hours. In 3 of the cases the anthisan was withdrawn at the end of twenty-four hours with a return of skin irritation and urticaria, but these disappeared quickly again when anthisan was administered once more. In all these cases the treatment was stopped at the end of seven days without any recurrence of urticaria.

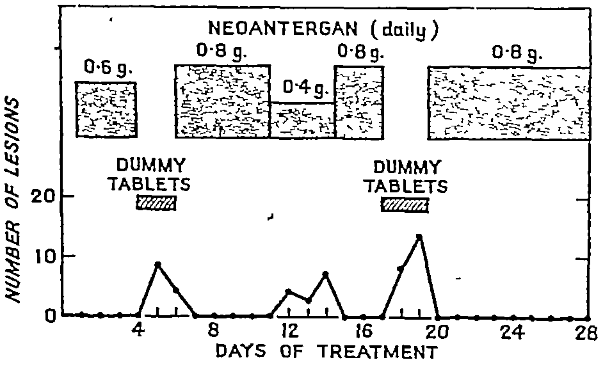

Fig. 3—Case 3. Angioneurotic œdema treated with anthisan. Note recurrence on substituting dummy tablets or reducing dosage below 0·8 g. daily.

In 3 of the acute cases the only side-effect noted was sleepiness. Two others had in addition dryness of the mouth and dizziness. One had a severe reaction with collapse, hypotension, diarrhœa, and intense nausea within an hour of 0·05 g. of anthisan being given subcutaneously; a single dose of 0·1 g. by mouth later produced a similar, though less severe, effect. This patient had fleeting joint pains while the drug was being given.

SUMMARY

Eight cases of chronic urticaria and angioneurotic œdema were treated with the anti-histamine drug,

anthisan (neoantergan malleate). The dosage required was between 0·3 and 0·8 g. a day, given in divided doses. Most of these cases were well controlled and had only mild side-effects. Once the required dosage was established increased tolerance to the drug was not observed in the first three months of treatment. Removal of the drug or reduction of the dosage was followed within ten hours to four days by a recurrence of chronic urticaria.

Six cases of acute urticaria were treated, 5 of them the result of sensitisation to penicillin, and in 2 of these the urticaria was controlled even though penicillin treatment was continued. If this effect is confirmed it will allow penicillin therapy to be continued even in patients who manifest severe urticarial reactions.

The commonest side-effects noted were sleepiness, mild headache, nausea, and dizziness. In the main they were not severe. Two patients had a single asthmatic attack during treatment. One severe toxic reaction to parenteral therapy was observed, and it is suggested that in the present state of our knowledge the drug should be administered by mouth only. It is proposed that the initial dosage should be 0·1 g. three times a day and that this should be increased as required to a maximum of 1 g. a day.

Grateful acknowledgment is made to Prof. D. M. Dunlop for his advice and criticism, and also permission to publish his case-records. We are indebted to Messrs. May and Baker Ltd. for supplies of tablets of anthisan.

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SHRAPNEL SHOT THROUGH THE PLACENTA

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DURING the Palestine disturbances in August, 1939, a woman, aged 24, a primipara nearing term, sustained an injury from the explosion of a nearby bomb. She felt a sharp pain in the abdomen, walked on a little way, and then collapsed. In this condition she was brought to the hospital.

On the right hypogastrium, below the umbilicus, four wounds were visible, the largest of them about 2 cm. in diameter. The innocuous external appearance of the injuries contrasted with the serious general condition. The patient was very anæmic and covered with cold sweat; the pulse was rapid and feeble. All the symptoms pointed to an internal hæmorrhage. The fœtal heart was not distinctly heard, and it was very doubtful whether the fœtus was living.

The patient was given an intravenous saline drip infusion and placed under ether anæsthesia. The abdomen was opened through a hypogastric longitudinal incision. The bomb shrapnel was found to have pierced the rectus fascia and muscle, leaving a large hole through which torn muscle protruded. There was considerable hæmorrhage.

When the peritoneum was opened, two perforations, each about 1 cm. in diameter, were found in the uterus. Blood and amniotic fluid dripped through the perforations. The abdominal cavity contained about 200 c.cm. of blood and amniotic fluid. The uterus was opened through a longitudinal incision. Its muscles had been much torn, with strips of muscle hanging loosely in the uterine cavity.

A male child was then extracted; the child was born in pallid asphyxia, which was relieved after treatment lasting 45 min. In other respects he had escaped unhurt.

The placenta was readily separable; it had been shot through near the edge. One of its blood-vessels had been perforated, from which extensive bleeding had taken place into the amniotic cavity.

After complete excision of all the torn tissues, the uterus was sutured in three layers, as in cæsarean section. The bladder had sustained no injury, and it was possible to cover the sutures with bladder peritoneum. No injury to intestines having been found, the peritoneum was closed. The torn soft tissues of the abdominal wall were excised, the skin perforations were sutured, and a drain was inserted.

The postoperative course was undisturbed except for an infection of the abdominal wall. The peritoneum gave no cause for concern. Four weeks later the patient was discharged.

Careful radiography had not revealed the shrapnel which must have entered the uterine cavity; it had doubtless been expelled thence through the vagina during the operation.

Had the patient not been pregnant, the shrapnel would undoubtedly have torn the intestines; but these were shielded by the uterus and the amniotic fluid. The fœtus therefore saved its mother.

We have kept the child under observation up to now; he has developed well physically and mentally.

Five years later, early in 1944, the patient consulted me for a missed menstruation. The Aschheim-Zondek hormonal pregnancy test was positive. The patient was aware that her pregnancy, in view of the severe uterine tear which she had sustained, entailed some danger, but she accepted the risk, as she very much desired a second child. She came to me for examination once a month. The pregnancy ran a normal course. At term the question arose whether a cæsarean section should be performed to avoid uterine rupture from the labour pains. In view of my experience in conservative myomectomy and of the favourable outcome of conservative management of delivery in cases so operated on,[1] I decided not to perform a cæsarean section. Labour ran a normal course and lasted only four hours. A healthy boy was born. The placenta was expelled spontaneously without difficulty.

PALUDRINE IN RELAPSING BENIGN TERTIAN MALARIA

FURTHER TRIALS

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LATE MAJOR R.A.M.C.

FOLLOWING the trials with 'Paludrine' already reported (Johnstone 1946a), a further series of cases of relapsing benign tertian malaria were treated at Colchester Military Hospital with paludrine and quinine combined. This treatment was thought to have distinct possibilities, in view of the similarity in action of paludrine and pamaquin. As before, a control series of cases treated with the standard quinine-pamaquin course were included in the investigations. Unfortunately the number of admissions to the malaria ward fell so considerably as the investigation progressed that it was finally decided to abandon the trials before an adequate number of cases had been treated. The results, however, seem worth recording.

Exactly similar precautions, admission to hospital, and follow-up were used as in the previous investigations.

In all, 61 cases were treated on the following courses, each course being used alternately:

(1) Quinine gr. 10 and pamaquin 0·01 g. t.d.s. for 10 days.
(2) Quinine gr. 10 and paludrine 0·25 g. t.d.s. for 10 days.

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[1] Zondek, B. *Harefuah*, 1936, **11**, 1; *Surg. Gynec. Obstet.* 1939, **69**, 214.

The final follow-up in these cases includes 29 cases of each series, two patients having failed to report in spite of repeated requests, and one patient having been accidentally killed before the end of the six-month period. The table shows the results obtained in the 58 cases successfully followed for six months.

RESULTS OF TREATMENT

Course	No. of cases	No relapse	Proved relapse	Clinical relapse*	Percentage of proved relapses	Percentage of total relapses
Quinine and paludrine	29	18	3	8	*10·3*	*37·9*
Quinine and pamaquin	29	24	2	3	*6·9*	*17·2*

* The criteria of clinical relapse include the history of a rigor and a tertian periodicity of symptoms.

The factors which may have influenced the results have been briefly compared in the two series.

(1) The average intervals between the date of arrival in the U.K. and the date of admission to hospital were for quinine-paludrine 4·8 months, and for quinine-pamaquin 4·1 months.

(2) The probable areas of infection were as follows:

	India-Burma		*Far East (P.O.W.)*		*Other areas*
Quinine-paludrine ..	24	..	4	..	1
Quinine-pamaquin ..	20	..	4	..	5

The fact that each series contains equal numbers of patients who had been in captivity in the Far East obviates any possible bias due to the higher relapse-rate that is to be expected in that group.

(3) The average intervals between treatment and further relapse were for quinine-paludrine 3·6 months, and for quinine-pamaquin 3·7 months.

It was previously thought that paludrine possibly gave a longer period of freedom from relapse than did the combined pamaquin-quinine treatment (Johnstone 1946a). This suggestion is not borne out by the present investigation, in spite of the fact that the dosage of paludrine was larger than in the previous investigation.

(4) As would be expected, no difference was noted in the rapidity with which the temperature fell to normal in the two series, since both received equally large doses of quinine.

CONCLUSIONS

This series is too small for conclusions to be drawn regarding an exact relapse-rate, but the results indicate that paludrine with quinine is not so effective as pamaquin with quinine for controlling further relapses of benign tertian malaria.

The possibility that paludrine may have a synergistic action similar to that of pamaquin has not been confirmed.

The results obtained in the quinine-pamaquin series closely approximate to those previously reported (Johnstone 1946a and b, Malaria Committee 1945), and the quinine-paludrine results are very similar to those found with paludrine alone (Johnstone 1946a), mepacrine (Malaria Committee 1945), and '4430' (Johnstone 1946b).

I wish to thank Major-General Sir Alexander Biggam for permission to publish this paper; and many members of the staff of the Colchester Military Hospital for their help. I am indebted to Imperial Chemical (Pharmaceuticals) Ltd. for the supplies of paludrine.

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Reviews of Books

Renal Diseases

E. T. BELL, M.D., professor of pathology, University of Minnesota. London: H. Kimpton. 1946. Pp. 434. 35*s*.

Professor Bell's renown as a morbid anatomist and his special interest in the kidney are well known; his monograph, besides surveying the literature of both medical and surgical diseases of the kidney, contains a detailed analysis of renal cases in a series of 32,360 autopsies, with statistics and numerous case-records. It is primarily an exposition of pathological findings and their interpretations, and it is well illustrated with 117 photographs and 4 colour plates, all original, well chosen, and germane. The section on tubular disease is disproportionately short, perhaps because Dr. Bell is interested mainly in the glomerular basement-membrane (as his good account of the diabetic kidney shows). He hopes, he says, to encourage closer coöperation between pathologist and clinician; and if pointing out the gaps and contradictions in our knowledge of function will help to fill and resolve them, the book should fulfil its purpose. At present we know little of the functional aspects of renal disease, except in essential hypertension. and it is inevitable that the chapters on function and functional disturbances (" extrarenal azotæmia ") should be less satisfactory than the rest. Clinicians will regret the absence of clinical charts or diagrams, and the scanty reference to the grosser biochemical disturbances; and English readers will be surprised to find no mention of the work on nephritis of Ellis, Evans, and Wilson. Despite these minor criticisms the book is a stimulating achievement.

Ranson's Anatomy of the Nervous System

(8th ed.) Revised by SAM LILLARD CLARK, M.D., PH.D., professor of anatomy, Vanderbilt University, Nashville. Philadelphia and London: W. B. Saunders. 1947. Pp. 532. 32*s*. 6*d*.

IT is a difficult task to take over the revision of an established textbook which is stamped with the individuality of its creator. In the 8th edition of " Ranson " Dr. Clark has succeeded in revising and even improving a good book while preserving its distinctive approach to the subject. The matter has been to some extent rearranged, and gross descriptive anatomy is now collected into one section. A new set of illustrations made from parasagittal sections makes it possible for the reader to picture the structures of the brain-stem in three dimensions. The whole book has been revised to include the results of recent research. It is doubtful whether the addition of a chapter of clinical illustrations was worth the space, for the comments are necessarily sketchy and there are already plenty of books dealing with the applied anatomy and physiology of the nervous system. The statement that the posterior columns of the spinal cord conduct sensory impulses serving tactile discrimination and localisation is based on Head's views; but, as Walshe has pointed out, these activities are not forms of sensibility but judgments, and cannot be assigned to tracts in the spinal cord.

Heparin in the Treatment of Thrombosis

An account of its chemistry, physiology and application in medicine. (2nd ed.) J. ERIK JORPES, M.D., reader in biochemistry, Caroline Institute, Stockholm; foreword by Prof. J. R. LEARMONTH, CH.M. London: Oxford University Press. 1947. Pp. 260. 18*s*.

JUST before and during the war, interest in the possible treatment of thrombosis by anticoagulants was stimulated by the production of heparin on a commercial scale in Canada and Sweden. Venous thrombosis, long known as a cause of surgical tragedies, is now recognised as being just as common an agent of sudden death in the medical wards. It is among the dangers of taking to one's bed for any illness; and is responsible, too, for much disability from swollen legs, and for pleural pain and breathlessness. Even when emboli appear it may not be easy to locate their source; the process begins in the deep veins of the calf in almost every instance, and emboli have usually appeared before the leg begins to swell. Tenderness in the calf is taken to be an early sign, especially when accompanied by mild fever.

This book gives an excellent account of the great advances made in Sweden on the study of the chemistry, mode of action, and clinical use of heparin. There is little doubt that heparin shortens the course and diminishes the incidence of complications of venous thrombosis. Jorpes states that, on the average, rest in bed is reduced from 5 weeks to 9 days, and duration of fever from 3 weeks to 7 days, and that further pulmonary emboli rarely occur in patients treated with heparin. His monograph is fully documented and should be carefully considered in Britain, where we have had little opportunity to do much in the way of active treatment for thrombosis along these lines. The amounts of heparin required may cost up to £20 or more per patient, but the Swedish results, if substantiated, would certainly suggest the expense is justified. The cheaper method of using dicoumarol is much more risky and seems to be less satisfactory.

A Descriptive Atlas of Radiographs

(6th ed.) A. P. BERTWISTLE, M.B., F.R.C.S.E. London: H. Kimpton. 1946. Pp. 606. 45*s.*

THE author states that this atlas is primarily designed for the clinician, to whom knowledge is presumably denied by a number of "vociferous radiologists who wish to keep radiology as a closed art, a mystic rite." There are 947 illustrations, most of which are accompanied by a short text. Some of the illustrations are good, some are indifferent, and a regrettable number are of such ancient vintage that text and picture cannot be correlated even by a radiologist. The text is scrappy and makes no attempt at differential diagnosis. Unfortunately some pictures are open to an interpretation different from the author's; accompanying a normal chest picture is the alarming mis-statement that the "older view that the lung markings were due to the pulmonary vessels can be discountenanced definitely." An atlas of X-ray pictures could be very helpful to both student and general practitioner, but this one requires more critical revision.

Buchanan's Manual of Anatomy

(7th ed.) Editor: F. WOOD JONES, D.SC., F.R.C.S., F.R.S., professor of anatomy, Royal College of Surgeons of England. London: Baillière. 1946. Pp. 1616. 45*s.*

THE student, as we have remarked,[1] can make use of three kinds of anatomy textbook—a small concise dissecting manual which can be thrown away when dirty and done with, a larger book giving a coherent account of the systems rather than the regions of the body, and a big work of reference which both he and his teachers can consult at need. "Buchanan's Anatomy" falls into the class of the reference work.

After an interval of nine years a new edition appears under the editorship of Professor Wood Jones, the revision of the various sections having been deputed to members of the department of anatomy at Manchester University. As hitherto, the book deals mainly with topographical anatomy on a regional basis, but there are innovations. Some, such as a series of radiographic illustrations, will certainly be approved; but others may disappoint those acquainted with previous editions. The introductory section on embryology and the descriptive accounts of organogenesis have been almost eliminated, and histology has been greatly reduced—sometimes inconsistently, as when the minute structure of the cerebellar cortex, but not the cerebral, is described. Nearly all the original drawings of Buchanan's Anatomy have been restored, supplemented by almost 200 new diagrams; but the removal of *all* colour (on the ground that colour is unnecessary and sometimes misleading) has made some of the diagrams less effective. The text still contains much of the sort of topographical detail which many anatomists feel might with advantage now be discarded in a reference work used chiefly by students. Certainly there are few items of anatomical topography of which a knowledge may not be of *some* value at *some* time to the practising clinician; but if our physiological colleagues adopted the same principle in planning their curriculum, the medical student would face a textbook of physiology about the size of the *Encyclopædia Britannica*. In any case the medical student is unlikely to make much practical use of such things as the chorda obliqua posterior, the external petrosal nerve (which is stated to be "of doubtful existence"), or the transversus nuchæ muscle.

More eponyms have led to multiplication of terms, which some will feel imposes an unnecessary strain on memory; but the perverse fact is that an eponym often strikes into the mind better than a more logical name. Miss Dobson's biographical notes, at the end of the book, refresh their interest, though perhaps there are rather too many of them.

Textbook on the Nursing and Diseases of Sick Children (4th ed. London: H. K. Lewis, 1947. Pp. 744. 30*s.*).—The new edition of the textbook for nurses, edited by Prof. Alan Moncrieff, has just appeared. It will be welcomed by sister-tutors and student nurses, in orthopædic as well as children's hospitals.

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[1] *Lancet*, 1944, i, 569.

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GLAXO LABORATORIES LTD · GREENFORD · MIDDLESEX · BYRon 3434 swell. Tenderness in the calf is taken to be an early sign, especially when accompanied by mild fever.

This book gives an excellent account of the great advances made in Sweden on the study of the chemistry, mode of action, and clinical use of heparin. There is little doubt that heparin shortens the course and diminishes the incidence of complications of venous thrombosis. Jorpes states that, on the average, rest in bed is reduced from 5 weeks to 9 days, and duration of fever from 3 weeks to 7 days, and that further pulmonary emboli rarely occur in patients treated with heparin. His monograph is fully documented and should be carefully considered in Britain, where we have had little opportunity to do much in the way of active treatment for thrombosis along these lines. The amounts of heparin required may cost up to £20 or more per patient, but the Swedish results, if substantiated, would certainly suggest the expense is justified. The cheaper method of using dicoumarol is much more risky and seems to be less satisfactory.

A Descriptive Atlas of Radiographs

(6th ed.) A. P. BERTWISTLE, M.B., F.R.C.S.E. London: H. Kimpton. 1946. Pp. 606. 45*s.*

THE author states that this atlas is primarily designed for the clinician, to whom knowledge is presumably denied by a number of "vociferous radiologists who wish to keep radiology as a closed art, a mystic rite." There are 947 illustrations, most of which are accompanied by a short text. Some of the illustrations are good, some are indifferent, and a regrettable number are of such ancient vintage that text and picture cannot be correlated even by a radiologist. The text is scrappy and makes no attempt at differential diagnosis. Unfortunately some pictures are open to an interpretation different from the author's; accompanying a normal chest picture is the alarming mis-statement that the "older view that the lung markings were due to the pulmonary vessels can be discountenanced definitely." An atlas of X-ray pictures could be very helpful to both student and general practitioner, but this one requires more critical revision.

Buchanan's Manual of Anatomy

(7th ed.) Editor: F. WOOD JONES, D.SC., F.R.C.S., F.R.S., professor of anatomy, Royal College of Surgeons of England. London: Baillière. 1946. Pp. 1616. 45*s.*

THE student, as we have remarked,[1] can make use of three kinds of anatomy textbook—a small concise dissecting manual which can be thrown away when dirty and done with, a larger book giving a coherent account of the systems rather than the regions of the body, and a big work of reference which both he and his teachers can consult at need. "Buchanan's Anatomy" falls into the class of the reference work.

After an interval of nine years a new edition appears under the editorship of Professor Wood Jones, the revision of the various sections having been deputed to members of the department of anatomy at Manchester University. As hitherto, the book deals mainly with topographical anatomy on a regional basis, but there are innovations. Some, such as a series of radiographic illustrations, will certainly be approved; but others may disappoint those acquainted with previous editions. The introductory section on embryology and the descriptive accounts of organogenesis have been almost eliminated, and histology has been greatly reduced—sometimes inconsistently, as when the minute structure of the cerebellar cortex, but not the cerebral, is described. Nearly all the original drawings of Buchanan's Anatomy have been restored, supplemented by almost 200 new diagrams; but the removal of *all* colour (on the ground that colour is unnecessary and sometimes misleading) has made some of the diagrams less effective. The text still contains much of the sort of topographical detail which many anatomists feel might with advantage now be discarded in a reference work used chiefly by students. Certainly there are few items of anatomical topography of which a knowledge may not be of *some* value at *some* time to the practising clinician; but if our physiological colleagues adopted the same principle in planning their curriculum, the medical student would face a textbook of physiology about the size of the *Encyclopædia Britannica*. In any case the medical student is unlikely to make much practical use of such things as the chorda obliqua posterior, the external petrosal nerve (which is stated to be "of doubtful existence"), or the transversus nuchæ muscle.

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[1] *Lancet*, 1944, i, 569.

THE LANCET

LONDON: SATURDAY, MAY 17, 1947

Infection by Injection

There is no form of anæsthesia which does not carry some risk to the patient's life or health; and often the risk is from infection. With inhalation anæsthesia the infection seldom comes from without: postanæsthetic pneumonia is endogenous. But whenever anæsthesia or analgesia is induced by injection there is a chance of introducing fresh organisms into the body; and though cases that "go wrong" are not often published, pathologists are only too familiar with unfortunate complications ranging from subcutaneous abscesses to meningitis.

The risk varies with the route. Intravenous injections are relatively safe, because the natural antibodies and complement of the plasma, aided by the reticulo-endothelial system, eradicate all but highly pathogenic forms introduced in large numbers. The pleural cavity is less well protected, when effusions are present, since in such cases antibody content is apt to be low. Subcutaneous injection, though infection is localised at first, is more dangerous, since the subcutaneous tissues are poorly supplied with blood. But intrathecal injection is the most dangerous of all. Normal cerebrospinal fluid (C.S.F.) contains negligible amounts of protein, and thus no natural antibodies: moreover, it has been noted that when spinal anæsthetics are injected there is usually a measurable rise in C.S.F. protein content, which, though insufficient to provide antibodies, makes the fluid a still better culture medium for organisms, even those not normally pathogenic. Cerebrospinal fluid is in fact so good a medium that an excellent method of isolating pathogens in meningitis is simply to incubate the fluid. From this it follows that spinal anæsthesia demands particularly rigid attention to aseptic technique, and though the records of failure are not at all complete they show that this attention is far from universal. Valuable warnings have been given by Wilson Smith and Muriel Smith,[1] by Frankis Evans,[2] by Vuylsteke,[3] and by Kremer,[4] who described 7 cases of meningitis in a Middle East hospital. Meningitis has also followed lumbar puncture for other purposes, and vertebral osteomyelitis is fairly common; rarely, meningitis complicates caudal anæsthesia.[5] A striking feature of most recorded infections is the presence of organisms of very low virulence, such as *Ps. pyocyanea*, *B. proteus*, fæcal streptococci, and coagulase-negative staphylococci. This again shows that more than ordinary care is required, since such organisms are widely distributed: they need not, indeed do not, come from an infected source. Also they happen to be the group of organisms against which even modern therapeutic methods are unavailing.

These risks are emphasised by the case of Voller *v.* Portsmouth Corporation and others, in which, as we recorded last week, Mr. Justice Birkett awarded damages of £12,000 against the corporation. The patient, a boy of 18, contracted *Ps. pyocyanea* meningitis after spinal anæsthesia with 'Nupercaine.' The judge was satisfied that the nupercaine was sterile, that the ampoule containing it did not convey the infection, and that the infection was not airborne and did not come from the skin of the administrator of the anæsthetic or the skin of the patient. He concluded that the infecting organisms were derived from the apparatus used for the injection—the syringe, needle, bowls of water, or other equipment. In evidence it appeared that the syringe and needle were "sterilised" by a chemical method, including the use of methylated spirit. It was agreed that the general condemnation of chemical sterilisation is of comparatively recent date, though Wilson Smith's 1941 paper in The Lancet was quoted as proof that the grave dangers of sepsis in spinal anæsthesia had been fully ventilated. The accident happened in 1944, but the judge felt that even at that time the technique used should have been better. Certainly there is no longer any excuse for ignorance of the essential factors in such infections. Wilson Smith found that some 40% of 223 unselected specimens of C.S.F. reaching the laboratory for bacteriological examination had been contaminated by non-pathogenic organisms, probably introduced from the "sterilised" water used for rinsing the syringes and needles employed for lumbar puncture. The Medical Research Council's War Memorandum no. 15 (1945) on the sterilisation of syringes, which severely criticises "chemical" sterilisation, states that even methylated spirit may contain organisms, and clearly lays down approved technique for sterilisation. Autoclaving, which is undoubtedly the best method, or adequate dry heat, is not always applicable to glass-metal syringes, though many will stand up to the necessary temperatures. Boiling, however, is within the scope of all; and boiling is perfectly satisfactory provided the syringes and needles do not remain in water exposed to the air, and are assembled with forceps or sterile gloves. It is very easy to contaminate a sterile syringe by immersing a hand in the water in which it has been sterilised.

It is clear that the formation of "syringe services" in all hospitals is urgently needed: that is to say, all syringes should be distributed already sterilised from the theatre. But much more knowledge is necessary, among doctors and nurses alike, of the meaning of "sterility." All should now be aware that there is no safe chemical method of sterilisation; that tap-water is not sterile; that water which has been autoclaved does not remain sterile when exposed to the air; and that the same syringes must not be used both for removing infected material and for spinal anæsthesia. Despite repeated and authoritative statements to this effect, individuals will always be found to quote their own immunity from catastrophe as proof of the unreliability of laboratory experiments and clinical experience. There is no room, however, for such self-satisfaction, and we trust that this Portsmouth case may lead to a continuous effort to re-educate nursing staff and doctors on the penalties of laxity.

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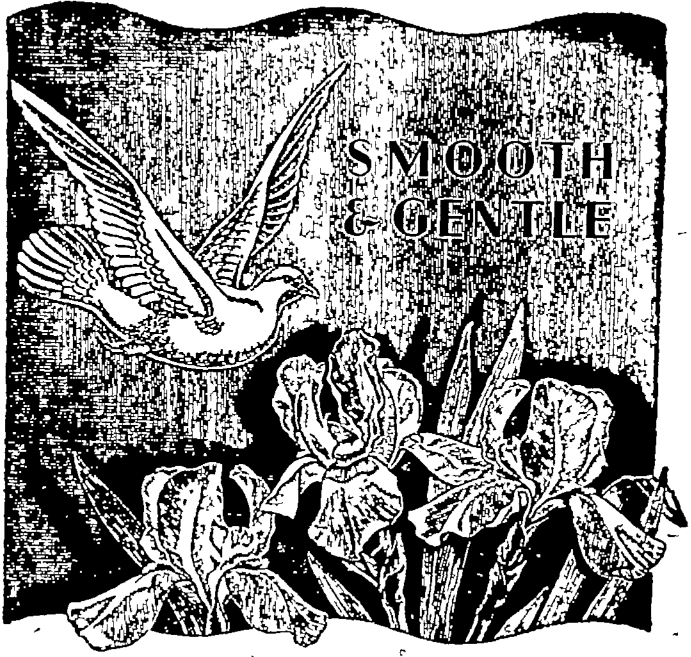
[1] Smith, W., Smith, M. *Lancet*, 1941, ii, 783.
[2] Evans, F. T. *Ibid*, 1945, i, 115
[3] Vuylsteke, C. A. *Brit. med J.* 1947, i, 170.
[4] Kremer, M. *Ibid*, 1945, ii, 309.
[5] Brown, W. W. jun. *Amer. J. Obstet. Gynec.* 1947, 53, 682.



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TELEPHONE: BISHOPSGATE 3201 (12 LINES) TELEGRAMS: "GREENBURYS BETH LONDON" infection the drug is of little value.[14] Benadryl is a cerebral depressant, and minor toxic effects such as lassitude, drowsiness, and giddiness are common, even with therapeutic doses of 25–50 mg. Other side-effects reported include hot flushes, dryness of mouth and nose, nausea, aggravation of existing headache or asthma, and, paradoxically, insomnia. Nervousness, difficulty in coördination, and epileptiform movements were noted in a boy aged $3^{1}/_{2}$ years being treated for hay-fever.[15] A young woman of 26 with dermatitis reacted to the drug in a shock-like manner,[16] and a girl of 18, who appears to have helped herself to 2000 mg. of benadryl in 48 hours, developed severe mental confusion and disorientation.[17] In view of these rare but alarming manifestations it is well to remember that histamine acid phosphate, in doses of 0·5 mg. intravenously, is a specific antidote to benadryl.

At about the time when benadryl was being introduced Mayer and his colleagues[18] produced 'Pyribenzamine,' which again closely resembles antergan in composition. This drug can protect animals against 60–120 times the lethal dose of histamine given intravenously, and so is about a hundred times as powerful as the early anti-histamine drugs Friedlaender and his colleagues[19] found that, in guinea-pigs, five or six times the lethal dose of histamine was needed to kill all animals protected with 3 mg. per kg. of benadryl or of antergan, whereas the same dose of pyribenzamine protected some animals against thirty-five lethal doses. Pyribenzamine has been highly effective in vasomotor rhinitis and hay-fever; it has given good results in urticaria and angioneurotic œdema, and has relieved itching in dermatitis; moderate relief has been claimed in chronic allergic rhinitis; but in asthma the results have again been poor.[20] The side-effects of pyribenzamine are similar to those of benadryl and are fairly common but mild.

Lately, Halpern and his colleagues[21] in France have introduced yet another group of anti-histamine drugs, this time derivatives of thiodiphenylamine, known as '3015RP' and '3277RP.' Experimentally these have been shown to be less toxic and very much more potent than the antergan group, and they have been successfully used in cases of urticaria.

Here, then, we have some new recruits to the élite class of specific remedies, and sufferers from hay-fever and the like are duly thankful. But it should not be forgotten that the anti-histamine drugs are at best only palliatives; they do not remove the need for attempts to recognise the allergen and eliminate it or to desensitise the patient. Nevertheless, in the hands of the research-worker, they may well lead to fundamental advances in the study of allergy. The drugs can be used to distinguish weals caused by release of histamine from those produced in other ways[22]; or to decide what elements of anaphylaxis are attributable to liberation of histamine from the tissues.[23] It has been found, too, that the drugs block all the actions of histamine except its stimulation of gastric acid secretion. This makes it possible to inject large doses of histamine plus an antagonist in experimental studies of peptic-ulcer production.[24] It also throws some light on the mode of action of the anti-histamine drugs. The mechanism is still doubtful; one view, based on the observation that the amount of histamine antagonised bears a quantitative relationship to the amount of anti-histamine drug injected,[25] is that the drugs compete with histamine for a site of action or receptive substance, in the same way as *para*-aminobenzoic acid competes with the sulphonamides.

Matters of Life and Death

We welcome the appearance of the text of the Registrar-General's *Statistical Review* for 1938 and 1939,[26] both for its account of the vital events of the last years of an uneasy peace, and even more for its commentary on the first fruits of the Population (Statistics) Act of 1938, whose inquisitorial nose was so firmly tweaked by Sir Alan Herbert. We may share A.P.H.'s distaste for the intrusion into private lives entailed by the questions about the dates of marriage and the birthdays of children, but this is certainly a case where the ends justify the means. These ends are quite clear. This country now faces the problem of an increasing proportion of older people with declining numbers of the young adults on whose working capacity the future depends. The problem stems from the low birth-rate between the two wars, culminating in 1939 when, with a rate of 15 births per 1000 of the population, we shared with France the melancholy distinction of the lowest rates in Europe. The post-war boom in the birth-rate, if it continues, will of course have its ultimate effect; but it will not tide us over the interim period until the children born in recent years attain maturity. As a profession we can do two things to minimise the seriousness of the situation now developing: we can blunt the worst effects of the inter-war lapse by reducing the mortality among potential mothers, and we can try to prolong the useful and happy working lives of older men and women. On the larger questions involved we must echo the cri-de-coeur of the R.A.F.—"give us the gen." For without the "general information," which only vital statistics can provide no decisive action is likely.

The marriage habits of a country tend to reflect the psychological reaction of the people to the social and economic conditions of the time. Marriage-rates, which were depressed during the slump years of 1926 and 1930–32, were rising steadily before the late war. Even more important was the fact that people were tending to marry younger. The favourable marriage position is indicated by a fall in the proportion of spinsters remaining unmarried—19% at age thirty and 11% at forty in 1938, instead of 32% and 20% at these ages in 1911. The reverse of the medal, however, is less cheerful. The new method of birth registration provides statistics to show that one in seven of the children now born in this country is the

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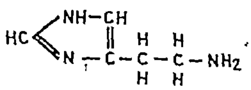
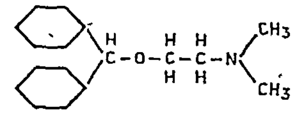
[14] Levin, S. J. *J. Allergy*, 1946, 17, 145.
[15] Well, H. R. *J. Amer. med. Ass.* 1947, 133, 393.
[16] Geiger, J., Rosenfield, S. Z., Hartman, D. L. *Ibid*, 1947, 133, 392.
[17] Borman, M. C. *Ibid*, 1947, 133, 394.
[18] Mayer, R. L., Huttrer, C. P., Scholz, C. R. *Science*, 1945, 102, 93
[19] Friedlaender, S., Feinberg, S. M., Feinberg, A. R. *J. Lab. clin. Med.* 1947, 32, 47.
[20] Feinberg, S. M., Friedlaender, S. *Amer. J. med. Sci.* 1947, 213, 68
[21] Halpern, B. N., Hamburger, J., Dechay, C. *Bull. Soc. méd. Hôp. Paris*, 1946, 62, 607.
[22] Last, M. R., Loew, E. R. *J. Pharmacol.* 1947, 89, 81.
[23] Yonkman, F. F., Oppenheimer, E., Rennick, B., Pellet, E. *Ibid*, 1947, 89, 31.
[24] Vallery-Radot, P., Halpern, B. N., Martin, J. *Pr. méd.* March 19, 1947, p. 185.
[25] Wells, J. A., Morris, H. C., Bull, H. B., Dragstedt, C. A. *J. Pharmacol.* 1945, 85, 122.
[26] H.M. Stationery Office 1947. Pp. 237. 4s. 6*d*.

The Anti-histamine Drugs

HISTAMINE, which can be looked on as the amino-acid histidine minus a molecule of CO_2, was first isolated from ergot by **BARGER** and **DALE** in 1910, but has since been found in many other plants. Its astonishingly wide and powerful pharmacological activity had been extensively studied before **DALE**, **BEST**, and their colleagues at the National Institute of Medical Research showed that it was a normal constituent of all body tissues, especially plentiful in the lungs.[1] **LEWIS** preferred to call the active substance obtainable from tissue cells "H-substance," but it seems probable that histamine itself is normally held within cells which are insensitive to its action, and that when it is liberated by trauma, infection, or toxins it produces various local and constitutional disturbances by acting on responsive cells in the blood-vessels, bronchioles, gut, and so on When injected parenterally histamine can produce effects closely resembling many familiar syndromes, including anaphylaxis, traumatic "shock," the collapse following burns, and the "allergic" maladies urticaria, asthma, and hay-fever. It may be that in all these conditions an escape of histamine, either free or in loose molecular combination, is an essential factor. On this view, when the specific antibodies in an allergic person's cells react to a foreign protein, histamine is liberated and causes spasm of smooth muscle or capillary dilatation. Man possesses highly efficient mechanisms for the destruction of histamine, and can detoxicate 10 mg. an hour given intravenously. The process seems to take place partly in the liver and partly in the various tissues which contain the enzyme histaminase (kidney, small intestine, &c.). Histamine has proved ineffective therapeutically, and attempts to build up an active immunity to histamine by injecting increasing doses have failed, because histamine does not produce antibodies, even when linked with iodine or bromine. Research chemists have therefore sought for anti-histamine agents: barbitone, the potassium salts, ascorbic acid, hesperidin, and ethylene disulphonate have in turn been lauded and then disparaged; by 1932 the list of substances or methods numbered 165 items. The amino-acids histidine and arginine were found to inhibit some of the effects of histamine in the guineapig and in isolated tissue, but they are too toxic and too weak to be useful.

The successful line of research dates from 1937, when **UNGAR**, **PARROT**, and **BOVET**[2] in France found that some phenolic ethers are potent antagonists of histamine These compounds had previously been synthesised and shown to possess sympatholytic activity by **FOURNEAU** and **BOVET**.[3] The most effective compounds in this series were named '929F' and '1571F,' and the claims made for them were confirmed, but they proved too toxic for clinical use. However, it soon became clear that phenolic ethers could be found which were no less active and of reasonably low toxicity. Two of them, 'Antergan' and 'Neoantergan,' were strikingly effective in protecting guineapigs against the bronchospasm caused by atomised histamine, and they have been widely used in France since 1942 in the relief of allergic disturbances. Neoantergan is better tolerated than antergan and can therefore be used in higher doses. **FEINBERG** and his colleagues[4] sum up their experience of neoantergan thus: "In seasonal hay-fever the drug was of benefit to 39 of 60 patients; in perennial rhinitis to 8 out of 10 patients; and in asthma to 1 of 5 patients." The ineffectiveness of this drug in asthma is characteristic of all the synthetic anti-histamine drugs so far tried On another page Dr. **HUNTER** confirms the excellent effects of neoantergan in urticaria and angioneurotic œdema. He also describes the side-effects noted—usually no worse than a mild lassitude provided the drug is given only by mouth. Oddly enough, as Dr. **HUNTER** points out, neoantergan is a potent local anæsthetic and also exerts a quinidine-like action on heart muscle.


HISTAMINE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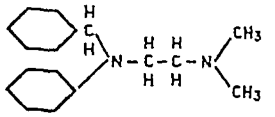
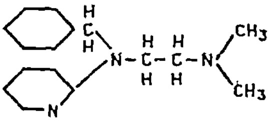

ANTERGAN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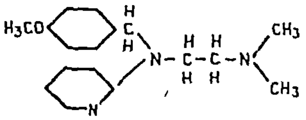
NEOANTERGAN

Two years ago, **LOEW** and others[5] in the U.S.A. introduced another of the phenolic ethers—β-dimethyl-aminoethyl benzohydryl ether hydrochloride, or 'Benadryl'—which quickly established itself in therapeutics. The formulæ show how close is the chemical relationship between this and antergan. **FEINBERG** et al.[4] have reported benefit from benadryl in 80% of patients with sensitisation dermatitis. Others[6-10] have recorded relief from hay-fever in about three-quarters of their cases, but **FRIEDLAENDER**[11] has been less impressed by its effects in this condition. He also remarks that the conspicuous success of benadryl in urticaria suggests that histamine may be a more important factor in urticaria than in other allergic conditions. In perennial vasomotor rhinitis 33 of 47 patients were benefited.[13] Temporary improvement has been reported in chronic hyperplastic ethmoiditis; the polypoid tissue retracts and disappears, and the purulent discharge diminishes, but only so long as the drug is being taken.[7] In purely allergic asthma, even under the most favourable conditions, the results obtained from benadryl are disappointing—only about 1 in 10 cases derives benefit[13]—and in bronchial asthma with secondary

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[1] See Dale, H. H. et al. *Lancet*, 1929, i, 1233.

[2] Ungar, G., Parrot, J. L., Bovet, D. *C.R. Soc. Biol., Paris*, 1937, 124, 53.

[3] Fourneau, E., Bovet, D. *Arch. int. Pharmacodyn.* 1933, 46, 178.

[4] Bernstein, T. B., Rose, J., Feinberg, S. M. New Antihistamine Drugs in Hay-fever and other Allergic Manifestations (in the press).

[5] Loew, E. R., Kaiser, M. E., Moore, V. *J. Pharmacol.* 1945, 83, 120.

[6] Koelsche, G. A., Prickman, L. E., Carryer, H. M. *J. Allergy*, 1946, 17, 151.

[7] Logan, G. B. *Proc. Mayo Clin.* 1945, 20, 436.

[8] Evermann, C. H. *J. Allergy*, 1946, 17, 210.

[9] Waldbott, G. L. *Ibid*, 1946, 17, 142.

[10] Goldstein, H. *J. Pediat.* 1947, 30, 41.

[11] Friedlaender, A. S. *Amer. J. med Sci.* 1946, 212, 185.

[12] Feinberg, S. M. Allergy in Practice, Chicago, 1946.

[13] Feinberg, S. M. *J. Amer. med Ass.* 1946, 132, 702.

31 volunteers who, acting as controls, received normal broth-saline intranasally, were uniformly negative; but of 20 who received normal egg-fluids, 1 developed a definite cold and 3 had doubtful colds. Possibly these colds were acquired before isolation, and became manifest after a rather long incubation period; but fortunately such "unauthorised" colds have been few. Experience has shown that in 70% of induced colds the incubation period is two to three days, though it may be as short as twenty-four hours or as long as six days. The volunteer seems to be equally susceptible whether he has had a cold within the past month or has been free for over six months. A possible, though unlikely explanation is that the filtrates contain a virus different from that currently producing natural colds; or a general immunity may in some be more important than a transient specific immunity.

DRINKER'S PROGRESS

ALCOHOLICS Anonymous is an American fellowship of heavy drinkers, some cured, some newly joined in the hope of cure. New members who live in remote places get a steady flow of helpful letters, mostly by air-mail, from others who have been through a like experience and who talk their own language; town members, whenever their longing for a drink becomes unbearable, can ring up a cured member, at whatever time of the day or night, and are encouraged to talk with him or go walking with him. Some pieces of advice are given to all who join: they are told that "A.A. will work if you want it to work," and are urged to say to themselves on waking, not that they will give up drink, but that they will not drink for this one day. They are taught to eat sweets to replace the sugar which they were previously getting from alcohol. "The technique," one recovered alcoholic writes[1] ". . . was not to push, or even to lead, but to walk with you and offer you something you need—if you want to accept it." A.A. claims 75% of successes in the treatment of its members: half of them are able to stop drinking at once, and a further quarter stop after one or two lapses; a quarter fail, or lose touch with the fellowship. There is no charge: a sincere desire to stop drinking is the only thing required of new members.

Among other work, A.A. has provided research material; and two monographs,[2] reprinted from the *Journal of Studies on Alcohol*, have lately thrown light on alcoholism from data made available by the fellowship: one is an analysis of the results of a survey into phases of the drinking habits of alcoholics conducted through the *Grapevine*, the national organ of the Alcoholic Foundation, New York; the other sets out detailed histories and the psychological findings in "compulsive" drinkers, most of whom were members of the fellowship. The *Grapevine* survey was made by means of a questionary which members of the organisation were asked to fill in, so that it could be learnt at what ages those events occurred which, in the experience of recovered drunkards, are critical turning-points. Dr. E. M. Jellinek's analysis of the replies is illuminating in its reasoned rejection of some widely held opinions and acceptance of others. Solitary drinking at an early stage, and bouts with subsequent amnesia for what happened in them, are ominous signs: about two years after the first of such amnesic bouts the man usually finds that he is constantly drinking more than he had intended; this is the crucial phase. He next begins to rationalise his conduct ("I can stop it if I want to," "I never get drunk without a good reason"), and thenceforward, unless circumstances prevent him or insight develops, his course is set for steady alcoholism. About a year after the process of rationalisation has begun (at the average age of 30) he starts taking a drink first thing in the morning, so that he can face the day before him. About a year, or perhaps as long as three years, after this he begins to indulge in bouts of drinking without regard to his family, work, or other obligations. Solitary drinking, which had been practised sooner or later by 90% of the ex-alcoholics who answered the questionary, was closely associated with "antisocial" acts—quarrel-picking, brawling, violent jealousy. A still later phase was characterised by tremors and indefinable fears: this usually developed after about another three years of excessive indulgence. Two years later the subjects realised that they "were licked"; they could not control their drinking or rescue themselves from their degradation. It was after they had reached this nadir that they got in touch with Alcoholics Anonymous. There were of course wide variations in the length of interval between these phases in the drinking history of individuals, and in a few cases the order in which they developed was atypical, but in most the drunkard's progress had been towards a predictable downfall; the length of time between prodromal symptoms and the lowest point before recovery was, in the shortest instance in the survey, 12 years, and in the longest, 18 years. Jellinek concludes his analysis with the design of a much more comprehensive and skilful questionary which could be used in any study of the history of recovered alcoholics to discover significant prognostic factors.

The other study fills a surprising gap in psychiatric knowledge by providing authentic and detailed life-histories of a number of drunkards, most of them well-educated men and women from upper social and economic levels. The histories make gloomy but absorbing reading; and though the dénouement is often satisfactory enough for the quondam drunkard, he leaves in his wake, as he progresses towards ultimate reformation, such a trail of misery as to put the reader in mind of that Mr. Wilson whose story was once heard by Joseph Andrews and Parson Adams.

Psychological tests given to 47 of these alcoholics consisted of the Rorschach inkblots, the vocational interest indicator of masculinity and femininity, and the level of aspiration test. The results showed the alcoholic to be an unstable, restless person who does not withdraw in the face of difficulties or adjust to them, but treats them as a challenge; he takes chances, refuses to recognise his inadequacies, and denies any conflict within himself. He exposes himself to the risk of failure, inviting rather than avoiding trouble.

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[1] *Reader's Digest*, 1946, 48, 9 Article condensed from the *Grapevine*.

[2] Studies of Compulsive Drinkers: HERMAN WORTIS, M.D., LEONARD SILLMAN, M.D., FLORENCE HALPERN, M.A. New Haven: Hillhouse Press. Pp. 90 $1. Phases in the Drinking History of Alcoholics: E. M. JELLINEK, SC.D. Memoirs of the Section of Studies on Alcohol, Yale University. No. 5. New Haven. Hillhouse Press. Pp. 99. $1.

GESTATION PERIODS

THE whole gamut of mammalian gestation periods, from the elephant (about 620 days) to the opossum (about 12 days), is accurately recorded in the second edition of Kenneth's[1] comprehensive and well-documented tables. His figures offer some support for the belief of Aristotle and William Harvey that the length of pregnancy is directly proportional to the size or weight of the animal, but several exceptions must be admitted—compare the hippopotamus (about 240 days) and the lion or tiger (about 110 days) with the human (280 days). Needham[2] maintains that despite such discrepancies the log. of the adult weight—or, better, the birth-weight—of an animal is directly proportional to the log. of its gestation period.

Among several figures for human gestation periods Kenneth gives the longest recorded menstruation-labour interval as 351 days and the shortest as 196 days.

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[1] Kenneth, J. H. Gestation Periods. A Table and Bibliography. Technical Communication no. 5. 2nd ed. Imperial Bureau of Animal Breeding and Genetics, Edinburgh. 1947. Pp. 30. 3s. From Central Sales Branch, Imperial Agricultural Bureau, Penglais, Aberystwyth.

[2] Needham, J. *Sci. Progr. Twent. Cent.* 1930–31, 25, 251.

product of extramarital conception and that nearly 30% of all mothers conceive their firstborn out of wedlock. Of married women under twenty, between 40% and 50% were pregnant before marriage; and lest it be thought that the under-twenties are in any way worse than their older and theoretically better sisters, it is pointed out that taking all extramarital conceptions as a whole, whether later legitimised or not, the rates of irregular maternity are highest among women of twenty to twenty-four (36·0 births per 1000 unmarried women), gradually decreasing to a rate of 4.0 per 1000 in those over forty. The extensive range of these sexual irregularities indicates that despite the availability of contraceptive methods "a large proportion of our children continue to arrive other than at the conscious and deliberate intention of their progenitors." The medical implications of these facts are seen in the statistics of infant mortality. In the first days of their lives the mortality-rate among illegitimates is more than twice that among legitimates. The precise causes of death responsible for this difference are hard to assess owing to the vagueness of certification in conditions like congenital debility and enteritis; but syphilis is clearly one of the principal reasons for disparity, followed by diarrhœa and enteritis, prematurity, and congenital debility.

Despite a general improvement in mortality-rates among the adult male population, there has been a dramatic rise in the wastage from cardiovascular disease of the degenerative type in men over forty. Comparing the male and female death-rates in 1939 with those of 1921–30, we have the following percentage increases in the death-rates from coronary and myocardial disease, arteriosclerosis, and senility:

	45–	*50–*	*55–*	*60–*	*65–*	*70–*	*75+*
Males ..	+130	+157	+137	+115	+83	+58	+39
Females ..	+ 78	+ 76	+ 79	+ 81	+78	+53	+32

It is perhaps significant that these excessive rates weigh most heavily upon men who were between twenty-five and forty-four years of age during the war of 1914–18. Similar dramatic increases are apparent in the standardised death-rates in cancer of certain sites; mortality from lung cancer increased by 78% from 1931–35 to 1939, cancer of the testis by 14%. Despite the difficulties of certification in deaths from multiple causes among the aged, these events can hardly be explained entirely by improvements in diagnosis or changing fashions in nomenclature. They remain as a challenge to further research. In that research the demand will be always for more facts, and these facts must come from the general practitioners of this country. "A death rate," as WILLIAM FARR said, "is a fact, anything beyond this is an inference"; but the specific death-rate for any disease is a fact only if its certification is at once complete and accurate. At both ends of the age-scale, death certification lacks the precision it has attained for childhood and young adult life; yet the importance of adequate information about these periods is surely manifest. Let us look, therefore, upon the certification of death not as a chore demanded by a bureaucratic machine but rather as an opportunity to contribute to the science of medicine.

Annotations

IN MEMORIAM

THE young have eyes only for the road ahead; but as they grow older they begin to glance back, and finally they stop to study quite openly the way they have come. This is the true luxury of age; and happy is he who can relish it. In his imagining each lingers over something different, for there are many roads and many eyes; but the best-remembered images usually have this in common, that they spring from an experience shared. A common aim, a common interest, or perhaps a common peril has swelled the store of happy experience. For those who served in the war that is past the strange experience is not yet clear in its full form and size. But one thing is certain: the memory will continue. What will be best recalled is not the dragging days of boredom, the long hours of work, or the brief encounters with danger, but those with whom these times were spent. Not all returned; and some came back scarred by battle. General Hood has appealed [1] for a memorial to the two thousand men of the Royal Army Medical Corps who were killed; it is to be a living memorial, to help the injured and the relatives of the dead. Those who served will need no second bidding, and in answering this call they will brighten their memories; while those who did not serve will wish to give in thanks that they were served so well.

THE COMMON COLD

THE common-cold research unit at the Harvard Hospital, Salisbury, has now been working for ten months, and the 2000 volunteers who came forward after the recent newspaper appeal have assured a supply sufficient for the rest of this year. Results of initial experiments were given to the epidemiological section of the Royal Society of Medicine at a meeting in Salisbury on May 2.

As we have already noted,[2] volunteers on arrival are isolated in pairs and observed for three days, in case they are in the incubation period of a cold. On the fourth day they are inoculated with test or control material. In work of this character, where the experimental animals are able to express subjective impressions, it is of the first importance that the doctor diagnosing the induced colds should be unaware of the nature of the inocula. The period of trial is ten days, of which six remain for the development and assessment of colds. Since the unit can take only 12 pairs of volunteers at fortnightly intervals progress by this method is bound to be slow; and the first objective is the discovery of some more convenient test for the presence of the "cold" virus.

Attempts to cultivate the virus, which have occupied most of the investigators' time, are still only in the preliminary stages. Washings from the nose and throat of persons in the first or second day of a cold have been found to provide a satisfactory source of virus. Bacteria are removed from the washing by filtration through collodion membranes with an average pore-diameter of 0·7μ. Of 64 volunteers inoculated intranasally with filtrate, 28 developed definite though usually mild colds, 11 developed doubtful colds, and 25 proved refractory. Of the nine filtrates that have been prepared, all have induced colds in some of the volunteers. Even diluted to 1 : 100 the filtrates still provoke colds, though with less certainty. The filtrates can be stored for at least three days at 4°C without apparent deterioration, for at least twenty-seven days at −10°C, and for at least four and a half months at −76°C. Preliminary filtration studies suggest that the size of the virus is under 150 mμ, but over 30 mμ; but the lower size-limit is tentative because the starting material was probably of low titre.

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[1] See p. 698.

[2] See *Lancet*, Jan. 18, p. 108.

fatal charge for miles), walls, hedges, river banks, and ponds are dangerous: but apparently the heart of a wood is fairly safe. Finally, the person who is going to be struck is better wet than dry: for wet clothing will short-circuit some of the current. In the same issue Dr. T. H. White and his wife report the case of two children in England, sheltering under one umbrella beneath a high wall, and standing in a pool of water. They were struck and killed outright.

> Mrs. White herself had a strange experience from secondary discharges when lightning struck the ground some 60–70 feet from the room in which she was with her 15 months' baby. The room filled with a great flame, as it seemed, but she heard no sound. She felt as though the floor and ceiling were giving way, and seemed to see the baby screaming and debris falling. She was numb and stiff from the chest down and tingling all over. She remembered beginning to scream, and next remembered finding herself on a neighbour's veranda 200 yards away, without knowing how she got there. The numbness subsided, but the tingling became worse and she had a violent headache. The baby was dazed and pale for about five minutes after reaching the neighbour's house, but then recovered and walked about. Three hours later Mrs. White was still suffering from shock with dilated pupils and stiff limbs, but with a slow pulse. She had no burns or bruises. Next morning the baby was normal and so was she except for some stiffness of the neck.

She and her husband comment that a house with a galvanised-iron roof and a veranda all round closed in with mosquito gauze should be nearly lightning-proof, since it forms in effect a Faraday cage—a closed conductor inside which there can be no charge.

THIOURACIL AND THE HEART

As a remedy for heart-failure and angina pectoris total thyroidectomy has never found much favour in Britain; for it is an irreversible procedure with a considerable operative mortality. Not unnaturally, thiouracil has lately been suggested as a substitute. Raab,[1] who attaches importance to adrenergic discharges in the pathogenesis of angina pectoris, reports favourably on thiouracil, ascribing its efficacy to "a diminution of myocardial sensitivity to heart-anoxiating, angina-producing epinephrine and sympathin discharges." Of his 10 patients, 7 responded satisfactorily, 1 was slightly improved, 1 showed no improvement, while 1 died as the result of a coronary occlusion during treatment. The dose of thiouracil in the early stages ranged from 0·4 g. to 1·2 g. in divided doses daily, with 0·1 g. as a daily maintenance dose.

A very different view is taken by DiPalma and MaGovern,[2] who hold that thiouracil is indicated in angina pectoris only when the basal metabolic rate is raised, or as a test in the selection of patients for thyroidectomy. Their conclusions are based upon a small series of 8 patients, of whom 6 had had coronary occlusion and 1 had severe rheumatic aortic incompetence; in only 1 is the result described as excellent, and in 5 it was poor. The daily dose of thiouracil was 0·6 g., given in divided doses, and the duration of treatment ranged from three weeks to over a year. In 4 cases treatment had to be stopped because of toxic reactions—skin rashes or dyspnœa. During treatment 1 patient had a coronary occlusion, and 1 developed dyspnœa attributed to water retention. This latter reaction to thiouracil has already been described[3]; and DiPalma and MaGovern refer to a patient with hypertensive heart-failure, not included in their series, in whom administration of thiouracil was followed by recurrence of subcutaneous and pulmonary œdema. On the other hand, Sharpey-Schafer[4] has used thiouracil successfully in patients with severe congestive heart-failure who had not responded to treatment by rest in bed, digitalis, and organic mercurial diuretics. He divides his cases into two groups: low-cardiac-output failure (hypertensive and valvular heart disease), and high-cardiac-output failure (heart-failure with emphysema). In the former thiouracil decreased arteriovenous oxygen differences and the resting oxygen consumption, while in the latter it reduced the high cardiac output to normal through a decrease in oxygen consumption and an increase in the arteriovenous oxygen difference. Dosage was high—1–3 g. daily for up to 275 days. It is clear that further work is required for the assessment of thiouracil in both angina pectoris and congestive heart-failure.

NEW OUTLOOKS ON INDUSTRY

> ". . . to know, as Cromwell's picked captains knew, 'what they are fighting for, and to love what they know,' to be informed and consulted about the job and their part in it. It is no longer sufficient that a man should 'do what he is — well told,' and leave the worrying to the 'bosses.'"

Mr. H. E. G. West,[1] managing director of Newton Chambers & Company, writing on the conversion of management into leadership, heads his article "A Matter of Confidence"; and confidence only comes when the men realise that the management is treating them sincerely. Such sincerity, initiated at the highest level of management, must be transmitted to the lower levels. "I believe," he says, "joint consultation is possible in every industrial unit at almost every level." If the men are to know what they are doing they must be given some insight into the work of the firm. His firm has arranged short training courses for groups of 15–20 men and women returned from the Forces; this "reinstatement week" gives them a chance to see the entire background of the industry and its relation to the firm's activities. The young people entering the firm from school have the various departments and activities explained to them by senior managers and executives; business-training pupils have been asked to "log" the instruction given in their first month and the impression the managers made on them. "The comments in those journals were often illuminating, indeed salutary, to the lecturers." Training of these kinds have spread understanding and good will, and have no doubt had other good results, raising self-respect and encouraging initiative; but training courses, Mr. West points out, will not supply deficiencies in transport, canteen service, ventilation, heating, lighting, tools, clothing, health services, or safety precautions. Dr. R. S. F. Schilling,[2] writing on the next steps in industrial health services, brings this home. The shrinking manpower in dirty and unattractive industries—notably the mining, foundry, and textile trades—and shorter hours of work, will oblige management to depend for increased production on more mechanisation, better layout, and improved methods. Toxic and dust hazards, once the doctor and chemist have made their nature clear, must be prevented largely by the engineer. The selection of workers for various tasks, and accurate job-analysis, falls to the psychologists; human relations must be studied with the help of social scientists and welfare officers.

Mining presents special problems: in the three years 1943–45 accidents to miners causing incapacity for more than three days came to more than 170,000 yearly; and nearly 1900 miners were killed in the three years by accidents at work. In 1944 more than 12,000 miners or their dependants were granted compensation for industrial diseases, the most important being pneumoconiosis, "the beats," and nystagmus. It is hardly surprising that many of the older miners discourage their sons from entering an occupation with such risks. Dr. Schilling suggests that a comprehensive health service

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[1] Raab, W. *J. Amer. med. Ass.* 1945, 128, 249.
[2] DiPalma, J. R., MaGovern, J. J. *Amer. Heart J.* 1946, 32, 494.
[3] Williams, R. H., Bissel, G. W., Jandorf, B. J., Peters, J. B. *J. clin. Endocrin.* 1944, 4, 58.
[4] Sharpey-Schafer, E. P. *Brit. med. J.* 1946, ii, 888.

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[1] *Industrial Welfare.* March–April, 1947, p. 39.
[2] Ibid, p. 42.

The medicolegal importance of such cases is obvious; the law has indeed recognised a gestation period of 331 days.[3] The average period is 280 days, but the observations of Hotelling and Hotelling [4] and Anderson et al.[5] indicate significant racial differences; the average gestation period of the American negro, for example, is a few days less than that of the white American.

Kenneth notes several instances of the "fertilisation-labour" interval—which should be termed the "coitus-labour" interval because the exact time of fertilisation of the ovum cannot be readily determined in the human subject. The coitus-labour period is a more accurate approximation to the absolute length of pregnancy than the menstruation-labour interval, often and conveniently used in obstetric practice. Further information about the coitus-labour interval could be gained from studies on artificial insemination or the correlation of a single act of coitus with the result of an Aschheim-Zondek or similar test some 3–4 weeks later. Venning [6] has shown that adrenal corticoid excretion is increased in the first trimester of pregnancy. If corticoids, in addition to hormones derived from the chorion or the anterior lobe of the pituitary, are excreted in the urine shortly after implantation and embedding of the ovum, the elaboration of more sensitive tests for their identification might well replace the Aschheim-Zondek and similar tests as the earliest proofs of pregnancy.

A NEW CORONARY VASODILATOR

A DRUG capable of active coronary vasodilatation without reduction of the blood-pressure or increase in the pulse-rate would clearly be valuable. These properties are claimed by Anrep and his colleagues [7] for khellin, the active principle of *Ammi visnaga* Lam. This plant, which grows wild in Eastern Mediterranean countries and in Arabia, has for centuries been a popular remedy in Egypt for renal and intestinal colic; and in 1934 the tincture and decoction were included in the Egyptian pharmacopœia.

The active principle, a di-methoxy-methyl-furano-chromone, has been carefully investigated. In heart-lung preparations from dogs the minimal active concentration was found to be about 1 : 2,000,000, while concentrations of about 1 : 200,000 produced a three to fourfold increase in coronary blood-flow. The same effect was obtained in the intact animal, provided the dose did not exceed 2 mg. per kg. body-weight. It is thought that khellin acts directly on the muscle-fibres of the blood-vessels and that the apparently selective response by the coronary vessels is due to their particular sensitivity. The drug has now been used in over 150 patients; and with single or repeated doses of 100 mg. intramuscularly, or with 50–100 mg. by mouth thrice daily, the results are said to be "extremely encouraging." Among 38 patients with angina pectoris the response was satisfactory: in 13 who received 40 mg. thrice daily, one to three days being required for the full effect; of 9 treated by intramuscular injections of 90 mg. daily, or 120 mg. on alternate days, 8 responded well; while of 16 severe cases treated by a combination of intramuscular and oral therapy, 14 responded well. This dosage was given daily for 2–5 weeks to 8 patients with coronary thrombosis; and these too were apparently benefited. Full trial of the drug is thus justified.

That khellin may have further uses is suggested by the observation that after a single intramuscular injection of 200–300 mg. "complete and prolonged relief" was obtained in 41 out of 45 patients with severe bronchial asthma; and even this fairly large dose had no effect upon the blood-pressure. It has, moreover, relieved attacks resistant to adrenaline and aminophylline. Whether, as suggested, khellin is safer than aminophylline, is not yet certain, for experience with it is so far small. If, however, khellin is to come into general use preparations of it must be purified and standardised; for there is some evidence that the impurities in *Ammi visnaga* may be toxic.

PLEURISY AND TUBERCULOSIS

IN 1911 Koster and Allard published a classical report [1] indicating that "primary" pleurisy with effusion was followed in nearly 50% of cases by pulmonary tuberculosis. Later investigations, however, have yielded less alarming figures, and a study by Lassen and Kjaergaard in 1935 suggested that only some 8% become tuberculous. Opinion on the best treatment is still divided, as is shown by two recent papers. In one, Jervell and Istre [2] found that of 143 cases of primary pleurisy, observed for 1–5 years, pulmonary tuberculosis developed in 11, with 4 deaths. Apart from the effusion the radiological findings were negative in 100, of which 3 subsequently showed signs of pulmonary tuberculosis. There was no subsequent history of tuberculosis in any of the 24 cases showing hilar adenitis, or of the 28 showing homolateral pulmonary infiltration. Tuberculosis did, however, develop in 2 of the 3 with pulmonary infiltration on the side opposite to the effusion, and in 6 of the 7 with bilateral infiltration. Jervell and Istre conclude that the patient with a primary effusion need very rarely be submitted to the hardships of an artificial pneumothorax.

This is not the view of Nilsen,[3] who has followed up 138 cases for an average of $4^1/_2$-years. His routine treatment of these patients consisted in aspiration of the fluid, with air replacement at atmospheric pressure. Of the 138, 18 developed some form of tuberculosis, which in 8 proved fatal; and in more than half of these 18 cases the disease developed within a year of the pleurisy. Nilsen, though not suggesting a sustained pneumothorax for every case of tuberculous pleurisy with effusion, advocates this treatment when there is homolateral infiltration, or when the sputum contains tubercle bacilli and there is no evidence of contralateral infiltration.

ADVICE ON THUNDERSTORMS

THE *East African Medical Journal* [4] is usefully confident about behaviour in thunderstorms. The best place to be, it affirms, is inside a house with all doors and windows closed and not too near the fireplace; "to seek further safety in a cellar or clothes cupboard is not necessary." Lightning is apt to come through an open window with wind and rain. If a chimney is struck, bits of masonry and metal may be blown out into the room and cut an occupant's legs. The neighbourhood of the main switch and meter are also best avoided, since they may be blown up and burnt out if lightning strikes the supply wires; and it is advised that the lead-in wire from the aerial to a radio set should be fitted with a switch so that both may be earthed when thunder is about.

Open windows, doorways, and verandas are dangerous. If it is impossible to seek sanctuary in a house or a closed motor-car any solid shed will do, especially if doors and windows can be shut. A shallow shed with one side open is said to be little safer than the open air. Crowds of people and herds of cattle seem to be mildly attractive to lightning. If one is far from home or shelter when the storm breaks the best plan, it seems, is to lie down in a ditch or hollow until it is over; but the writer of the article had no hope that this advice would be widely followed. Single trees, wire fences (which may carry a

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3. Gaskill v. Gaskill. See *Lancet*, 1921, ii, 357.
4. Hotelling, H., Hotelling, F. *Amer. J. Obstet. Gynec.* 1932, 23, 643.
5. Anderson, N.A., Brown, E. W., Lyon, R. A. *Amer. J. Dis. Child.* 1943, 65, 523.
6. Venning, E. H. *Endocrinology*, 1946, 39, 203.
7. Anrep, G. V., Barsoum, G. S., Kenawy, M. R., Misrahy, G. *Brit. Heart J.* 1946, 8, 171; *Lancet*, April 26, p. 557.

1. *Hygiea, Stockh.* 1911, 73, 1105.
2. Jervell, A., Istre, B. *Nord Med* 1946, 32, 2623.
3. Nilson, P. A. *Ibid*, p. 2630.
4. 1945, 22, 105.

colonies there are islands of comparative cleanliness where a start with hope of extension could be achieved.

Until a fully comprehensive operation can be launched, the best line is to concentrate on making one class of African reasonably clear—that is, the educated African. If these are taught, in the schools and universities, and by all means possible, how to dislike and avoid venereal disease and where to get treatment if they become infected, then slowly, as the clerks, telegraphists, and printers emerge from their technical training, they will also be "V.D.-conscious." Then one day, perhaps, gonorrhœa will be regarded as an unpleasant disease to be rid of and not as a rather annoying variant of normality.

MORE PITFALLS IN DIAGNOSIS OF ANGINA

THE fact that cervical arthritis may cause precordial pain has been known for some time,[1] and two American workers[2] report a series of cases in which angina pectoris was closely simulated by ruptured intervertebral disks in the lower cervical spine. Of 30 patients with this lesion, there were 7 in whom the differential diagnosis between ruptured cervical disks and coronary disease had to be carefully considered. These subjects had precordial pain, sometimes radiating to the shoulder and into the arm. In some this was associated with exertion and accompanied by dyspnœa; in others the pain occurred at rest but was so severe that, being accompanied by dyspnœa, it immediately suggested myocardial infarction. Only by careful examination was the possibility of coronary disease excluded. In 3 the diagnosis was confirmed at operation, which revealed a herniated nucleus pulposus compressing the nerve-root, and the removal of the herniated nucleus led to complete relief of pain. In a 4th case the precordial pain occurred only after operation, but was finally relieved by neck retraction.

In establishing the diagnosis the important points are a history of trauma to the neck, and the radiation of the pain which is sometimes rather diffuse. With a ruptured disk, pain which is related by the patient to exertion turns out to be due to strain on the neck or shoulder: another useful guide is a history of repeated attacks of numbness in the fingers. Examination may show wasting of the pectoral muscles, or of the biceps, triceps, or small muscles of the hand. The pain may be reproduced by pressure on the head or over the affected nerve root in the brachial plexus, and radiography often reveals characteristic changes in the spine. Where the diagnosis is still in doubt the lack of response to nitrites is a pointer.

Why a ruptured intervertebral disk should cause precordial pain is still unexplained, but it is noteworthy that in one patient in this series pressure on the annulus fibrosus at operation reproduced the precordial pain of which he had been complaining.

LOCUST BEANS IN INFANTILE DIARRHŒA

A METHOD of treating infantile gastro-enteritis, which has been favourably reported on in Italy, uses a flour made from the beans of *Ceratonia siliqua*, an evergreen tree of the order leguminosæ, which has spread from the Levant throughout the coasts and islands of the Mediterranean as far as Spain. It was introduced into England in 1570, and its cultivation in London is recorded in Gerard's *Herball*. From the earliest times its long bean-pods have been eaten by man and lower animals; they were thought at one time to have supported John the Baptist in the desert—hence the names "locust beans" and "St. John's bread." In Sicily a spirit and a syrup are made from them.

During the Spanish civil war[3] it was observed that poor children, whose food consisted largely of these beans, did not get the diarrhœa which was prevalent among children of the rich. Moreover, children sometimes developed obstinate constipation after eating the beans. So research into the properties of the beans was instituted in Spain[3] and in Switzerland.[4] Soragni,[5] in Italy, has since treated 11 cases of diarrhœa in children with a preparation of locust beans made into a flour with starch and cocoa powder by Messrs. Nestlé under the name 'Arobon.' This contains fat 1%, protein 4·5%, carbohydrate 40%, "amido" 15%, mineral salts 3·5%, pectin 1·5%, cellulose 6%, lignin 23·5%, and water 5%: calorie value 250 per 100 g. The results of treatment were good, and the success has been attributed to the large content of lignin, whose properties resemble those of pectin. Neyroud[6] thinks that the flour adsorbs toxins and also helps to re-establish a normal bacterial flora in the gut. Scarzella[7] has used it to treat diarrhœa in 23 babies, aged 1–14 months, and has found that usually within 12 hours the colour of the fæces changes, and their reaction becomes acid instead of alkaline. He emphasises that locust-bean flour must be regarded as a medicine rather than a food.

"A COUPLE OF ASPIRINS"

FOR many years now aspirin has been the domestic panacea. Toxic reactions, including gastric hæmorrhage and anaphylactic phenomena, may be alarming but are fortunately very uncommon. A recent American report suggests, however, that the safety of aspirin for young children has been too readily assumed. Erganian, Forbes, and Case[8] have seen, within two years, 13 young patients with symptoms attributed to salicylate intoxication, mostly after aspirin had been given for a "cold." All showed a similar pattern of acid-base imbalance which the authors believe to be characteristic of this poisoning in the young. The clinical picture was of a severely toxic, febrile, apathetic, or even semi-comatose, infant, with increased, deep, and pauseless respiration, vomiting, and disinclination for food or drink. The patients were either very pale or cyanosed, and dehydration was pronounced. Spontaneous hæmorrhages in the skin and from the gastro-intestinal tract were seen in 2 cases. The urine contained albumin, casts, and ketone bodies. Treatment consisted in gastric lavage, subcutaneous glucose-saline, warmth, and oxygen; and to counteract the acidosis M/6 sodium r-lactate was injected in Ringer's solution. In all, except one infant of four and a half months who died from renal failure, the condition improved within two hours.

Erganian and her colleagues find that salicyl compounds in a dosage of about $^1/_2$ grain per lb. body-weight (in six divided doses) in the twenty-four hours tend to accumulate in the body; and they think that in infants who show no sign of renal failure, diarrhœa, diabetes, or severe infection the combination of hyperpnœa and listlessness with fever should suggest salicylate intoxication. The frequency of such poisoning in Britain cannot be estimated, but it might be well to adopt the American workers' proposal that aspirin should never be given to infants, and that it should be prescribed for young children only with caution and a watchful eye for signs of overdosage.

REGISTERS FOR 1947.—The *Medical Register* contains 76,292 names, being 1159 more than twelve months ago. During 1946 2237 names were added, and deaths totalled 1043. The number of temporary foreign registrations has increased by 101 to 3449.

The *Dentists Register* contains 15,266 names—156 fewer than twelve months ago.

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[1] Nachlas, I. W. *J. Amer. med. Ass.* 1934, 103, 323.
[2] Josey, A. I., Murphey, F. *Ibid*, 1946, 131, 581.
[3] Roralen Sales, M. *Med. esp.* 1942, 8, 563.
[4] Martin du Pan, R. *Ann. pædiat.* 1945, 165, 205; *Schweiz. med. Wschr.* 1945, 75, 763.
[5] Soragni, E. *Lattante*, 1947, 18, 78.
[6] Neyroud, M. *Ann. pædiat.* 1946, 166, 113.
[7] Scarzella, M. *Minerva med.* 1947, 38, 371.
[8] Erganian, J. A., Forbes, G. B., Case, D. M. *J. Pediat.* 1947, 30, 129.

for the mines must make use of physicists, physiologists, and engineers as well as doctors, to reduce dust, improve bad lighting, and restrict causes of accident to the unforeseen. All new miners should be examined on entry, and those working on the face should be examined at intervals, to ensure that only those fit for this work are employed on it, and that those who show early signs of pulmonary disease are removed from it.

Commenting on an article[3] on the care of the aged by Mr. Seebohm Rowntree, the editor of *Industrial Welfare* notes that the capacity for work and ability to learn has been shown to be much higher among the ageing than is usually assumed, and that their speed of work, reliability, and absence-rates compare very favourably with those of younger workers. Once physical power has declined they can hardly be used in heavy industries, of course, but he suggests that in the lighter trades—as the textile industry has proved—our labour force could be much augmented by allowing older men and women to continue in full or part time work.

PHYSICAL ANTHROPOLOGY

In the last decade or two the science of physical anthropology has enlarged its horizon, multiplied many times the number of its unofficial devotees, and transcended its name. The metamorphosis is largely due to these unofficial professionals, for there are only a handful of self-styled physical anthropologists, and in any case advances have mostly come from fields outside the old science. The development of the blood-group investigations was perhaps the beginning. With it came the promise of ever-increasing data on human genetics, and of a clarification of the old muddled problems of race classification and race origins. In America in the 1930's ambitious studies of child growth began; anthropometry has gradually become dynamic. Physiologists of all sorts, but especially those concerned with endocrinology and those interested in man's adaptation to artificial environments, began to contribute. Psychologists like William Sheldon in America and Cyril Burt in England revivified and extended the constitutional studies of the old Italian school of clinical anthropologists; their findings seemed, too, to hold the germ of yet more interesting investigations on the psychological correlates of physique and physiological function. Meanwhile, in the more familiar territory of palæoanthropology and comparative anatomy, material has been accumulating faster than ever before.

All this activity is well reported in a new American *Year Book of Physical Anthropology*, whose first number has belatedly come to hand. The year covered is 1945, and the book is a paper-bound collection of reprints of twenty-six articles. A particular effort has been made to gather contributions from journals off the anthropologist's beaten track, and none from the *American Journal of Physical Anthropology* is included. All, however, are in English, and we may hope that in future years French, Swiss, Scandinavian, South American, and Russian work will find a place. Nevertheless, most of the new—and old—interests of physical anthropologists are well represented, though there is little on growth or physique and nothing on human physiology.

A long article comes from Franz Weidenreich on fossil man in Java, with a welcome tabulation of all hominid fossils discovered there up to 1941. W. E. Le Gros Clark contributes two further papers on palæoanthropology. Adolph Schultz and William Strauss jun. are represented by a contribution on the number of vertebræ in the primates, which will long remain the most informative account of this subject; it gives a classification of primates and a considerable bibliography. Papers on functional anatomy are particularly plentiful, and include two by H. Haxton on joint structure and movement, one on the structure of the external nose, and another on variations in the form of the vertebral border of the scapula. No fewer than five articles are devoted to some aspect of tooth formation or evolution; but there is only one on human genetics—by L. H. Snyder and F. Blank on the inheritance of the shape of the sella turcica. Finally, an entire chapter of Alexander Wiener's *Blood Groups and Transfusion* is reprinted, with tables of racial distribution of the ABO and MN characters complete to 1943. It comes as something of a shock to find in this chapter only a few paragraphs on the Rh groups—so quickly has the subject developed—but a table of these up to 1945 is included in a further article by the same author.

This yearbook in short contains much information of interest to those who are not primarily anthropologists, as well as a useful conspectus for those who are.

VENEREAL DISEASE IN BRITISH WEST AFRICA

Smallpox, dysentery, cerebrospinal fever, plague, typhus, rabies, leprosy, yellow fever, malaria, blackwater fever, trypanosomiasis, bilharziasis, filariasis, infestations with intestinal worms, yaws, and dietary deficiencies are but a few of the special problems confronting the medical authorities responsible for the West African colonies, and somewhere in this long list have to be fitted tuberculosis and venereal diseases. The Colonial Medical Service is hopelessly understaffed for the job—in Nigeria, for example, there is only one doctor per 130,000 of population.

No-one who served with the Forces in that area can have failed to be impressed by the high incidence of venereal disease among the African troops, and, though the task of obtaining a substantial improvement may appear impossible, the problem is multiplying as long as nothing energetic is done. Judged by the published medical statistics of the four colonies the venereal disease situation would not appear to be so bad as for some of the other diseases listed. The annual medical report for 1943 shows that in the Gambia, for example, 1555 patients were treated in the hospitals and dispensaries for venereal disorders—a ratio of 7·77 per thousand of the population of 200,000. However, in the *African troops stationed there in 1944*, when the majority of sufferers were seen by a doctor, the ratio was 120 per thousand. In Sierra Leone, with a population of 1,770,000, in 1943 some 3880 of such patients were treated in the civil hospitals,[1] or 2·19 per thousand of the population, but in the Army the ratio in 1944 was as high as 279 per thousand. In the Gold Coast the annual report for 1943 reveals an even wider difference—11,903 civilian patients of the 3,790,000 population were treated, or 3·14 per thousand, while the Army figures reached the *staggering total of* 500 per thousand or 50% per annum. Of the $20^{1}/_{2}$ million in Nigeria, only 44,625 patients are reported as treated by the civilian authorities in 1943, a ratio of 2·17 per thousand. Comparable Army figures for 1944 are not available, but the estimated incidence of gonorrhœa alone in West African personnel was in the astronomical region of 625 per thousand. Thus, taking the four colonies together, in 1943 the civil authorities treated some 62,000 cases of venereal disease in a population of $26^{1}/_{4}$ million; *while in 1944 the Army* treated 27,800 such cases out of about 60,000 African troops.

It is evident from these figures that only a few drops are being pipetted from a vast cesspool, and it is to be hoped that future methods employed in tackling this problem will include not only better treatment for the small nucleus already secured but an imaginative scheme aimed at substantial portions of the whole. That there are regions of comparative freedom is shown in the difference in the numbers involved in the Gambia and, say, Nigeria. In 1938 Purcell[2] said he had treated over 5000 cases of yaws in the Northern Territories of the Gold Coast in a tribe where there was no gonorrhœa or clinical syphilis. Therefore even in the more infected and horticulturist, but to the many millions of individuals who can make their own substantial contribution to the food-supply if they are given good reason to do so. In producing many important items of food—potatoes, vegetables and fruit of many kinds, and poultry—the ordinary Englishman (especially when he has a five-day working week) is ready enough to play his part. But if he is to do so he must have the necessary incentive; we must put an end to the artificially low prices now prevailing for these things. If he can buy potatoes and eggs in the shops at the present subsidised price, the incentive to produce them for himself and for his neighbours rests wholly on his own actual shortage of them. Once increase the price of these things to a level corresponding to our need, and production everywhere will take a sharp upward turn. Our present policy discourages all effort except by the subsidised large-scale producer. Here is one way of reducing our imported-food bill to which we are turning a blind eye.

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[3] Ibid, p. 46.

[1] Willcox, R. R. *Brit. J. vener. Dis* 1946, 22, 65.
[2] Purcell, F. W. *W. Afr. med. J.* 1938, 7, 96.

It does not follow, however, that subsidies could be dispensed with. For if the prices paid to producers are allowed to find a natural level it will be necessary to use Government money to reduce the burden on consumers where it is worst borne.

PLANNING

The case here made for incentives first, and redistribution of the national income second, should not be confused with the cry for laissez-faire so often heard from some sections of the business community. It is not, indeed, a case for absolute priority for incentives over redistribution, but rather for logical sequence and orderly thinking. It is quite possible to arrange incentives aright, and at the same time to proceed with redistribution in the interests of social justice. What is dangerous, and what is at present hampering us, is failure to recognise the need for economic adjustments on a sufficiently drastic scale, and having done so to plan the redistribution in the light of these requirements. What the Government are trying to do is to settle the programme of redistribution on the basis of the old economy, the old scale of imports, and the old allocation of man-power and resources as between different occupations; and then to force the economy of the country into line. If the new Planning Chief is not given a real opportunity to assess the relative merits of the alternative methods whereby an underlying balance may be attained, he will prove but another cog in the machinery.

Measured in terms of man-power, only about $^1/_{15}$th of our resources is devoted to agriculture, and on the face of it the radical change in our import-export situation dictates a drastic revision of this ratio. If this $^1/_{15}$th were doubled or trebled, our livelihood would cease to depend on the success of the drive to double our exports—a success which under present conditions is at best problematical. Admittedly the difficulties standing in the way of so big a reallocation of labour are formidable. In particular, if we think that a big rise in agricultural prices and wages is the only means of drawing man-power back to the land, we must discover how it can be applied without causing a fresh all-round increase in the cost of living and an inflationary wage movement. These difficulties, however, are not insurmountable, and it is high time they were given more serious attention in official circles than they seem to have had so far.

Planning, it has been well said, is not a matter of superimposing some new authority: "it is much more a question of providing existing authorities with information sufficient to enable them to coördinate their work effectively and accurately." In the national sphere today it is up to the economists to provide the data needed to display the choices before us.

Special Articles

SHORTAGE OF NURSES

Hospital Doctors' Review

THE fevers group of the Society of Medical Officers of Health and the London and Home Counties branch of the Medical Superintendents' Society met in London on March 14, to discuss the nursing shortage. The following memorandum * embodies the meeting's discussion and conclusions.

CHARACTER AND INCIDENCE OF THE NURSING SHORTAGE

It has been stated that there are more nurses in the country today than ever before. This may be so, for nurses are now employed much more than formerly in attractive jobs outside hospitals—e.g., in public-health and school services, day nurseries, and factories. Furthermore, the shorter hours now worked in many hospitals necessitate an increase of some 10–12% in the number of nurses.

It is pre-eminently in the local-authority hospitals, the special hospitals, and the smaller voluntary hospitals that the acute shortage of nursing staff exists. Most of these have been compelled to close a considerable proportion of their beds because of it. London is particularly hard-hit: most of the local-authority general hospitals in London have had to close down about half their beds and the fever hospitals even more. This means daily refusal of admission to thousands of cases recommended to hospital. It also threatens, as far as the fever hospitals are concerned, the training of medical students and graduates.

It is said, on the other hand, that the great London voluntary hospitals with medical schools have no shortage of nurses, and have, indeed, waiting-lists. This is doubtless due partly to the inherent attractiveness of these hospitals. These discrepancies in staffing as between different kinds of hospitals have been greatly increased since the Rushcliffe scales of salary were introduced in 1943. The Rushcliffe policy of uniformity of salary-scales for all hospitals, regardless of their varying appeal to prospective nurses, is undoubtedly a major factor in the shortage which now threatens the existence of many local-authority and other hospitals.

FEMALE POPULATION CONCERNED

The Registrar-General has kindly supplied the following estimate for England and Wales of females aged 17 in the 25 years from 1922 to 1946 (figures given in thousands): 358, 356, 360, 367, 364, 357, 350, 346, 353, 354, 345, 314, 296, 263, 262, 399, 374, 357, 334, 324, 315, 309, 300, 291, and 291. Thus, the main average female population from which nursing recruits may be drawn dropped from 361,000 in the quinquennium 1922–26 to 301,200 in the quinquennium 1942–46—a decrease of 16% in 20 years. If we compare the earlier quinquennium with the 2-year period 1945–46, however, the drop is nearly 19%. Owing to the continued low birth-rate during the years 1930–45, the available population is unlikely to increase and is more likely to decrease during the next 15 years. We have, therefore, good reason to reckon that for the next few years the female population available as potential nursing recruits will be some 20% less than that available a quarter of a century ago.

ALTERNATIVE EMPLOYMENT

From this diminished female population, the proportion attracted to industry, to the Services, and to clerical and administrative work has increased as compared with that entering hospital nursing. The reasons usually advanced for this shift include the higher wages, shorter hours, advantages of home life or unrestricted private life, and the generally easier time enjoyed in those alternative occupations. On the other hand, the nurse's

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* Dr. WILLIAM GUNN, president of the fevers group, presided over the meeting, at whose request the memorandum has been written by the principal speaker. These speakers were Dr. H. STANLEY BANKS (president, London and Home Counties branch, Medical Superintendents' Society); Dr. E. B. BROOKE (Surrey); Dr. O. W. S. FITZGERALD (Herts); and Dr. W. F. T. MCMATH (Willesden).

Reconstruction

THE NATIONAL SITUATION*

Social Objectives and Economic Necessities

FROM A CORRESPONDENT

It happens that since 1939 two of the most dramatic changes that have ever occurred in our economic life have taken place together.

First, the loss of our foreign assets has precipitated the need for a great alteration in our way of living: we no longer possess the income from foreign assets which for a century has enabled us to enjoy imports greatly in excess of our exports. Secondly, the country has taken a great step forward in its determination to put social welfare above the freedom of the old unrestricted industrial England.

Our present malaise is largely due to the combination of these two changes, and our failure to work out their implications.

Had the first change occurred by itself, the old corrective process of supply and demand would after its own fashion have provided a solution. There would, for example, have been a sharp rise in the prices of many things hitherto imported from abroad, and in due course a reallocation of our internal resources between one occupation and another. This would have been attended by high prices and high wages in some occupations, and by low prices, low wages, and unemployment in others. Though the social consequences would have been most uncomfortable, and the cost in human welfare very heavy, the economic machine would eventually have attained a new equilibrium.

Had the second change occurred by itself the picture would again have been different. The determination to put social welfare above industrial laissez-faire means primarily two things: (1) the setting of a brake on the old corrective machinery of supply and demand, and especially on its chief instrument, unemployment; and (2) redistribution of the national income to ensure a fair share of the necessities of life for all before superfluity for the few—a redistribution which has been attained partly by taxation, partly by rationing, and partly by food subsidies. These things—rather than the present drive for nationalisation and a "planned economy"—are the essential features of the drive for social justice on which all parties are at heart agreed.

Now had this programme had a fair field in which to operate—i.e., relatively stable economic conditions—a great social advance would almost certainly have been achieved at a moderate cost in economic efficiency. The refusal to use unemployment as a means of transferring labour from one industry to another is unimportant in relatively stable times; for other methods, such as discouraging entry into a particular industry, are sufficient to bring the desired results. Similarly, given relatively stable conditions, the redistribution of our national income by taxation, rationing, and food subsidies need not have unduly disturbed the economic machine.

The tragedy of our present plight is that these two trends are in absolute conflict. We have on the one hand an economic situation which urgently demands a reallocation of our resources, and on the other hand a social policy which not only abhors the old corrective mechanism but actually obscures the need for any adjustments at all. We cannot go on fumbling like this. If we are to retain the measures we have already taken for social betterment, and to go further on the same path, we must promptly devise some means of distinguishing more clearly between economic necessities and social objectives. Without this clear-cut distinction, the "planning" which is now our recipe represents no more than a groping towards a solution. Once the economic necessities stand out stark and clear we can consider how far their operation can be controlled in the interests of social welfare.

THE FOOD PROBLEM

The conflict between these two forces is nowhere more evident than in our handling of agriculture. Until 1939 we pursued a policy of importing food—to such an extent that half our import bill was in respect of food, and only about 40% of our requirements was produced at home. Today the import-export balance has undergone a radical change, and we cannot find enough foreign currency to pay for food imports on the old scale. But though we have granted the farmer fixed prices and thereby improved his prospects, we have not yet recognised the need to devote to home agriculture a far greater proportion of our resources.

The adjustment required can be grasped only if we remember that for over a century agriculture has been steadily drained of man-power, not only in numbers but in quality, since able and ambitious men have been steadily attracted into industry and commerce. In estimating what home agriculture is capable of providing, it is idle to use figures (like those of the white-paper recently published by the Government) which ignore the possibilities of a policy which would put this process into reverse. If we want to get more out of the land, the reward to the producer must be allowed to rise: it is insufficient to offer the farmer merely his cost of production plus a reasonable profit—there must be real monetary incentive on a grand scale until the needs of the community are met and a new equilibrium is attained. Under the old regime of supply and demand such a change would have occurred; and from the economic angle the necessity for it can be decisively demonstrated.

As things stand today the nutritional and social policies of the Government keep the price of food to the consumer under rigid control; and, despite the subsidies, the reward to the farmer is fixed by reference to cost of production. By obscuring the possibilities of a rapid rise in production of food, this policy has played into the hands of the export industries, to which we are told to look for the £300–400 million needed to balance our import-export account. These industries have been given priorities; the home market is subjected to rigid controls; and we have almost unwittingly embarked upon an attempt to draw a still greater proportion of our man-power into industry, with all the doubtful consequences that such a policy must entail if it succeeds. The Government have thus been led into all sorts of difficulties; they have on their hands a shortage of man-power for the basic and export industries, and no real means of correcting it; and a huge bill for stabilisation of the cost of living which reflects their attempt to continue to import food on the old scale and yet maintain prices to the consumer at a low level.

Standing in too close a proximity to the industrial and commercial life of the nation, the Government and their advisers assume that salvation is only to be found by a search for pre-war standards of living along the road that leads to enhanced industrialisation. If only our planners could be induced to step back a few paces and see the goal in perspective!

INCENTIVES

If we take things in the proper order, we must surely recognise the need for a steep rise in the incentives to the producer of home-grown food—a rise sufficient to draw into the field a larger proportion of our man-power and other resources. This applies not only to the farmer

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* A previous article appeared on March 15

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[illegible]

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Special Articles

SHORTAGE OF NURSES

[illegible]

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Our present malaise is largely due to the combination of these two changes, and our failure to work out their implications.

Had the first change occurred by itself, the old corrective process of supply and demand would after its own fashion have provided a solution. There would, for example, have been a sharp rise in the prices of many things hitherto imported from abroad, and in due course a reallocation of our internal resources between one occupation and another. This would have been attended by high prices and high wages in some occupations, and by low prices, low wages, and unemployment in others. Though the social consequences would have been most uncomfortable, and the cost in human welfare very heavy, the economic machine would eventually have attained a new equilibrium.

Had the second change occurred by itself the picture would again have been different. The determination to put social welfare above industrial laissez-faire means primarily two things: (1) the setting of a brake on the old corrective machinery of supply and demand, and especially on its chief instrument, unemployment; and (2) redistribution of the national income to ensure a fair share of the necessities of life for all before superfluity for the few—a redistribution which has been attained partly by taxation, partly by rationing, and partly by food subsidies. These things—rather than the present drive for nationalisation and a "planned economy"—are the essential features of the drive for social justice on which all parties are at heart agreed.

Now had this programme had a fair field in which to operate—i.e., relatively stable economic conditions—a great social advance would almost certainly have been achieved at a moderate cost in economic efficiency. The refusal to use unemployment as a means of transferring labour from one industry to another is unimportant in relatively stable times; for other methods, such as discouraging entry into a particular industry, are sufficient to bring the desired results. Similarly, given relatively stable conditions, the redistribution of our national income by taxation, rationing, and food subsidies need not have unduly disturbed the economic machine.

The tragedy of our present plight is that these two trends are in absolute conflict. We have on the one hand an economic situation which urgently demands a reallocation of our resources, and on the other hand a social policy which not only abhors the old corrective mechanism but actually obscures the need for any adjustments at all. We cannot go on fumbling like this. If we are to retain the measures we have already taken for social betterment, and to go further on the same path, we must promptly devise some means of distinguishing more clearly between economic necessities and social objectives. Without this clear-cut distinction, the "planning" which is now our recipe represents no more than a groping towards a solution. Once the economic necessities stand out stark and clear we can consider how far their operation can be controlled in the interests of social welfare.

THE FOOD PROBLEM

The conflict between these two forces is nowhere more evident than in our handling of agriculture. Until 1939 we pursued a policy of importing food—to such an extent that half our import bill was in respect of food, and only about 40% of our requirements was produced at home. Today the import-export balance has undergone a radical change, and we cannot find enough foreign currency to pay for food imports on the old scale. But though we have granted the farmer fixed prices and thereby improved his prospects, we have not yet recognised the need to devote to home agriculture a far greater proportion of our resources.

The adjustment required can be grasped only if we remember that for over a century agriculture has been steadily drained of man-power, not only in numbers but in quality, since able and ambitious men have been steadily attracted into industry and commerce. In estimating what home agriculture is capable of providing, it is idle to use figures (like those of the white-paper recently published by the Government) which ignore the possibilities of a policy which would put this process into reverse. If we want to get more out of the land, the reward to the producer must be allowed to rise: it is insufficient to offer the farmer merely his cost of production plus a reasonable profit—there must be real monetary incentive on a grand scale until the needs of the community are met and a new equilibrium is attained. Under the old regime of supply and demand such a change would have occurred; and from the economic angle the necessity for it can be decisively demonstrated.

As things stand today the nutritional and social policies of the Government keep the price of food to the consumer under rigid control; and, despite the subsidies, the reward to the farmer is fixed by reference to cost of production. By obscuring the possibilities of a rapid rise in production of food, this policy has played into the hands of the export industries, to which we are told to look for the £300–400 million needed to balance our import-export account. These industries have been given priorities; the home market is subjected to rigid controls; and we have almost unwittingly embarked upon an attempt to draw a still greater proportion of our man-power into industry, with all the doubtful consequences that such a policy must entail if it succeeds. The Government have thus been led into all sorts of difficulties; they have on their hands a shortage of man-power for the basic and export industries, and no real means of correcting it; and a huge bill for stabilisation of the cost of living which reflects their attempt to continue to import food on the old scale and yet maintain prices to the consumer at a low level.

Standing in too close a proximity to the industrial and commercial life of the nation, the Government and their advisers assume that salvation is only to be found by a search for pre-war standards of living along the road that leads to enhanced industrialisation. If only our planners could be induced to step back a few paces and see the goal in perspective!

INCENTIVES

If we take things in the proper order, we must surely recognise the need for a steep rise in the incentives to the producer of home-grown food—a rise sufficient to draw into the field a larger proportion of our man-power and other resources. This applies not only to the farmer

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* A previous article appeared on March 15

We consider that a shortened practical basic course of two years' duration should be undertaken by all nurses. This course should include three or four months' whole-time theoretical training in elementary physiology, hygiene, and dietetics; but the main emphasis should be on training in practical bed-side nursing. The examination should be entirely practical and should lead to qualification as "enrolled nurse." The practical training should be taken in any general *or special* hospital of suitable size. The status and remuneration attached to the grade "enrolled nurse" must be sufficient to satisfy the large numbers who would elect to remain in this grade.

For those who wished to rise to the rank of ward sister there should be one year's higher training in each of the following: medical nursing, surgical nursing, tuberculosis, fever nursing, mental nursing, and midwifery. The higher examination would be both theoretical and practical, leading to qualification as "State-registered nurse."

SPECIAL HOSPITALS

Much experience has shown that special hospitals cannot be staffed unless additional inducements are offered over and above those available to nurses in general hospitals. In fever, children's, tuberculosis, and mental hospitals student nurses and post-registration student nurses must be paid higher salaries than the corresponding grades in general hospitals. In addition, the full conditions of service recommended in the Rushcliffe report should be applied without delay to those special hospitals which have not yet put them into practice. This applies particularly to the 96-hour fortnight. Arrangements should be made for the nurse's private life to be removed from supervision by senior nursing officers. In mental hospitals there should be a longer preliminary training-school course in order to acclimatise new nurses to the treatment of patients. In those fever hospitals which are training-schools for medical students and graduates, specially attractive conditions of service are necessary in order to attract staff and so retain the teaching and other functions of these hospitals. Special hospitals of all types, provided they are of suitable size and have suitable equipment, should be able to provide adequate practical training for the basic course, leading to the qualification of "enrolled nurse."

MINIMUM AGES

The minimum age of enrolment as a nurse should be 20 years, and of registration 21 years.

CONSCRIPTION OR DIRECTION OF WOMEN TO NURSING

The plight of the hospitals must be faced: the closure of wards for lack of nursing staff is alarming, especially in London. The worst feature is that recruitment in many hospitals has virtually ceased. Within 12 months there will be a crisis unless some drastic improvement is made. Many of the hospitals, including large ones with training-schools for doctors and nurses, will be forced to close down or will be handed over to the National Health Service in a moribund state.

The facts set out above have driven some to consider that there is no ultimate solution to the problem except conscription of women, with direction of a certain number to nursing. Conscription might have to be considered seriously if all other methods of staffing hospitals failed. It would be much better, however, to attract staff voluntarily by improving the economic and other conditions of service of student nurses.

FOREIGN TRAINEES

The reduction in the total number of potential recruits, and the great demand for female labour in industry point strongly to the need for foreign immigrants sufficiently educated to train as nurses. There are, we believe, still large numbers of suitable young women on the Continent willing and anxious to come to Britain for such a purpose. Trained nurses, whether of foreign or British origin, are never likely to become a burden on the community through unemployment, but are likely to remain permanent assets.

PART-TIME HOSPITAL NURSES

The employment of part-time nurses, on the Gloucestershire model or otherwise, is to be encouraged. It is a particularly suitable method for nursing the chronic sick, since part-time nurses have other absorbing interests, and the time spent at the work is sufficient to interest and not to depress. The scope of part-time nursing in acute hospitals with training-schools, is however, limited, and the problem of staffing the hospitals as a whole cannot be greatly affected by schemes on these lines.

General Recommendations

1. Increased salaries (or training allowances) for student nurses in all approved hospitals where recruitment has seriously diminished.
2. Recognition of the principle of differential salary scales within limits for the grade of student nurse, in order to meet varying needs and conditions.
3. Recognition of the principle of "loading" for London in nurses' salary scales.
4. Establishment of pre-nursing training-schools under education authorities for selected school-girls *from the age of 15 years, with provision for small personal* maintenance grants.
5. A practical basic course of two years' training in approved general or special hospitals for all nurses, leading to qualification as "enrolled nurse," with *recognised professional status as a nurse and adequate* remuneration.
6. A higher qualification as "State-registered nurse," equivalent to the rank of ward sister. This would require advanced theoretical and special training.
7. Higher salaries for student nurses in all special hospitals as an urgent measure if these hospitals are to be preserved.
8. The minimum age for "enrolled nurse" to be 20 years.
9. Immediate arrangements for foreign immigrants to train as nurses.
10. Publicity for the advantages instead of the disadvantages of nursing as a profession, including more attractive advertising.

SOCIALIST MEDICAL ASSOCIATION

THE 17th annual general meeting of this association, held in London last Sunday, was attended by some 120 doctors and health-workers. Mr. SOMERVILLE HASTINGS, F.R.C.S., M.P., the president, said that the National Health Service Act provided a framework, sound in most (but not all) of its provisions, into which the detail had yet to be filled. Bad features were the retention of the pay-bed in hospitals, and the provision for part-time employment of doctors within the service. The association wished to see temporary health centres provided in all localities, and sites allocated for permanent centres.

The meeting adopted a resolution which welcomed the National Health Service as a positive contribution to the post-war reconstruction and pressed for staff committees in hospitals, elected by health-workers, which would take an active part in administration and policy. The association, it said, looked forward to the day when, following the inevitable reform of local government, the country's hospitals would be administered by local-government bodies. Health centres were pivotal to a satisfactory service.

The urgency of the nursing crisis was stressed in a resolution which emphasised the serious effects of the shortage of nurses, drawing special attention to the wastage of those who leave the profession before they qualify, and singling out institutional life as the main factor which deterred girls from becoming nurses and prevented completion of training. It called for the immediate transformation of nurses' homes into hostels run by lay wardens, immediate increases of pay for nurses, and the employment of part-time nurses on a nation-wide scale. An emergency resolution asked the Minister of Health not to approve any changes in the nursing curriculum without considering the views of organisations representing members of the nursing profession.

A resolution, passed unanimously, called on the Minister to resist any attempts to amend the provisions of the National Health Service Act dealing with abolition life has been represented for years in the press as one of "genteel poverty," hard domestic work (e.g., scrubbing floors), long hours, and semi-monastic severity. The facts, however, are that remuneration (except for student nurses) has been substantially increased, that ward orderlies are being recruited for the more menial tasks, that in most hospitals there is minimal interference by senior staff with the nurse's private life, and that any qualified nurse may live out. These facts, which are not yet widely known, should be publicised in every possible way. It is suggested that a propaganda film should be made by the Ministry of Health, and also that advertisements for nurses should be sited and framed so as to make a really popular appeal to prospective candidates.

RECRUITMENT OF NURSES

The shortage of nurses at present is one mainly of entrants to the profession—that is, of student nurses or other recruits.

Economic factors.—All our observations tend to indicate that, in London at least, the first and foremost reason for this shortage is the low salary offered to nurses in training under the Rushcliffe conditions of service. The Rushcliffe Committee rightly considered the nurse's prospects *after* training to be more important than an attractive salary during training. But the salary of trainees was fixed at figures which are now below the economic level and require subsidy from private sources, at least in London, if a reasonable standard of existence is to be maintained. A recent inquiry among the student nurses in a large London fever hospital as to the reasons for the virtual cessation of recruitment to the hospital revealed the following factors in their order of importance: (1) inability to live on their salary in London, (2) the unattractive uniform (mostly second-hand overalls), and (3) the erroneous belief amongst the public that student nurses had to do hard physical work and had poor off-duty time. The student nurses were pleasantly surprised to find that most of the hard work was done by ward orderlies and that the off-duty time was generous. They did not wish to live out; they enjoyed the communal life. They had no complaint as to restrictions on their private life, but in some cases resented "bullying" by certain ward sisters.

The Rushcliffe salary scales for student nurses, although slightly increased since 1943, have been rendered out of date by (1) the rising cost of living since 1943, and (2) the Hetherington scales for female domestic staff and the Mowbray scales for domestic staff, which have more recently come into force. The Mowbray scales recognise the principle of a "loading" of about 19% for London, which is not excessive considering the present high cost of maintaining even the smallest degree of social life in London. This principle should certainly be applied to nurses' remuneration.

WEEKLY WAGES OF CERTAIN RESIDENT STAFF *

	£	s.	d.
Student nurse, 1st year	1	1	2
" " 2nd year	1	5	0
" " 3rd year	1	8	0
Staff nurse (fever-trained) 1st year..	2	2	4
" " (general-trained) 1st year	2	6	2
Student nurse, general-trained (fevers)	1	14	7
Domestic assistant	2	17	0

* Plus board, lodging, uniform, and laundry.

A student nurse has to work and study for about seven years from the age of 17 or 18 before she attains to the remuneration of a maid aged 18 years. When superannuation, insurance, and the other necessary contributions are deducted, she has some 17*s.* or 18*s.* a week on which to clothe herself, travel, entertain herself on her day off, meet personal items of expenditure, buy textbooks, and pay examination fees.

It is clear that a higher salary (or training allowance) for student nurses is needed in those hospitals which cannot now attract recruits—e.g., fever, tuberculosis, mental, children's, and certain general hospitals. It should not be applied uniformly everywhere, for that would not cure the maldistribution of student nurses that now exists owing to the vast majority applying for admission to the great voluntary hospitals with medical schools. In order to preserve the balance, higher salaries (e.g., £100 plus emoluments) are needed in the less attractive hospitals; and in London, there should be a "loading" of 15–20% as in the Mowbray scales.

Social factors.—Formerly the sense or spirit of vocation was one of the most powerful motives in the recruitment of nurses. It inspired them to endure the discomforts of poverty, hard work, and long hours of duty. For this they earned the high respect of the community, and they also experienced a sense of satisfaction in their work which was largely its own reward. This unselfish spirit, however, came to be exploited by hospital authorities and the public; and this led gradually to the present emphasis on the economic factor. The economic motive cannot now be displaced, but it is still far from being the only motive. The sense of satisfaction derived from succouring helpless human beings will always remain the greatest attraction of nursing, and should ensure its professional status. This motive should be fostered in recruitment, especially among senior school-girls. In these times of economic stress, however, it is useless to rely upon the vocational motive, without at the same time offering reasonable monetary inducements.

TRAINING

The gap from 15 to 17½ years of age.—It is generally agreed that many potential recruits are lost because their interest in nursing is not sustained between the school-leaving age and the age of entry as a student nurse. Various efforts have been made to bridge this gap, but with little success. It is now clear that in order to obtain enough suitably educated nurses it will be necessary for education authorities to set up pre-nursing training-schools for suitable girls from the age of 15 years. A small maintenance grant would be necessary in most cases, especially in London. Subjects of instruction should include further general education, mothercraft, nursing methods, elementary anatomy, physiology, hygiene, dietetics, and domestic-science subjects—e.g., cooking, washing, and care of linen. During this course periodic visits might be made to day nurseries and hospitals, and in the last year of the course the girls might be fully employed in day and residential nurseries. An admirable scheme of this sort is actually in operation in the city of Dundee.

While this scheme would be expensive, it would be a substantial gain to education, it would materially aid the staffing of hospitals, and it would tend to eliminate wastage by better selection of recruits. Recruitment to these courses could be greatly stimulated through occasional lectures by selected speakers of wide general outlook to senior school-girls.

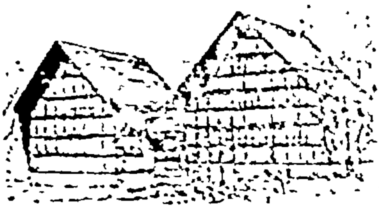
Short practical basic course.—The regulations of the General Nursing Council are too exclusively directed towards the enhancement of the professional status of the nurse and too little towards the production of sufficient practical nurses to care for the sick. The many women who are cut out for the practical work of nursing, but who are unable to master the theoretical teaching of the present syllabus, are not sufficiently encouraged to become nurses. They can, of course, train as an "assistant nurse," but the implied inferiority is not encouraging. This category is, moreover, at present largely made up of the early failures among student nurses, and is set to work almost exclusively at the less popular forms of nursing—e.g., the chronic sick.

The number of nurses required in the country is so large that it is wasteful and indeed impracticable to train them all, or even a high proportion of them, to undertake the most highly skilled work. The work of the hospitals demands large numbers who need no more than the basic skills of practical nursing, and only relatively few with an advanced theoretical training. But in order to give reasonable satisfaction to all concerned, the former group must be thoroughly well trained in practical bedside nursing, must be accorded the status of "nurse," and must have remuneration adequate to their status. We consider that the whole of the regulations of the General Nursing Council should be redesigned to this end, and that the Council should be endowed with responsibility for ensuring that its regulations for training are compatible with an adequate flow of recruits to the profession.

In England Now

A Running Commentary by Peripatetic Correspondents

I FIRST saw the children as they came running into their chalet for the midday meal, hungry and happy. It is easy to be sentimental about children, especially children who have come from concentration camps, from holes in the ground, from the garbage heaps of Europe—and all of them orphaned by the war. Certainly they do not spend much time on sentiment at the Pestalozzi children's village. They are anxious to get on with the work and to build more houses for new arrivals—houses without the slightest smell of an institution: no uniforms, no severe matrons, no barred windows or locked doors. Each nation has its own chalet, like the one illustrated here, where about 20 children from five to twelve years old are to live for ten to fifteen years. They are looked after by house-parents and treated as a large family.



Chalet at Trogen.

The village is at Trogen, in the north-east corner of Switzerland, five miles from Lake Constance. It is named after Johann Pestalozzi, the Swiss educationist, who died in 1827 at the age of 81. Disliking and distrusting the orphanages of his day, he collected as many down-and-out orphans as he could cope with, and brought them up as a family, regardless of their race or religion. It was in this spirit that W. R. Corti, a firm believer in Pestalozzi's ideals and the editor of an influential Swiss magazine, conceived the plan of the children's village. Switzerland was already giving holidays to war orphans, but he thought that three months' holiday was not enough. A child would soon forget this happy time when it returned to its own unfortunate country; better, he thought, to give a few children a really good home. So the scheme was started, and public subscriptions poured in. School-children of all ages gave up their holidays and went to help build the chalets; Swiss townsfolk sent practical gifts, and villages too poor to give money went out into the forests to fell trees, to be sold for the good cause.

Our arrival at the Austrian chalet was unexpected. We found the house-father helping one of the children to make a boat. Each chalet, set in a landscape of green hills and woods, has a playroom stocked with constructional toys and carpentry materials, bedrooms holding four or five children, and a modern washroom with showers. Each child has his own cupboard which he has carefully labelled with his Christian name only, because most of the children don't know their surnames. The young and energetic chief organiser proudly showed us houses already finished, and others in the building. But he knows that unless large sums of money can be raised the whole village will have to be written off as a failure.

We lunched in the French chalet with the children. They were happy members of a family; when the "parents" came in (young married people with a child of their own) the children rushed eagerly up to clutch at them and kiss them. During lunch the house-mother told the children that in the afternoon they were going to watch a tree being felled for them. This pleased and excited them, for they realised well enough it meant more help for the village.

In one room a piano—the only one the village has been able to afford so far—is the gathering point for a weekly sing-song, when all the different national songs are sung. The children like painting, and one twelve-year-old Polish boy was found in Warsaw scratching designs on the pavement. When he came to the village and was given all the painting materials he liked he worked every day at vivid but lurid scenes of street-fighting and battles. A freshly coloured landscape, just done, was the first work he had produced which had nothing to do with the war. Possessions are still a wonder to them: Johnny gets up each morning long before the rest to sit at his table in the school-room. When asked why, he said: "Because it is my own."

In Zurich we visited Herr Corti, who believes that now is the time to make the village an international affair. He wants to see other nations build such villages. France and Italy and a few other European countries are already interested. He even wants to build a house for the war-orphans of our country. But Switzerland alone has neither the money nor the scope to do all that must be done. Is it not time that we had an English village for children of all nations?

* * *

Her adenoids caressed the "well, I guess those were genu-ine Bedou-ine (both rhyming with wine) A (as in cake) rabs." We fled from her through the mountains to the Red Sea, to Suakin. One story about the origin of this old and now ruined port is that seven beautiful virgins, a present from the king of Abyssinia to the court of Egypt, once stopped the night there. When they finally arrived in Egypt they were all found to be pregnant, and the eunuch in charge was blamed. He escaped the king's wrath, however, because the girls claimed to have been visited during their night's halt by seven ginns who were the cause of their trouble. Pharaoh therefore packed them off back to the port, where they kept up their prolific reputations. On this theory the name Suakin comes from *Sawwa ginn*, which means "the ginn did it."

Having wandered through the old place, where some of the 1884 campaigns were fought, and the pilgrims now gather Mecca-bound, we went fishing. It was like using a bent pin in an overstocked aquarium. From the boat one could see through the crystal-clear water a million colours in nearly as many fish queueing for the old sardine. I. Walton would have been staggered by the experience.

* * *

We had a house-party the other day. Some jovial types coupled up the fire hose and inundated half the hospital. Then they threw a sofa and a bicycle out of a fourth-floor window. Next morning they felt terribly ill—especially when they heard that they had to pay for the damage. One would have thought that they had learnt their lesson. But no: they say: "By George, that was a wonderful party. Old so-and-so was absolutely stinking. Do you remember? . . ." They are looking for another excuse to blow off steam. Odd how educated men of above normal intelligence can behave when exhilarated en masse. Even when drunk they are lovable characters, but put them together when they are in that condition, and the whole appears to be very different from the sum of its parts.

* * *

Do many members of our profession look forward to Sunday mornings as much as I do? What joy to wake, not alas as one should in May to the cheerful singing of birds but to the monotonous sound of rain dripping on the lino outside, and to know that on this day at any rate I need not rush out wash-basin in hand to stay the flood before it cascades into the drawing-room below. "On Sunday the doctor breakfasts in bed." The family surges round me. The two children are ordered by their despairing mother to "get into Auntie's bed and keep quiet." My bath towel may be used to mop up the landing. My comb may be broken over the two-year-old's head. My secret store of handkerchiefs may vanish before my eyes, and the baby be potted in my bedroom as its Sunday treat. But all this is part of the joy of anticipation. Nine o'clock strikes. The gong is sounded and they are all gone. The elder child can vomit its breakfast. The cat can steal the baby's kipper, and the toast can be burnt to a cinder. I am away from it all. My housekeeper brings in my favourite dish. I relax and enjoy it. Truly a doctor's life has its moments. And if Sunday morning eight to nine is not one of the high spots nine to ten certainly is.

of the buying and selling of practices, the better distribution of doctors, and the inclusion of a basic salary in the payment of all doctors. Other resolutions called for the permanent provision of day-nurseries for children up to five years of age, and the abolition of charges for school meals. The nationalisation of all water undertakings was demanded, and legislation was urged for the abolition of patent medicines. The need for price-control for all essential foodstuffs was the subject of another emergency resolution, which was passed, and the last resolutions of the day expressed the need for a national economic plan, and for speedy demobilisation to overcome the man-power shortage.

The officers for 1947–48 will be: president, Mr. Somerville Hastings; vice-presidents, Dr. H. H. Joules and Dr. D. Stark Murray; hon. secretary, Dr. D. E. Bunbury; treasurer, Dr. L. T. Hilliard.

Medicine and the Law

Illegal Claim to Treat Disease

AT the Hampstead police-court on May 7 Jacques J. Harpman and the Institute of Endocrinology, Ltd., were fined £50 and £6 6s. costs each on six summonses relating to the publication of an advertisement.

Mr. A. C. Castle, prosecuting for the Pharmaceutical Society of Great Britain, reminded the court, that, under the Pharmacy and Medicines Act, 1941, it was an offence for anyone, even a doctor, to advertise an article which might be used to treat a number of diseases whereof cure was deemed either very difficult or hopeless; among such diseases, listed in section 8, were diabetes, infantile paralysis, and epilepsy. The defendant company, which was registered in 1931, formerly traded at Baker Street, London, W.1, and was now at 31, Heath Drive, N.W.3. Last October a Mr. John F. Armstrong wrote a letter to the institute asking for particulars of a certain treatment. He received in reply a list of ailments treated by the company, which included epilepsy, infantile paralysis, and diabetes. In the same envelope was a booklet, entitled "Hormone Therapy," bearing the name of the company, and that of Mr. Harpman, the managing director; this was apparently designed to impress on its readers the importance of the glands, in particular the pituitary, the thymus, and the pancreas. On the pituitary it said: "In short, the gland has a controlling influence in the growth of bones . . . such diseases as debility, impotence and epilepsy." On the pancreas: "The system needs sugar, but not too much . . . if it becomes flooded, we have a disease known as diabetes." On the thymus: "It is also used in other diseases of childhood such as infantile paralysis." In other parts of the booklet it was stated that "glands seldom work normally . . . let members of our Institute ascertain (the position) with their modern knowledge." Then in large block capitals: "Restore balance by our fresh hormone preparations."

Interviewed on Feb. 11 by an inspector of the Pharmaceutical Society, Mr. Harpman said he qualified as a doctor in South Africa in 1903 and was in practice till 1930. His age was 69 and he took his M.D. at La Plata University. In 1930 he founded the Institute of Endocrinology. The booklet was published in 1935 and he was not now distributing it. He had a few copies left and that was how it came to be sent to Mr. Armstrong.

Mr. Christmas Humphreys, defending, said that the institute had an enormous practice and had done a great deal of good work. There had never been a summons previously. Over 200,000 booklets had been distributed. "Then came the Act—a very remarkable document, because there are many thousands of people registered, and as many unregistered, who are required to heal their fellow-men of a variety of diseases mentioned in it. The Act discusses hopeless diseases; it says no person shall claim to treat the diseases mentioned. He may treat them, he may cure them, but he must not claim them. He must not advertise. The defendants have had to plead guilty to claiming to do something which they probably do do."

In spite of its frankness, this argument appears to have little effect. However that may be, the directors of the institute have now been made aware that further use of the booklet is definitely illegal.

Public Health

Decentralisation in London

THE London County Council has been considering how best to administer the local and domiciliary health services for which it will become responsible next year under the new Act. Some of these services are already administered by the council; others will be transferred to it from the metropolitan borough councils, still others are new duties. Last year the council resolved that the administration of these personal health services should be decentralised as far as possible and the plans drawn up by the L.C.C. general-purposes committee, after consultation with the borough councils, to give effect to this resolution were submitted to a meeting of the council on May 13.

The central administration of the services will be in the hands of a committee of whom 30 will be members of the L.C.C. and not less than 10 will be appointed from members of the City corporation (1) and borough councils (9). The remaining 6 will be coöpted. The day-to-day administration of the services will be entrusted to divisional health committees and for this purpose London has been divided into 9 divisions. The local committees, which will be appointed by the central committee, will have 12–23 members drawn from the borough councils included in the division and the L.C.C. in the ratio of 2 to 1. Each committee will also have 6 coopted members. Besides their responsibility for the detailed administration of the services the committees will report to the central committee on "local considerations," and they will be empowered to spend up to £500 "in any one case."

Smallpox

At Bilston, Staffs, the disease, originally thought to be variola minor, has proved to be variola major. As reported last week, a labourer, not included in the list of contacts, was taken ill on April 25 and removed to hospital on May 1, where he died the following day. Now his wife, vaccinated 64 years ago in infancy, and his son-in-law, aged 30 and unvaccinated, have developed the disease (vaccinated May 2; onsets May 7 and 8; rashes May 11; removed to hospital, May 11).

At Coseley, near Bilston, a woman, aged 78, confined to her house for several weeks past with bronchitis, developed high fever about May 1; the condition was diagnosed as pneumonia. A rash, first noticed on May 7, was thought to be due to chemotherapy, but by May 9 it had become semi-confluent; and on the same day the patient, now very ill, was removed to hospital. The original case at Bilston is said to have visited this patient's house "about a month ago."

A case of smallpox reported from Sheffield cannot at present be associated with a known source. An unvaccinated schoolboy, aged 11 and living in a tenement house, sickened on May 1 and developed a rash on May 4. The diagnosis was confirmed and the patient removed on May 10. Fortunately he had been confined to bed since the onset.

Infectious Disease in England and Wales

WEEK ENDED MAY 3

Notifications.—Smallpox, 1; scarlet fever, 873; whooping-cough, 2033; diphtheria, 186; paratyphoid, 1; typhoid, 1; measles (excluding rubella), 8142; pneumonia (primary or influenzal), 516; cerebrospinal fever, 52; poliomyelitis, 7; polioencephalitis, 3; encephalitis lethargica, 3; dysentery, 122; puerperal pyrexia, 122; ophthalmia neonatorum, 87. No case of cholera, plague, or typhus was notified during the week.

The case of smallpox was notified at Bilston, Staffs. Of the 122 cases of dysentery, 76 were notified in Lancashire (including 32 at Prestwich, 18 at St. Helens, 15 at Liverpool, and 6 at Whiston).

Deaths.—In 126 great towns there were no deaths from enteric fever, 2 (0) from scarlet fever, 2 (0) from diphtheria, 10 (0) from measles, 22 (3) from whooping-cough, 73 (6) from diarrhœa and enteritis under two years, and 12 (2) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 250 (corresponding to a rate of 26 per thousand total births), including 47 in London.

At the same time, I do not believe that the scientific attitude will lead to loss of liberty, but rather that understanding of the limitation of our ethical ideas will enable us the better to control our destiny, increase our freedom and tolerance, and further the highest aim of man—the increased happiness and well-being of our fellow-men.

London, W.1. RICHARD DOLL.

EXCHANGE VISITS WITH CONTINENTAL DOCTORS

SIR,—The World Friendship Association is anxious to hear from medical practitioners who are interested in the following plan: (1) to receive as a guest for fourteen days during August a medical practitioner from Denmark or Holland, and (2) to visit during the month of September a medical practitioner in Denmark or Holland and stay with him as his guest for fourteen days.

The cost of the return journey to Denmark from the port of embarkation will be 15 guineas; and for Holland the cost will be £9 10s. In addition a fee of 12*s.* 6*d.* is payable for membership of the association. The visits will normally be direct exchanges and are contingent upon hospitality being afforded here.

The World Friendship Association is an organisation which exists to foster understanding by arranging mutual visits. Hitherto its facilities have been available only to school-children and members of youth organisations; but it is now possible to extend them to adults.

Practitioners who are interested should write to Mr. G. A. Talbot, World Friendship Association, 29, Portman Square, London, W.1, marking the envelope "Medical Exchange."

London, W.C.2. RICHARD W. DURAND.

HOSPITAL ADMISSIONS

SIR,—May an assistant in general practice, who has had recent experience of the admission of patients to hospital from both ends of the telephone, make five comments on your article last week?

1. In the course of admitting nearly 60 patients to various hospitals in this area in the past year, I cannot recall any instance where the time between the hospital answering the telephone and the house-officer accepting or refusing the case was more than five minutes. Time has been wasted in some cases, but this was usually due to delay in getting the hospital number—i.e., the responsibility lies with the local telephone exchanges.

I should add here that most of my cases are sent to a large voluntary hospital in which the house-officers admit on a rota.

2. Any hospital with more than 200 beds which does not possess a buzzer, broadcasting, or other signalling device for summoning house-officers should be regarded as an anachronism. The value of such systems in speeding admissions is out of all proportion to the cost of instalment.

3. Much tiresome delay for the G.P. would be avoided if he would familiarise himself with the admission systems of the hospitals in his area. For example, in some hospitals time may be wasted in summoning the house-surgeon to admit a fractured femur, when the casualty officer is the man to do it. It may save time also if it is known that there are house-physicians for adult and for children's work, and house-surgeons for general work and for ear, nose, and throat.

4. The system by which one medical officer has responsibility for all admissions has the advantage of simplicity, and should be the rule in all small hospitals and in those without signalling devices. Where a signalling device has been installed, the house-officer rota system can be made to work as well, if not better, and the advantage for the G.P. is that he can talk to the man who is going to look after his patient, instead of passing messages through a go-between.

The only serious drawback to this system seems to be an occasional wastage of the patient's time on arrival at the hospital receiving-room before the appropriate house-officer arrives on the scene. I would suggest that all dangerously ill patients be sent direct to the wards, and that the housemen should take the G.P.'s word for the state of their patients.

5. Finally, the three hospitals in which I worked all used the admitting-ward system, but it was the duty of the house-officer to see that beds were available for emergencies during the take-in period. He would do this either by transferring convalescent cases to other wards or to convalescent homes, or else by reducing the admission of waiting-list cases.

Stokenchurch, Bucks. C. J. H. STAREY.

EMOTIONAL EFFECTS OF TRAUMA

SIR,—In my opinion Dr. Csillag (May 3) has underestimated the emotional effects of severe trauma. While I agree that amputations for grossly traumatised or severely infected limbs are rarely refused, it is difficult to accept the statement that "amputations are never followed by depression or suicidal tendencies." This may have been the case in battle casualties and other war injuries, but in civilian surgery the depression and often extreme melancholia which follows the loss of a limb is a factor with which every surgeon has to contend.

Probably the improvement which Dr. Csillag notes in the 2 cases reported was due to two factors: (i) the relief from pain afforded by removal of an infected or grossly traumatised limb, and (ii) general systemic improvement following the removal of a secondarily infected elbow-joint. The idea of giving a fretting and irritable child "something to cry about" can hardly be extended to traumatising a schizophrenic for the purpose of producing a shock.

Edinburgh. J. W. PERROTT.

PETHIDINE ADDICTION

SIR,—In his interesting paper of May 3, Dr. Polonio states that in pethidine addiction relapses are common, and then goes on to say that "none of our patients has relapsed hitherto." The general experience seems to be that relapse is inevitable unless patients accept a long period of psychotherapy, re-education, and rehabilitation.

As a rule addicts present themselves for treatment because it is socially or economically expedient to do so, or because they have infringed the law. The desire to be cured is mere lip-service to environmental pressure of one kind or another, and it rarely comes from a fundamental urge to reintegrate their personalities and reorientate themselves to a normal way of living. In other words, the desire for cure rarely arises spontaneously from within the addict. Moreover, as a group, drug-addicts are so unstable, and their lives become so complicated, that they seldom have the patience, or the means, needed for undertaking a complete cure.

I should be interested to hear how long Dr. Polonio's patients were under treatment before he considered them cured. It is comparatively easy to disintoxicate drug-addicts, but quite another matter to free them from the psychological craving which ultimately causes them to relapse.

London, W.1. ELLIS STUNGO.

SEASONAL CHANGES IN INSULIN REQUIREMENTS

SIR,—I should like to draw attention to a phenomenon which I have observed regularly each spring in some diabetic patients.

In a few of those who have been under my care for some time I have noticed that the insulin requirements change in the spring and again in the late autumn. In one case, which was otherwise well controlled, hypoglycæmic reactions suddenly became frequent in April and the insulin unitage had to be reduced; in the late autumn the dosage of insulin had to be increased to its previous level. Other cases of mine have shown similar though less dramatic variations. In none of these patients was there any increased bodily activity to account for the spring reactions; and likewise there were no complications to give rise to the hyperglycæmia and glycosuria in the autumn.

It seemed that the requirements of insulin in these people underwent a seasonal change, increasing in the winter and decreasing in the spring and summer. I should be interested to know if other practitioners have noticed similar changes.

Preston Hall Hospital, Maidstone. G. R. W. N. LUNTZ.

Letters to the Editor

ACADEMIC FREEDOM

SIR,—In the lecture you published on May 3, Professor Polanyi has, it seems to us, given a warning about the dangers in store for the younger scientific workers. His analysis of the freedom of the scientist is of great importance at a time when the whole conception of "freedom" has become the central theme of debate about the National Health Service.

There are two main fallacies in Professor Polanyi's arguments. Firstly, his two different concepts of freedom, "freedom from external constraint" and "liberation from personal ends by submission to impersonal obligations," are not, as he suggests, "near opposites"; at best they are statements of one aspect of the problem of freedom. Secondly, there is not in fact the hard-and-fast differentiation of scientists, or of science for that matter, into "pure" and "applied," of which he writes. Study of the history of science shows that there has never been any such thing as "research conducted for the advancement of knowledge" as distinct from applied science. Many scientists may think that they are just advancing "pure" science or knowledge, but in reality they are, to greater or lesser degree, helping to solve the problems of the society they live in. Newton is often quoted as an example of a "pure" scientist, but when one comes to examine his *Principia Mathematica* one finds that in this work he attempts to find the theoretical basis for the solution of the most important, practical, economic problems of his day. Thus, his work on ballistics arose from the social need to improve the accuracy of firearms, and his work on specific gravities from the requirements of the shipbuilding industry, &c. In other words, these sorts of problems were thrown up, as it were, by his particular economic and cultural period, and the measure of Newton's genius is the extent to which he helped to solve these problems and lay the foundations for the solution of many other, future problems. Similarly, the measure of Einstein's genius has been not the "beauties" or "internal logic" of his theories but the extent to which these theories solve practical problems. Conversely, the so-called applied science of the atomic bomb has helped to solve many "theoretical" problems of physics. In fact there is an indissoluble unity between the theoretical and applied aspects of science; "pure" science never has existed and never will.

The historical process of selection whereby certain scientific work emerges as important and other work (by far the greater proportion, incidentally) is forgotten, is not an haphazard one; it is essentially one by which theory is tested in practice—i.e., how far these theories fulfil the needs of society.

Freedom, whether scientific freedom or any other type, as Professor Polanyi verbally admits but implicitly denies, is not an absolute quality. As man's knowledge advances, as he is able to gain an increasing degree of control of his environment, so does he become more "free." Freedom consists in a mastery over ourselves and external nature founded upon the knowledge of the necessities of nature. In so far as man is able to find out the factors—economic, political, biological—which affect his actions, so, if he is able thereby to influence these factors and change nature, he has freedom. The extent of this freedom is determined by the accuracy of his knowledge and understanding, on the basis of which he can influence his environment.

If Professor Polanyi's general conclusions are applied to the present state of medicine it can be seen that they are not realistic. There is no sharp division between the "advancement of [medical] knowledge" and applied medicine. The two are interdependent. We doubt if other scientists would agree that there is a choice between "dedication to the advancement of a system of knowledge which requires freedom, or pursuit of applied science which involves subordination," but in the realm of medicine we are sure that such a distinction does not exist.

The "freedom" which we desire is not the spiritual abstraction of the Professor but the organisational facilities afforded by a planned service, to solve the very real medical problems which confront us. This does not mean a blind submission to "external authority" but active participation in formulating the plans which we ourselves will carry out.

London.

A. W. LIPMANN KESSEL
A. MCPHERSON.

SIR,—Professor Polanyi's lecture is valuable in showing that scientific and academic freedom is not an isolated phenomenon but is related to the totality of its social surroundings: it cannot be guaranteed merely by institutional forms, but blossoms only when the cultural and ideological traditions of the social milieu favour its growth. He rightly points out the difference between the anarchic individualist and the self-discipline of the individual scientist, with his multiple relations with his fellow-workers and with the whole body of traditional science.

But why should Professor Polanyi want to imprison the tradition and ideology of scientific freedom in the strait-jacket of philosophical idealism? History is against him. Plato in ancient Greece and Hegel in modern times have been the leading exponents of philosophical idealism and of the totalitarian State. The materialist tradition, from Epicurus and Lucretius to Voltaire and Marx, has favoured the free growth of science.

There is no necessity (except as a matter of personal faith or preference) to postulate a spiritual reality as the distinctive and unifying factor of science: what distinguishes the tradition of science from cabala, witchcraft, and astrology is the constant unification and testing of hypothesis in the light of verifiable facts. The revolutionary in science claims to be heard because he believes that his new hypothesis explains better than previous hypotheses a known range or a greater range of socially verifiable facts. Neither the discovery of sulphonamides nor that of their mode of action are discoveries of "hitherto hidden spiritual realities," but of material agents and of their mode of action in the presence of other material agents, in specific quantities and circumstances.

This constant testing of hypothesis with fact is the distinctive spiritual or moral tradition of science—not the search for spiritual objectives. This constant return to the world of facts and of social action also invalidates the too-sharp distinction drawn by Professor Polanyi between academic science and applied science. The two aspects of science interact on each other: each is necessary to the growth of the other; each languishes without the other. It is indeed a pity that Professor Polanyi feels himself compelled to believe that only those who hold certain unverifiable metaphysical assumptions are true and consistent champions of freedom.

London, W.1. E. MONTUSCHI.

SIR,—Professor Polanyi's article was extremely interesting—but how depressing! Is there really no other means of securing academic freedom than by demanding belief in essentially unconfirmable hypotheses? Science certainly requires acceptance of the reality of the external world, but beyond that some sort of experimental evidence is necessary before beliefs can be confidently held.

Professor Polanyi asks us to give reality to "transcendent ideas" with spiritual foundations, such as "absolute truth" and "absolute justice." Now, "transcendent" has different meanings in different systems of philosophy; but it is probably most often used in the Kantian sense of not realisable in experience, and I hesitate to acknowledge as transcendent, in this sense, more than is absolutely necessary.

Truth is the description of reality, and the conception of it must be relative to the observer and the existing sum of knowledge; the object of science is continually to make this description more general and more exact. Justice, which is a concept arising from the social relations of humanity, has been evolved for the protection of both the individual and the group; and no-one can hope to be just who does not realise the limitations of justice. History shows that in the name of transcendent ideas groups of men, such as religious sects, have carried out persecutions comparable to those of Hitler.

Parliament

ON THE FLOOR OF THE HOUSE

LATE night sittings and many divisions always bring discussion of the relative merits of American and British methods of voting. At Westminster M.P.s march through the lobbies, whereas members of the House of Representatives in Washington answer to a roll-call. But any one who has seen both methods has no doubt that the Westminster way, for all its seeming cumbrousness, is the quicker.

On Monday the third reading of the Transport Bill took place at 11 P.M. But after that we had a debate on physical education, and Mr. D. R. Hardman, parliamentary secretary to the Ministry of Education, was not very encouraging. The plans for a national college of physical education prepared by a committee under the late Lord Dawson of Penn proposed a building costing £350,000. But that cannot be carried out in this time of building and financial priorities. The National Fitness Council which was buried in 1939 remains buried, but the Minister said that this does not mean it cannot be resurrected.

Tuesday, Wednesday, and Thursday were taken up with the committee stage of the National Service Bill. The reduction of the period of service from 18 to 12 months—notified before Easter and immediately after the earlier debate—led to a spate of critical eloquence from Mr. Winston Churchill, but the Government carried their amendment after a division in which a bare handful voted against it; for the Opposition, while delighted at the chance to castigate the Government for their change of attitude, were not willing to lose the chance of passing a National Service measure in peace-time.

The medical and dental clause of the Bill, clause 9, was passed with a friendly comment by an Opposition medical M.P. and a brief explanation by the Minister of Labour in which he referred appreciatively to the work of the Medical Priority Committee. The medical side of the Services is as well organised as any and better than most, but there will be need to use our medical man-power economically for some time to come.

In the House of Lords Lord Woolton called attention to the danger of a serious shortage of food in this country, but disclaimed any intention of dividing the House or of unduly embarrassing the Government. A serious criticism made by Lord Woolton was that British farmers are not producing now as much as they did in the war. They could, he affirmed, give us an additional £150 millions worth of foodstuffs at present prices.

Lord Henderson's reply was reassuring but he was subjected to more interruption than is usual in the House of Lords. Perhaps there was a touch, or more than a touch, of politics in it. And, as Lord Woolton said, food and politics do not mix well. Lord Addison had to intervene at one point to say "this is not a question-and-answer entertainment; we are having a serious debate on food." Lord Henderson summed up by saying that Lord Woolton had fallen into an exaggerated condition of alarm and despondency, the situation was not really as bad as all that. But it seems likely that food facts will become missiles of controversy—and in the process a greater, even if often inaccurate, knowledge of food will be spread abroad.

MEDICUS, M.P.

FROM THE PRESS GALLERY

Peace-time Fare

The two-day debate in the Lords showed how pervasive food is, for it ranged with pertinence over agriculture, housing, man-power, foreign loans, and international trade. Lord WOOLTON opened the discussion on May 7 by saying that in his opinion we were in danger of a food crisis as serious as the fuel crisis during the next few months when the yield of the previous harvest would have been consumed. He begged the Government to be frank with the country. People wanted food, not "pep" talks, and he doubted whether our heavy workers were getting the right sort of food to enable them to give increased production. Lord Woolton quoted an article by Dr. Franklin Bicknell in the *Medical Press* (May 7) in which it was stated that: "England is dying of starvation. . . . Fat is what miners, farmers, fishermen, housewives all demand. Lack of fat is why we are all worn out."

Government buying was not giving us the goods, and people felt it would be better to have less politics and more knowledge in providing our food-supplies. If our dollars were dwindling why did we buy luxurious fruits? With our dollar shortage it was lamentable that British farmers are not producing as much as they did in the war. Lord Woolton surmised that the meat situation was serious. We were living beyond our income, and between January and April had used 150,000 tons of our stocks, and the loss of livestock in the bad winter had not yet been felt. Turning to bulk purchasing Lord Woolton affirmed that we were confusing the separate functions of government and catering, and trading and politics made bad companions. But he was, he added, concerned about supplies, not prices, and he begged the Government to secure food for the nation, never mind by what means.

Lord HENDERSON said the Government did not anticipate any disastrous increase of serious food shortage. There might be temporary cuts in some foods, but there would be increases in others. If there was no immediate prospect of a general removal of rationing control, there was no justification for alarmist prophecies of crises, and the prospects of a fair, though not a bumper, harvest were far better than anyone a month ago could have thought possible. We had, he admitted, been finding it difficult to maintain our supplies of wheat, and our present stocks made careful control necessary. But supplies from Canada now were coming forward freely and if this year's harvests were good it might be possible to abandon bread rationing. It was expected to increase the rations of animal feeding-stuffs in the coming year and to maintain the sugar, fats, and soap ration at their present level, but the meat ration might have to be reduced to the level ruling at this time last year. Potato supplies would be adequate to the demand, the supply of tea was being maintained with difficulty. Food was just as short now, he ended, as it was when Lord Woolton himself introduced many of the bulk purchase arrangements which he now criticised. We were not, Lord Henderson ended, living in a world of peace and plenty, but in a world that was only slowly recovering from the ravages and after-effects of war. But the Government would do their utmost to maintain and raise the food standards of the people within the limits imposed by the food shortage which continued to afflict a stricken world.

Lord BEVERIDGE recognised that today the food problem was harder than during the war, but he thought the Government did not have a clear grip of it. One of the best ways to save dollars was to increase our own agricultural produce, and that meant more men on the land and more houses for them. This Government, he also suggested, were too apt to be content with rationing; they were proud of it as a means of equality. They should aim not at supplies that will enable them to go on rationing for ever, but at supplies that will make it possible to abolish rationing.

Lord HAWKE felt that only by getting more than our fair share of food could we fulfil our part in the world recovery, yet the Government clung to the principle of international allocation. Lord SHEPHERD pointed out that in the past money had enabled us to buy food from countries such as Russia and India when the people were starving. Food was now, under UNO, the concern of an international authority which aimed not merely at regulating supplies but also at increasing production.

Opening the second day's debate, Earl DE LA WARR suggested that we could not deal with the crisis because we went on thinking of it as a crisis and not as a long-term change. We must and could produce more food at home and not regard agriculture as an emergency industry. The Earl of HUNTINGDON, parliamentary secretary to the Ministry of Agriculture, said that in the

of insanity was never raised at the trial and was never raised in the Court of Criminal appeal; and in view of the general disquiet about this case, will he assure the House that this is not a trial by doctors to supersede a trial by jury?—Mr. EDE: I am not bound in my consideration of the case by what has been submitted either to the lower court or to the Court of Criminal Appeal. I have to examine all the documents, and they are many and various, which come into my possession with regard to each case. If I have any doubt as to the mental stability of the person who has been sentenced to death it is my duty to order a medical inquiry. If that medical inquiry takes a certain course, the matter is then taken completely out of my hands.

Obituary

PHILIP ROSCOE WRIGLEY

F.R.C.S.

Philip Wrigley, who died, after a few days' illness, on May 2, will be remembered by many for his friendliness, even temper, and good sound surgery. To the first all who came into close contact with him can testify; of the second it may be told that he was one of the last to get upset, if ever he did get upset, by the trying climate of Mesopotamia where he served with the 33rd British general hospital in the 1914–18 war; and of the last, one can point out that in Manchester, when surgeons themselves needed operation, they called on Wrigley to do what was necessary.

Of an Oldham family he was educated at Manchester Grammar School, and he spent all his surgical life in Manchester's medical school and hospitals. He qualified in 1900 and obtained the F.R.C.S. five years later. At the Infirmary he was a popular and successful teacher, but he did not publish much, his main articles being descriptions of unusual abdominal cases from his extensive practice. He retired from active work about a year ago.

His brother, F. G. Wrigley, specialises in ear work in Manchester, and they are the only two brothers to have been on the staff of the Royal Infirmary together since the long-off days of the Halls, one of whom supported the Jacobite cause after the invasion of 1745.

Philip Wrigley leaves a widow, a son and a daughter.

E. B. L.

DR. S. MONCKTON COPEMAN

AT the memorial service to Dr. Copeman held at the Church of the Order of St. John of Jerusalem on May 7, Major-General R. J. Blackham said:

> "Wherever he went Copeman was an outstanding and welcome figure and his unfailing courtesy and consideration for others won him many friends in many sections of society. He loved not only humans but all forms of animal life, and as a member of the council of the Zoological Society he did much to improve the lot of the residents of the gardens he understood so well. Copeman's wide culture, travels in many lands, and retentive memory made him a delightful companion and nothing pleased him better than dispensing hospitality with a lavish hand. One of God's good men,
>
> 'He scarce had need to doff his pride or slough the dross
> of Earth—
> E'en as he trod that day to God so walked he from his birth,
> In simpleness and gentleness and honour and clean mirth.'"

MISS D. F. CLEPHAN

FOR more than 25 years, with the support of the Medical Research Council, Dorothy Clephan worked as illustrator with those engaged in radiological research and treatment at the Middlesex Hospital and the Marie Curie Hospital. She was responsible for the many coloured plates in the late Dr. Elizabeth Hurdon's *Cancer of the Uterus*. Equally successful in pen and ink, water-colour, photography, and plastic and other kinds of modelling, she was, in fact, a genius with her hands. Services such as hers are best appreciated by those who depend upon this kind of help to illustrate their problems when committing themselves to print. She was a gifted singer, and a delightful sense of humour rounded off her essentially gentle nature. She died on April 18.

S. R.

Appointments

BRASH, DAVID, M.B. Glasg., D.M.R.: radiologist, Bolton Royal Infirmary.

BULLOUGH, A. S., M.B. Manc., F.R.C.S.: surgeon, Hope Hospital, Salford.

CAMPBELL, EDWARD, M.B. Edin., D.P.H.: asst. venereologist, West Riding, Yorks.

CARRAGHER, A. E. P., M.B. N.U.I., D.P.H.: pathologist, Warrington Infirmary and Warrington municipal hospitals.

DAVIES, J. H. T., M.B. Camb.: dermatologist, Rochdale Infirmary.

DOBBS, R. H., M.D. Camb., F.R.C.P.: physician i.c. department of diseases of children, Southend-on-Sea General Hospital.

MCDOWELL, L. A., M.B. Belf., D.P.H.: deputy M.O.H., asst. school M.O., and asst. tuberculosis officer, Burton-upon-Trent.

MACPHERSON, IAN, M.D. Leeds, M.R.C.P.: consultant physician, St. James's Hospital, Leeds

NEWBOLD, J. C., M.B. Camb., F.R.C.S., M.R.C.O.G.: surgical registrar and obstetrical tutor, Jessop Hospital for Women, Sheffield.

SAVAGE, JOHN, M.B. Glasg.: dermatologist, Doncaster Royal Infirmary and Worksop Victoria Hospital.

SCHOFIELD, J. E., M.B. Manc.: anæsthetic registrar, Manchester Royal Infirmary.

SEVITT, SIMON, M.SC., M.D. Dubl., M.R.C.P.I., D.P.H.: asst. surgeon, Birmingham Accident Hospital.

SIMON, GEORGE, M.D. Camb., D.M.R.E.: asst. director, radiological dept., Hospital for Consumption and Diseases of the Chest, Brompton.

SINCLAIR, W. W., M.B. Glasg., D.P.H.: asst. county M.O., and M.O.H. for area 5, Norfolk.

WILSON, J. D., F.R.C.S.E.: deputy medical superintendent, Lord Mayor Treloar Cripples' Hospital and College, Alton and Hayling Island, Hants.

Middlesex Hospital, London:

BLOOM, ROSS, M.B. Wales, M.B. Lond., F.R.C.S.: fracture and orthopædic registrar.

SELLORS, T. HOLMES, D.M. Oxfd, F.R.C.S.: thoracic surgeon.

St. Mary's Hospital, London:

GIDEON, D. S., M.R.C.S.: specialist, ear, nose, and throat dept., St. Mary's Hospital and Princess Louise Kensington Hospital for Children.

LEIGH, A. G., M.D. Lpool, F.R.C.S.: asst. ophthalmic surgeon, St. Mary's Hospital, and ophthalmic surgeon, Paddington Green Children's Hospital and Princess Louise Kensington Hospital for Children.

MATHESON, W. J., M.B. Edin., D.C.H.: joint pædiatric registrar, St. Mary's Hospital and Princess Louise Kensington Hospital for Children.

ROBIN, I. G., M.B. Camb., F.R.C.S.: asst. surgeon for diseases of ear, nose, and throat, St. Mary's Hospital and Princess Louise Kensington Hospital for Children.

St. George's Hospital, London:

CHALMERS, J. N. M., M.D. Glasg., D.P.H.: asst. pathologist (clinical pathology).

MARTIN, N. H., B.M. Oxfd, M.R.C.P., F.R.I.C.: chemical pathologist.

Birmingham United Hospital:

Asst. radiologists in diagnostic X-ray dept..

BISHOP, J. C., M.C., M.B. Birm.

SMITH, O. E., M.B. Birm.

St. Peter's Hospital, Chertsey:

BAYNES, T. L. S., M.D. Lond., F.R.C.S.: gynæcologist.

ETHERIDGE, F. G., B.M. Oxfd, D.A.: anæsthetist.

GILLESPIE, H. W., M.D. Tübingen, L.R.C.P.E., D.M.R.: radiologist.

GOADBY, H. K., M.D. Camb., F.R.C.P.: physician.

MIMPRISS, T. W., M.S. Lond., F.R.C.S.: surgeon.

County Borough of Blackpool:

Asst. school M.O..

WARD, G. W., M.B. Manc.

WRIGHT, J. M. L., L.R.C.P.E., D.P.H.

Manchester Public-health Department:

CHADWICK, T. H., M.B. Manc., D.A.: consultant anæsthetist, Withington Hospital.

GOLDBERG, H. M., M.B. Lond., F.R.C.S. consultant surgeon. Booth Hall Hospital.

GRIFFITHS, D. L., M.B. Manc., F.R.C.S.: consultant orthopædic surgeon, Crumpsall Hospital.

HAXTON, H. A., M.B. St. And., F.R.C.S.: consultant surgeon, Crumpsall Hospital.

PARKINSON, J. S., M.B. Manc., M.R.C.P., D.P.H.: consultant physician, Withington Hospital.

ROBINSON, B. P., M.B. Manc., F.R.C.S.: consultant ear, nose, and throat surgeon, Booth Hall Hospital and Crumpsall Hospital.

SAVATARD, JUDITH, M.B. Lond.: consultant dermatologist, Withington Hospital.

SMITH, S. B., M.R.C.S., D.O.M.S.: consultant ophthalmologist, Booth Hall Hospital and Crumpsall Hospital.

SMITH, G. G. E., M.D. Manc., M.R.C.P.: consultant physician, Crumpsall Hospital.

WERTHEIM, LEOPOLD, M.R.C.S.: consultant dermatologist, Crumpsall Hospital.

Northants Maternity and Child Health Services:

Asst. M.O.

GOODCHILD, MURIEL, M.R.C.S., D.C.H.

STARK, VIDA, M.D. Glasg., D.P.H.

Nottingham and Midland Eye Infirmary:

Asst. surgeons

BOOTH, A. H., M.B. Madras, D.O.M.S.

GOLDSMITH, HAROLD, M.D. Münster, L.R.C.P.E., D.O.M.S.

Examining Factory Surgeons:

MADDEN, C. P., L.M.S.S.A.: Romford, Essex.

SMALLEY, ERNEST, M.B. Edin.: Heywood, Lancs.

Scientific Film Congress

A congress is to be held in Paris at the beginning of October to consider the draft constitution of an international film organisation which has been prepared by the British and French organisations. Further information may be had from the Scientific Film Association, 34, Soho Square, London, W.1.

University College of Nigeria

Mr. Kenneth Mellanby, D.SC., reader in medical entomology in the University of London at the School of Hygiene and Tropical Medicine, has been appointed principal-designate of the university college which is to be set up in Nigeria. Dr. Mellanby was appointed O.B.E. in 1945 for his services in connexion with the preservation of the health of our troops in South-East Asia.

Empire Rheumatism Council

The council will hold a week-end course on June 13, 14, and 15 at the Apothecaries Hall, Black Friars' Lane, London, E.C.4. The speakers will include Sir Adolphe Abrahams, Dr. Ernest Fletcher, Dr. R. E. Bonham-Carter, Dr. G. D. Kersley, Dr. George Graham, Dr. W. S. C. Copeman, Dr. Oswald Savage, Dr. F. S. Cooksey, and Mr. W. D. Coltart. Further particulars may be had from the secretary of the council, Tavistock House North, W.C.1.

New York Academy of Medicine

At the centennial convocation held on April 24 the following were elected to the membership of the academy as honorary fellows: Sir John Fraser, Dr. Gordon Holmes, F.R.S., Sir Wilson Jameson, Sir John Boyd Orr, F.R.S., and Prof. John Ryle. The following were elected as corresponding fellows: Prof. H. R. Dean, Prof. N. Hamilton Fairley, F.R.S., Sir Alexander Fleming, F.R.S., Sir Howard Florey, F.R.S., Prof. James Mackintosh, and Sir Lionel Whitby.

Society of Apothecaries of London

On May 8 the honorary freedom was conferred on Sir Stanley Hewett, and the mastery of midwifery, honoris causa, on Sir Allen Daley, Sir Eardley Holland, and Sir William Fletcher Shaw. Dr. Thackray Parsons, the master, said that the society, which had brought women into the medical profession by giving its licence to Elizabeth Garrett Anderson, is this year to admit women to its freedom. Claiming that medical education in England owes more to the society than to any other body, he described its influence on the provincial medical schools, almost all of which began by framing their courses of instruction to satisfy the requirements of its examining committee, and spoke particularly of its interest in midwifery, and the relations of midwifery to pædiatrics and to social medicine. Sir Stanley Hewett, in receiving the freedom, said that as surgeon-apothecary to H.M. the King for nearly 40 years he felt he had served his apprenticeship. Dr. J. P. Hedley, a past master of the society, introduced the new masters of midwifery, each of whom returned thanks for the honour.

R.A.M.C. War Memorial Fund

Launching a public appeal in London last week, Sir Alexander Hood, president of this fund, said that over £8000 had already been raised among personnel of the R.A.M.C. and the Emergency Medical Service. Further results could be achieved only through press publicity since the R.A.M.C., scattered throughout this country and over the world, had no territorial background; the Corps' essentially humanitarian work justified extension of the appeal to a wider public. Proceeds, said General Hood, were to be spent, not on a memorial in wood or stone but on the welfare of those who suffered during the war or of their dependants. Help would be substantial, so that in six or seven years the fund would cease; and "welfare" would be widely interpreted to include monetary grants and assistance—for example, in training for civil technical qualifications, in buying equipment, and in the education of children. After the 1914–18 war the corresponding fund totalled about £20,000; and it was hoped that this sum would be bettered. Subscriptions should be addressed to the hon. treasurer, c/o Glyn, Mills & Co., 22, Whitehall, London, S.W.1.

Return to Practice

The Central Medical War Committee announces that Dr. M. P. Leahy has resumed civilian practice at 30, Harley Street, London, W.1 (Langham 4012).

Diary of the Week

MAY 18 TO 24

Monday, 19th

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
5 P.M. Mr. Norman Capener: Reconstructive Operations in Chronic Arthritis.
ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5.30 P.M. *Odontology.* Sir Frank Colyer: Roman-British Burials.

Tuesday, 20th

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.1
5 P.M. Prof. R. E. Lane: Care of the Lead Worker (Milroy lecture).
ROYAL COLLEGE OF SURGEONS
5 P.M. Sir Thomas Fairbank: Developmental Affections of Bone.
LONDON SCHOOL OF DERMATOLOGY, 5, Lisle Street, W.C.2
5 P.M. Dr. R. T. Brain: Electrotherapeutics.
EUGENICS SOCIETY
5.30 P.M. (Burlington House, Piccadilly, W.1.) Mr. H. J. Eysenck, PH.D.: Measurement of Socially Valuable Qualities.

Wednesday, 21st

ROYAL COLLEGE OF SURGEONS
5 P.M. Mr. George Perkins: Lesion of the Epiphyses.
ROYAL SOCIETY OF MEDICINE
5 P.M. *Endocrinology.* Prof. F. G. Young, D.SC., Dr. R. D. Lawrence: New Aspects of Insulin Action.
LONDON SCHOOL OF DERMATOLOGY
5 P.M. Dr. C. W. McKenny: Technique of X-ray Treatment (part I).

Thursday, 22nd

ROYAL COLLEGE OF PHYSICIANS
5 P.M. Prof. R. E. Lane: Care of the Lead Worker (Milroy lecture).
ROYAL COLLEGE OF SURGEONS
5 P.M. Prof. Lambert Rogers: Ligature of Arteries (Arris and Gale lecture).
6.15 P.M. Mr. H. A. Brittain: Operative Treatment of Tuberculous Disease in the Larger Joints.
UNIVERSITY OF DUBLIN
5 P.M. (Dixon Hall.) Prof. B. R. Samuels: Sympathetic Ophthalmia (Montgomery lecture).
EDINBURGH POST-GRADUATE COURSES
4.30 P.M. (Royal Infirmary.) Mr. Donald Douglas: Surgery of Hydatid Disease.
CHADWICK LECTURE
3 P.M. (Cheltenham Town Hall.) Sir Arthur MacNalty: Advances in Preventive Medicine during the War of 1939–45.

Friday, 23rd

ROYAL COLLEGE OF SURGEONS
5 P.M. Mr. H. Osmond Clarke: Structural Deformities of the Spine.
ROYAL SOCIETY OF MEDICINE
3 P.M. *Epidemiology and State Medicine.* Dr. H. J. Parish: Future of Preventive Inoculations.
5 P.M. *Pædiatrics.* Dr. L. K. Diamond: Erythroblastosis.

Births, Marriages, and Deaths

BIRTHS

BLOMFIELD.—On May 9, at Sheffield, the wife of Mr. G. W. Blomfield, F.R.C.S.—a daughter.

COWPER.—On May 6, at Kingsbridge, S. Devon, the wife of Dr. W. H. Cowper—a daughter.

DAY.—On May 6, in London, the wife of Dr. F. M. Day—a daughter.

FYSH.—On May 7, at Roffey Park, Horsham, the wife of Dr. Christopher Fysh—a son.

HUNT.—On May 4, in London, the wife of Dr. John Hunt—twin sons.

LAMBLEY.—On May 6, at Northampton, the wife of Mr. D. G. Lambley, F.R.C.S.—a son.

LOW.—On May 3, the wife of Dr. M. G. Low—a daughter.

MASSON.—On May 2, in London, the wife of Dr. H. F. Masson—a son.

O'BRIEN.—On May 2, the wife of Dr. Brendan O'Brien—a son.

SMITH.—On April 11, in Ipswich, the wife of Dr. L. E. Smith—a son.

WOODS.—On May 5, in London, the wife of Lieut.-Colonel T. Woods, R.A.M.C.—a daughter.

MARRIAGES

DAVIS—LOESER.—On May 7, in London, Albert Davis, F.R.C.S., to Renate Marie Loeser, M.R.C.S.

MACARTHUR—PARTON.—On May 3, at Epsom, Angus MacLeod Macarthur, M.B., to Hilary Claire Parton, M.B.

POLLITT—ATTWOOD.—On April 30, at Stafford, P. G. H. T. Pollitt, M.B., to Gwendoline Attwood.

WILKINSON—EXELL.—On May 7, at Kensington, Ronald S. Wilkinson, B.M., to Thelma M. Exell.

DEATHS

ALCOCK.—On May 2, at Burslem, Staffs, Samuel King Alcock, M.D. Lond., J.P., aged 84.

CAZALET.—On May 10, at Bexhill-on-Sea, Grenville William Cazalet, M.R.C.S., aged 87.

CRAWFORD.—On May 4, at Martinstown, Dorset, James Muir Crawford, O.B.E., M.D. Edin., lieut.-colonel I.M.S. (retired), aged 80.

LOWSLEY.—On May 8, at Bradninch, Devon, Montagu Marmion Lowsley, D.S.O., M.R.C.S., lieut.-colonel R.A.M.C.

MILLER.—On May 2, at Blackheath Park, London, John Wilson Miller, M.B. Glasg., D.P.H.

WRIGLEY.—On May 2, at Swettenham, near Congleton, Philip Roscoe Wrigley, F.R.C.S.

STORIES OF ENDOCRINE RESEARCH*

E. C. DODDS
M.V.O., M.D., D.Sc. Lond., F.R.C.P., F.R.S.
COURTAULD PROFESSOR OF BIOCHEMISTRY IN THE UNIVERSITY OF LONDON
From the Courtauld Institute of Biochemistry, Middlesex Hospital, London

ENDOCRINE research, like all other types of research, can be conducted in various ways—in fact, we can use the investigations of the internal secretions as a model in the consideration of the whole question of the methods of research in general. The first I may perhaps call the Addisonian or even the Guy's method. No finer examples could be taken than the study of the two diseases in which Guy's men played such prominent parts in their elucidation: Addison's disease and myxœdema.

Thomas Addison (fig. 1) was born at Long Benton, Northumberland, in 1793, was educated at Newcastle, and took his degree in Edinburgh in 1815. He then came to London, where he was first of all house-surgeon to the Lock Hospital and then assistant to Dr. Bateman, a well-known skin specialist, at Snow Hill. He first went to Guy's in 1824 as assistant physician, and his selection for the appointment was largely due to the influence of the treasurer, Benjamin Harrison. He remained on the staff of Guy's until just before his death in 1860.

Accounts of him written by those who knew him personally all show him as an extremely forceful personality, with unrivalled powers of observation and an untiring persistence in searching out the hidden causes of disease. Wilks and Bettany (1892) say:

> "For many years he was the leading light of Guy's so that every Guy's man during the 30 or 40 years of his teaching was a disciple of Addison. . . . He was dogmatic in his teaching and thus the pupils accepted as pure gospel every word which flowed from his lips. The force of his words was enhanced by his mode of delivery and by the presence of the man himself. . . . His penetrating glance seemed to look through you and his whole demeanour was that of a leader of men enhanced by his somewhat marked attitude. . . . As a teacher, it is difficult to conceive a better. . . . The clinical lectures were most excellent, as he never failed to thoroughly unfold the case which he was discussing. . . . His examination of the patient was of the most complete character; possessing unusually perceptive powers, being shrewd and sagacious beyond the average of men, the patient before him was scanned with a penetrating glance from which few diseases could escape detection. He never reasoned from a half-discovered fact, but would remain at the bedside with a dogged determination to trace out the disease to its very source for a period which constantly wearied the class and his attendant friends. . . ."

Fig. 1—Thomas Addison (1793–1860).

Almost the same words are used by the writer of the obituary notice in the *Medical Times and Gazette* (1860).

Addison in 1849 and 1855 described several cases of lassitude, pigmentation of the skin, loss of weight, and death. The findings at necropsy invariably showed bilateral destruction of the suprarenal glands, to which Addison attributed the condition, suggesting that they mainly influenced the red blood-cells.

Dr. Trousseau, of Paris, first gave the name "Addison's disease" to the symptoms which Addison had described. Brown-Séquard (1856, 1858) showed that these symptoms could be reproduced in animals by removal of the suprarenal glands. Swingle and Pfiffner (1931) extracted from the cortex a substance which would maintain life in adrenalectomised animals and was sufficiently pure not to cause abscesses at the site of injection. Methods of extraction have since been improved, and the substance has also been produced by a sterol-degradation process (see below). By the administration of cortical hormone, patients with Addison's disease can now be kept in reasonable health over long periods.

MYXŒDEMA

Still another example of the Addisonian or Guy's technique is the research leading to the discovery of thyroxin. The first description of the condition now known as myxœdema was given by Sir William Gull (1873). Gull (fig. 2) was born at Colchester in 1816, and he also owed his entry to Guy's to Benjamin Harrison, who arranged for him to be entered as a student. Like Addison, Gull was distinguished for his powers of observation and diagnosis; and, like Addison, he held the view that to find out the cause of a disease was equally, if not more, important than to prescribe for it. The writer of the obituary notice in the *Guy's Hospital Reports* (1890) says:

> "He was never tired of exposing the absurdity of much of the traditional polypharmacy. He would show how much harm may be done by the vigorous treating of half-understood diseases and he once said that if every drug in the world were abolished, a physician would still be a useful member of society."

Fig. 2—Sir William Gull (1816–1890).

He was opposed to the granting of medical diplomas by the Society of Apothecaries once the Conjoint Board was established and said in this connexion:

> "The road to medical education is through the Hunterian museum and not through an apothecary's shop."

He was noted for his rather caustic wit, and his remark "Savages explain, science investigates," his description of a neurotic woman as "Mrs. A. multiplied by four," and so forth, are often quoted. Another obituary notice (*Lancet* 1890) remarks:

> "He had not exactly a vein of pure humour; for his humour was generally critical and sometimes sarcastic; and he would speak of the whims and fancies of men in terms of material pathology with a cheery satire quite inimitable, and yet with a depth of sympathy and a force pathetic and startling."

In 1873 Gull described "a cretinoid state supervening in adult life in women." He showed that the symptoms in these cases were very similar to those seen in cretins:

> "And that it is allied to the cretin state would appear from the form of the features, the changes in the lips and tongue, the character of the hands, the alteration in the conditions of locomotion and the peculiarities, though slight, of the mental state."

Ord (1878), who reported several cases of the same condition, which he termed "myxœdema," noted that:

> "You will find little or no trace of a thyroid body and a decided resilient fulness on both sides of the neck above the clavicles. . . . In the fatal case examined by me, the thyroid was reduced to about a fourth of its natural size. . . ."

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* Addison lecture delivered at Guy's Hospital on Dec. 2, 1946.

Kocher (1889), reporting the results of 250 thyroidectomies, commented on the danger of myxœdema supervening as the result of complete removal of the thyroid gland, and he referred to this again in 1895.

Murray (1891) reported the successful treatment of a case of myxœdema with an extract of sheep's thyroid. He described the condition of the patient before treatment, gave details of a method for preparing a suitable extract, and reported the vast improvement in the patient when seen after three months' treatment.

The active substance, thyroxine, was first isolated in crystalline form by Kendall (1915). Harington (1926) proved its chemical constitution, and he and Barger (1927) synthesised it.

DIABETES

Sometimes this method hangs fire very seriously, and a typical example is diabetes. We have the disease described accurately by Hippocrates, though he did not know there was sugar in the urine. This was discovered in the seventeenth century by Thomas Willis (fig. 3), who was appointed Sedleian professor of natural philosophy at Oxford in 1660. He moved to London in 1666 and acquired the largest fashionable practice of his day. He gave the most complete and accurate account of the nervous system which had so far appeared, and gave descriptions of myasthenia gravis, puerperal fever, and epidemic typhoid. In his essay on diabetes, a translation of which was published in 1681, Willis says:

> "But that as many authors affirm the drink to be little or nothing changed is very far from truth, because the urine in all (that I have known who hath hapned to have it, and I believe it to be so in all) very much differing both from the drink taken in, and also from any Humour that is wont to be begot in our Body, was wonderfully sweet and as it were, imbued with Hony or Sugar."

Despite the most careful clinical studies, no progress was made until a chance observation of von Mering and Minkowski (1889) showed that the pancreas was connected with diabetes. Von Mering was interested in protein digestion and wondered what would happen if one removed the pancreas and therefore the source of trypsin. He and his assistant, Minkowski, performed the operation, and to their astonishment diabetes mellitus developed. Again no progress was made. Every type of extract of the pancreas was made with no result, until Laguesse (1893) *observed that ligature of the pancreatic duct in the dog* was attended by degeneration of the pancreas but not by diabetes mellitus.

Fig. 3—Thomas Willis (1622–1675).

This brings us to another method of research, where the scientist considers the data, evolves the solution, and then proceeds to the laboratory to prove his theory correct. This method practically never works. The usual result is that the investigator comes to the wrong conclusion, and the experiments which he devised prove something entirely unsuspected. The case of Frederick Banting (fig. 4), however, is one of the brilliant exceptions to this rule.

Banting was born at Alliston, Ontario, in 1891 entered the University of Toronto in 1912. His were interrupted by the war, but he was sent back complete them. After the war he became resident surgery at the Hospital for Sick Children, Toronto, specialised in orthopædic surgery. In 1920 he became part-time demonstrator at the University of W Ontario and did some research work in the departm of physiology.

It was at this time that he studied the literature on diabetes, and on the basis of the facts then known was able to predicate the solution of the problem. As he states (Banting and Best 1922):

> "he read an article dealing with the relation of the isle of Langerhans to diabetes. From the passage in this article which gives a résumé of degenerative changes in the acini of the pancreas following ligation of the ducts, the idea presented itself that since the acinous, but not the islet tissue degenerates after this operation, advantage might be taken of this fact to prepare an active extract of islet tissue. The subsidiary hypothesis was that trypsinogen or one of its derivatives was antagonistic to the internal secretion of the gland."

He therefore predicated that, if one took a dog, tied its pancreatic duct, and waited 7–10 weeks for degeneration of the pancreas, with disappearance of the trypsin, an ice-cold Ringer's extraction of the pancreatic remnants should contain the active principle. He obtained permission from Professor Macleod to conduct this experiment, together with C. H. Best, and it was completely successful and proved to be the turning-point in the history of diabetes. A special research department was eventually created, and Banting became its director. He was noted for his great kindness in helping and encouraging young research-workers. He had many interests besides his medical work, and was one of Canada's finest amateur painters. Unfortunately he met his death in an aeroplane accident while carrying out research into altitude effects during the late war.

Fig. 4—Frederick Banting (1891–1941).

VITAMIN C

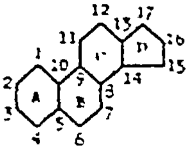
Yet another approach to a discovery is possible: where the research-worker sets out to discover a certain thing and discovers something completely different. An example of this is the work done by Szent-Györgyi which led to the isolation and characterisation of vitamin C. Szent-Györgyi in the early 1920's planned a detailed study of biological oxidation, in the hope that this might lead to an understanding of the function of the interrenal system. In 1928 he isolated from the adrenal cortex a powerful reducing substance, which he called hexuronic acid. This substance he also obtained from oranges and cabbages. He described some of its chemical properties. In 1932 he showed by animal experiments that this hexuronic acid had the same antiscorbutic activity as the substance found in fresh citrus fruits, and was in fact vitamin C or *l*-ascorbic acid.

SEX HORMONES

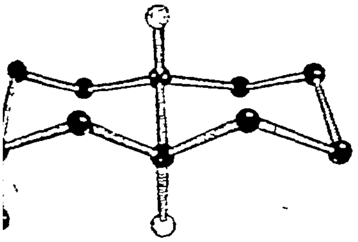
The history of the isolation and characterisation of the sex hormones illustrates yet another discipline of research. It shows how work done in another field, often academic and having apparently no bearing on the problem in hand, can often provide the necessary data without which the problem would remain insoluble.

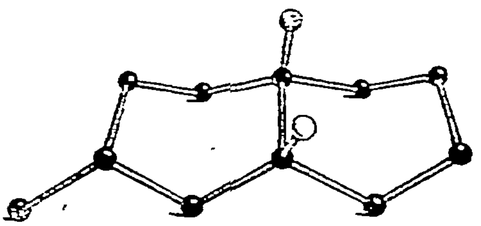
he effects of removal of the gonads in both male and ale animals have been known for centuries; and, the idea of internal secretions developed, it was lised that the sexual functions of both male and ale animals were regulated by chemical substances eted by the gonads. Attempts were made to isolate ive substances from ovarian tissue, and Allen and sy (1923) showed that the potency of such substances ld be tested on oöphorectomised rodents by the inal-smear technique of Stockard and Papanicolaou 17).

n the meantime, organic chemists and biochemists re greatly interested in the study of sterols, which are nd in the unsaponifiable fraction of fats of animals l of some plants and have a fatty character. They tain only carbon, hydrogen, and oxygen. Intensive dies conducted by Windaus (1932) in Gottingen and Wieland and Dane (1932) in Berlin showed that se substances consisted of a central nucleus to which ng side-chain was attached. It took much work ore the constitution of the central nucleus was covered, but finally the structure postulated by nheim and King (1932, 1933) was accepted:



This is known as the cyclopenteno nanthrene ring system. The carbon ms are numbered according to inter-tional practice, and the rings are tered. In the sterols the long side-in is attached in the 17-position, and sterols also have a hydroxyl group the 3-position and angle methyl groups in the 10-d 13-positions. This structure presents very complex blems of stereo-isomerism. Rings A and B are mpletely saturated, and it is possible to have two forms the rings according to the positions of the "points" the rings—i.e., carbon atoms 1 and 4, and 9 and 6. s the four valencies of the carbon atom correspond to e points of a regular tetrahedron, the "points" of the gs cannot be on the same plane, but may be either ore the plane of the paper or below. There are two ternative arrangements of this. In the first, one set points is above the plane of the paper and the other low: hence the rings present the appearance of a ir. This is called the trans-decalin arrangement, or e allo variety. In the second arrangement the points the rings are both on the same side of the plane of e paper, suggesting the appearance of two beds, and s is known as the cis-decalin or normal type. These o arrangements are illustrated by the perspective grams:

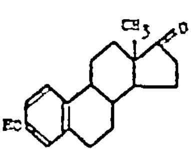




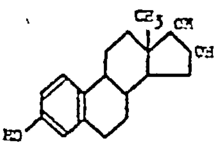
l natural sterols are of the allo or trans-decalin type. ereo-isomerism can also occur in the other rings and in e junctions of the various polar groups attached to the clens.

The work done by Windaus (1932) and Wieland and ane (1932) and by Rosenheim and King (1932, 1933) sterols was found to have an important bearing on e study of sex hormones. The first of these to be lated in crystalline form was the œstrogenic hormone, ich produces œstrus in female animals. The isolation s made possible by the discovery of Aschheim and ndek (1927) that large quantities of œstrogenic substances are excreted in the urine of pregnant animals. By 1932 five such substances had been isolated, by Butenandt (1929), Doisy et al. (1929), Marrian (1930), and Girard et al. (1932a and b), from this source and were found to have the same basic chemical structure as the sterols, but without the long side-chain at the 17-position. The formulæ are as follows:

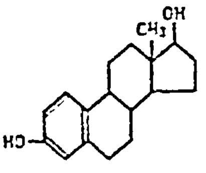
Œstrone

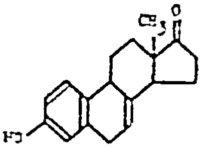


Œstriol

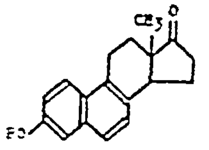


Œstradiol



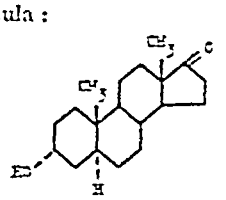


Equilin



Equilenin

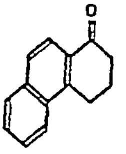
An androgenic substance, androsterone, was likewise isolated by Butenandt (1931) from male urine and found to have the following formula:



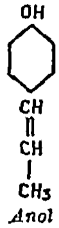
The question of stereo-isomerism in the œstrone molecule and the very complicated spatial arrangements of the more saturated members of this series render total synthesis impracticable at the present stage. Bachmann et al. (1940) have synthesised equilenine; but, great as this achievement is, it must be remembered that both rings A and B are unsaturated, and therefore the complicated spatial arrangement is ruled out.

For further progress in this field we must return to the pure organic chemistry of the sterols. It is to Ruzicka et al. (1934) that the credit belongs of first realising that the ready-made cyclopenteno phenanthrene nucleus could be obtained by cutting the side-chain off the sterols by chromic oxidation. Whereas Windaus and his colleagues concentrated their attention more on the side-chain, Ruzicka et al. (1934) realised the importance of the nucleus, and by suitable chemical operations they were able, by moving double bonds about and exchanging polar groups, to lay the foundations for the production from cholesterol of several hormones. Today testosterone, progesterone, desoxycorticosterone, and even œstrone and œstradiol are produced by this technique.

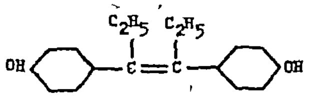
A rather different approach to the production of œstrogenic substances was suggested by the fact that no less than five such substances are produced in nature. It was decided to see how specific was the molecular structure for œstrogenic activity. Several phenanthrene compounds were made and tested, and the compound 1-keto-1:2:3:4-tetrahydrophenanthrene was found to have œstrogenic activity (Cook et al. 1934), though much less potent than the naturally occurring substances. The work was continued, and an important advance was the discovery that the phenanthrene structure was not essential for œstrogenic activity. Many compounds were made in an effort to produce simpler yet more potent substances. Finally the potency



of anol or *p*-hydroxy-propenyl benzene was tested and appeared to be very highly active:


Anol

However, when attempts were made to repeat the work, some batches of anol were found to possess only very slight activity, and it was obvious that the activity in the first batch must have been due to a contaminant. The work was continued in collaboration with Sir Robert Robinson, and finally the compound 4 : 4′-dihydroxy-α : β-diethyl stilbene, or stilbœstrol, was made and found to be very highly active.



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ZYGOMATIC MASTOIDITIS

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Of the 29 cases of zygomatic mastoiditis under review, a cellular mastoid was found in all but one of the 27 cases of acute infection. A cellular track was demonstrable in most of these. In both the cases of zygomatitis due to chronic infection, one of which was caused by actinocosis, the pus had apparently leaked through the roof the meatus.

CLINICAL PICTURE

All the cases reported in this paper presented with the auricular swelling as a prominent feature. Such swelling, ever, may appear as a complication after cortical stoidectomy. Horgan (1929) reported two, Rosenwasser d Druss (1933) four instances, and attributed them inadequate surgery at the first operation.

The greatest incidence is between the ages of 5 and years. The swelling develops in the course of a ppurative otomastoiditis and is commonest when such ections are common—in the late winter and early ing. A firm tumour covers the root of the zygoma d often causes œdema of the lower eyelid. It is tender, t fluctuation and "pointing" of the abscess are signs ng delayed in their appearance.

Trismus is an inconstant symptom. Pain and difficulty opening the jaws may be found in acute infection of e parotid gland and in inflammation of the skin of the terior wall of the meatus.

True zygomatic mastoiditis may be simulated by an scess in the pterygomaxillary space. Greenfield (1934) scribed such an abscess, which is very rare, and showed at it presented below the zygoma and caused severe smus. Mill (1932) showed an example of unusual gomatic infection, which, from the printed description, s probably of the same nature.

The differential diagnosis of acute zygomatic mastoiditis ay be rendered difficult by the frequent absence of one of e classical signs of suppuration in the middle-ear cleft—orrhœa.

ILLUSTRATIVE CASE-RECORD

A girl, aged 6 years, was admitted to hospital with a elling which had been growing in front of the ear for a rtnight. The swelling was firm, oval, and about $1\frac{1}{2}$ in. long, nd its general direction coincided with that of the zygomatic one. When it had first appeared there had been slight earache, ut so young a child was not able clearly to distinguish tween pain in the ear and pain in the adjacent swelling.

Examination of the tympanic membrane showed no normality. Tenderness could be elicited on pressure only er the zygomatic root. The solitary sign of aural disease as a slight impairment of the hearing on that side. No pus caped when the membrane was incised.

A cortical mastoidectomy was performed. The mastoid rocess was cellular. Grey swollen muco-endosteum was und in all the cells, and pus in the mastoid antrum. A achm of pus was liberated on opening the cells in the gomatic root.

CONDITION OF TYMPANIC MEMBRANE

Since this experience careful note was taken of the ndition of the tympanic membrane in all zygomatic nd other mastoid swellings.

Of the 27 patients with acute zygomatic mastoiditis, 3 had tympanic membranes scarcely distinguishable om normal. In 5 the membrane was injected and ightly bulging. In the remaining 9 otorrhœa was resent, and a perforation could be demonstrated in the ympanic membrane.

Impairment of hearing of varying degree was elicited n all. Those patients retained their hearing most who ad apparently the most healthy membranes.

This seemed to be an unusually high proportion of astoiditis without otorrhœa (66%). To obtain a control gure the records of other forms of acute mastoiditis ere studied. In the five years ending Dec. 31, 1945, 02 primary cortical mastoidectomies were performed. f these, 232 showed a superficial inflammatory swelling, aused by the underlying mastoiditis. Of these swellings 4 (10%) were centred over the zygoma, and 59, of which 5 (26%) were zygomatic, were not accompanied by otorrhœa. In 173 the mastoid swelling was associated with torrhœa, and zygomatitis accounted for 9 (5%) of these.

Thus 1 in every 4 cases of acute mastoiditis with superficial swelling had no perforation of the drumhead. Of those with no otorrhœa, 1 in every 4 had a swelling over the zygoma.

Beta hæmolytic streptococcus was found in 10 of the cases with no otorrhœa and alpha hæmolytic streptococcus in 3. Pneumococcus type III was not found in any.

If the total number of cortical mastoidectomies, 602, is taken as the basis of computation, zygomatic mastoiditis without otorrhœa was present in 2·4%, and all forms of mastoiditis without otorrhœa in 9·8%. This compares with the 5% of mastoiditis without otorrhœa reported by Watson-Williams (1929) in 300 simple mastoidectomies performed before the introduction of sulphonamides.

Sulphonamides had been given to 9 patients with zygomatic mastoiditis without otorrhœa, and to 6 with zygomatic mastoiditis and otorrhœa, before coming under observation. A study of the literature on zygomatitis will refute the suggestion that the absence of otorrhœa can be explained simply as a manifestation of "sulphonamide masking."

Heine (1908), speaking of swellings above and in front of the ear, said:

> "I have observed that these external signs were particularly well marked in cases in which the drum retained little or no sign of inflammatory change. The patients frequently state that, although they suffered from earache in the beginning, no discharge was noticed. This seems to suggest that the original trouble was a suppurative inflammation of the closed attic and that the pus found its way out directly without reaching the antrum or the mastoid cells."

More succinctly, Mouret and Seignourin (1920) wrote:

> "On apprendra que l'infection n'a fait que lécher la caisse, l'antre, avant de se localiser dans la région temporale."

A glance at the following table shows that otorrhœa is absent in a considerable number of cases and, also, that this absence is more frequent in the last two groups, which occurred within the sulphonamide era:

Author	*Zygomatitis without otorrhœa*	*Zygomatitis with otorrhœa*
Mouret and Seignourin (1920)	3	6
Holmgren (1921)	2	10
Mollison (1922)	1	3
Rankin (1923)	1	2
Gadolin (1938)	7	32
Reading (present series) ..	18	9

Single case-records are not included, such as those of Neville (1933), Watson-Williams (1930), and Watt (1932). All these described otorrhœa as a feature of zygomatitis. Breitstein (1926) described a case without otorrhœa and drew attention to the lack of this symptom.

One can infer that, though the absence of otorrhœa is common in zygomatic mastoiditis, it has become more common since the introduction of sulphonamides.

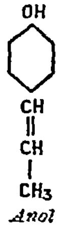
No explanation of this absence of otorrhœa is apparent. Failing any other, we must accept the suggestion that, in a cellular mastoid with a cellular zygoma, early occlusion of the air cells and of the tympanum by swollen muco-endosteum allows the escape of pus by the only route left open, to the zygomatic root and the temporal fossa. At operation such thickening of the membrane could be demonstrated in the aditus of some but not all of the diseased mastoid bones.

SUMMARY

A review of 27 cases of acute zygomatic mastoiditis is presented.

Attention is drawn to the absence of otorrhœa in many acute zygomatic infections, and hence to the difficulties which may arise in diagnosis.

of anol or *p*-hydroxy-propenyl benzene was tested and appeared to be very highly active:



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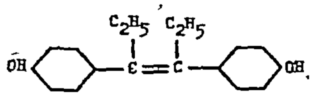

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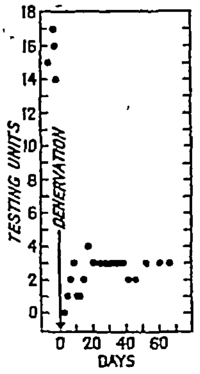

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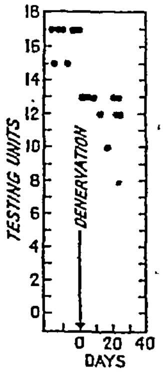

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Fig. 2—Increase of knee-jerk remaining after severance of central and lateral branches of crural nerve and due to hypertrophy of intact part of quadriceps. Maximum is reached 20–30 days after operation. In this rabbit the severed branches were prevented from reuniting. Compare figs. 4–6.

Fig. 3—Decrease of knee-jerk following severance of medial branch of crural nerve and of branch of gluteal nerve supplying tensor fasciæ latæ, in normal rabbit. Compare figs. 5 and 6.

by the quadriceps was used to effect an upward jerk. But with the animal unanæsthetised it is doubtful whether such methods would be sufficiently simple to warrant their use for frequent testing, and anæsthesia is impracticable because it affects these reflex responses in a manner impossible to standardise.

The method used by us to meet this difficulty has been to interrupt only part of the crural nerve, leaving intact the innervation of a portion of the quadriceps sufficient to overcome the inertia factor and give a very small jerk. The recovery of the other muscles can then be watched by noting any increase in the response after their reinnervation.

The main bulk of the muscles inserted on to the patella in the rabbit is innervated by the crural nerve, which splits up into lateral, central, and medial branches before entering the muscles. In most of our experiments the lateral and central branches were interrupted, leaving the medial branch intact. The muscles which that branch innervates, together with the tensor fasciæ latæ, whose nerve-supply is also left intact, give a response which is just perceptible when the limb is tested in the optimal position. It was expected that this would form a convenient base-line against which recovery of the other muscles could be watched. A complication, however, soon became apparent. In most of the animals the residual response—i.e., that due to the intact part of the quadriceps left to overcome the inertia factor—began to increase soon after operation, before the regenerating fibres could possibly be producing contraction in their muscles. Evidently the intact muscles undergo hypertrophy when excess work falls on them. That this was the true explanation was shown by experiments in which the parts of the nerve severed were not allowed to reunite. The intact portion of the quadriceps then increased in volume and weight, and the knee-jerk increased in extent, reaching a maximum 20–30 days after operation (fig. 2). The degree of hypertrophy is conditioned by the activity of the animal. Usually the increase was by 1–2 of our test units, but the limits of variation were wide, and one animal showed a hypertrophy of 6 units.

RESULTS

In spite of the difficulty produced by this phenomenon the technique allowed detection of the results of reinnervation of the paralysed muscles. When the central and lateral branches were crushed with smooth forceps 25 mm. from the quadriceps, it could be calculated that the regenerating fibres would again be able to produce contraction at about 30 days in the proximal parts and at 50 days in the distal parts of the muscles affected (Guttmann et al. 1942). It was during this period that a recovery of the response due to successful reinnervation became apparent and continued until the preoperation level was reached. There was then a period in which the response was maintained at a higher level than the mean value obtained before operation. This supernormal phase is interpreted as being due to responses which are the result of the reflex contraction tension developed by muscles which have undergone a completely successful reinnervation together with that developed by the intact hypertrophied muscles. After a while the response gradually declined back to the normal level, presumably owing to the disappearance of the hypertrophy (fig. 4).

That the reinnervation is completely successful after crushing of the nerve at one point in this way is shown by the fact that, when after several hundred days the muscles which were previously left intact were denervated, the response was reduced (fig. 5) by an amount comparable with the reduction which results if these muscles are denervated in a normal animal (fig. 3). Further, in eight animals all three branches of the crural were crushed, and the response recovered to the normal level in each case. In these experiments the response could first be detected 40–45 days after operation, the lag of 10–15 days being due to the initial reflex contraction tension developed having to overcome the inertia factor. After its first appearance the return back to the normal level was very rapid, usually being accomplished in about 10 days, and there was no supernormal phase.

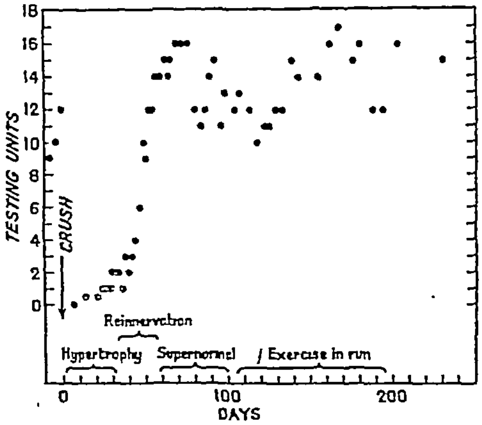

Fig. 4—Plots of knee-jerks in rabbit in which central and lateral branches of crural nerve had been crushed.

When the central and lateral branches were cut and their ends held together with cockerel plasma (Young and Medawar 1940), the recovery of the knee-jerk was very much less complete (fig. 6). Exaggeration of the residual response took place as before, and then 45–80 days after operation there were further increases in the response in eight animals, five others showing no signs of recovery. The magnitude of the response reached, or almost reached, preoperation levels in six cases, the maximum being attained after about 80 days. Apart from a temporary rise in the level of the response induced in most of the animals by a period of exercise in a run (figs. 4, 5, 6) there were no subsequent signs of increase.

At the end of considerable periods—398 days in one animal, 420 days in another—the muscles which had previously been left intact were denervated in those animals in which the response had reached the preoperation level (fig. 6). This led to a great reduction of the response, in striking contrast to the slight reduction caused by this denervation in normal animals and in the experiments where part of the crural nerve had been crushed. Thus, though the reflex response elicited after

"Sulphonamide masking," as an adequate explanation, can be partly discounted.

These patients were studied and treated at Selly Oak Hospital, Birmingham. To the medical superintendent of that hospital, Mr. R. P. S. Kelman, F.R.C.S., my thanks are due for his kind permission to publish.

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RECOVERY OF STRETCH REFLEXES AFTER NERVE INJURY

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In spite of the large amount of published work on the regeneration of nerve very little is known of the recovery of proprioceptor function. Since the functions of the various receptors of muscle in normal life are still largely unknown, it is impossible to estimate the importance of their recovery after nerve lesions, but it seems likely that some of the imperfections of muscle function after nerve suture are due to incomplete sensory reinnervation.

The only proprioceptor activities which it is easy to study experimentally or clinically are the stretch reflexes. The return of the ankle-jerk after nerve grafting has been described by Rezende (1942) in dogs and monkeys and by Davis et al. (1945) in cats; a division of the rabbit's crural nerve was made by Waller (1890) but seventeen months later the knee-jerk was still absent. Stopford (1930) reported the recovery of "joint sense" after nerve injury in man, this being a subjective term for a sense of whose receptors little is known.

Proprioceptor function is certainly not limited to response to stretching a muscle. The end-organs present in muscle include at least two chief types: muscle spindles and tendon organs. The stretch reflex is usually supposed to be mediated by the muscle spindles (Matthews 1933); but the evidence is incomplete, and it may well be that the excitatory afferent fibres belong to the tendon organs.

Histological investigation (Huber 1900, Tello 1907, Boeke 1916) has shown that there is some reinnervation of muscle spindles after nerve injury, but it remains uncertain whether the sensory and motor innervation are both restored. If all fibres become mingled at a point of nerve suture and no processes direct the regenerating fibres back into appropriate pathways, it is difficult to see how the normal pattern can be restored.

MEASUREMENT OF KNEE-JERK

We have devised a means of measuring the knee-jerk in the unanæsthetised rabbit in order to assess quantitatively its recovery after nerve injury.

The rabbit is placed on its back on a testing-couch in such a way that movement is possible only in the hind legs. When the patellar ligament is struck, the foot jerks upwards from where it has been resting on a horizontal rod, the height which it reaches being recorded by adjusting an upper rod to the level at which it is hit by the foot on almost every occasion that the reflex is elicited. The rods can slide a series of numbered holes, and by subtracting the depth of ankle from the total reading a measurement of the movement of the foot is obtained (fig. 1). As in subjects, the magnitude of the response is affected by conditions prevailing at the time of testing, but tests under conditions as standard as possible on successive give reasonably consistent readings with a no distributed variation.

It is thus possible to estimate the normal response then watch its recovery after interruption of the crural nerve.

A complication is introduced by the fact that, because of the weight of the shank and foot, a considerable amount of reflex contraction tension has to be developed by the quadriceps before any upward movement is possible. The height of the jerk elicited does not therefore give a linear measure of the force exerted by the muscles, even if the limb is placed in the same position at each test.

The term "inertia factor" has been given to that force which the quadriceps must exert to lift the weight the shank and foot and produce an upward movement which is just perceptible.

By transecting the quadriceps near its distal end attaching the tendon to a spring balance it has been to determine the magnitude of this force in different positions of the limb and to assess approximately its proportion of the total reflex contraction tension required for the normal response.

The tension required to elicit a slight movement in the usual testing position was 23–41% of that required to effect mean normal responses of 17–11 test units. Moreover, plots of the tension required to lift the limb to various heights showed that more work must be done in the earlier than in the later phase of lifting the leg. The same relationship between quadriceps tension and leg extension was found by Haxton (1945), who measured the forces involved in experiments on cadaver limbs.

The magnitude of the upward jerk cannot, therefore, be regarded as a linear index of the degree of recovery of the reflex after nerve injury; the return of a small response may represent a degree of recovery as high as 60%, for the muscles will have to develop enough contraction tension to overcome the inertia factor and to produce a visible jerk in that part of the upward swing where the greatest lifting forces are required to raise the ankle. The smallest detectable responses are those giving an upward jerk of about 3 mm. and fall between 0 and 1 test unit on the scale used; they are both difficult to elicit with certainty and to measure with accuracy.

Evidently it is desirable to devise some method of eliminating the inertia factor. Testing the animal the other way up to that which has been described, or testing with the animal held vertically, proved impracticable. It might be possible to devise some method of testing the animal on its back and counterweighting the limb so that all the reflex contraction tension developed

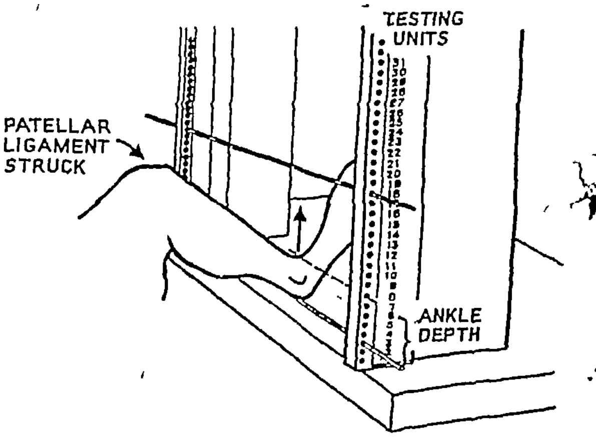

Fig. 1—Apparatus used to measure knee-jerk in unanæsthetised rabbit.

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When the whole crural nerve is crushed, there is full covery of the knee-jerk without a supernormal phase.

When two of the three branches were severed and united, five animals showed no visible recovery of the ıee-jerk, whereas eight showed a recovery of 19–70%. he recovery reaches a maximum soon after nerve-fibres ıve returned to the muscles, and does not increase ogressively thereafter.

When the entire crural nerve was cut and reunited, ıe recovery remained undetectable in nine cases, but two others slight knee-jerks reappeared, indicating velopment of over 50% of normal tension.

This investigation was assisted by a grant from the Medical esearch Council.

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IRULENCE OF A STRAIN OF THE VOLE ACID-FAST BACILLUS (G564)

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DURING the past six years we have continued the investigation initiated by Griffith and Dalling (1940) into the value of the vole acid-fast bacillus as an immunising agent against infection with tuberculosis in cattle.

This investigation is still far from complete, and it would be unwise to attempt to formulate any conclusions at this stage; but, in view of some of our findings and the increasing interest in the vole strain as a potential living vaccine for human beings, we wish to issue a warning.

Most of our work has been done with strain LV285, isolated by Dr. A. S. Griffith in 1937 from material supplied by Dr. A. Q. Wells. In using this established laboratory strain we have encountered nothing which might indicate that it is not reasonably safe for use in cattle. For one experiment, however, we wished to try a more recently isolated strain, and Dr. Wells kindly supplied several primary cultures of strains from voles examined by him in the course of his work. The fact that we wished to use a vaccine prepared from a strain exposed to the minimal amount of growth on artificial media precluded any possibility of previous investigation of the strains by either Dr. Wells or ourselves, and the strain which we used was unselected except in so far as it grew rather better than the others in early subculture and so promised a larger yield. This strain has in our hands proved too dangerous for use as a vaccine.

RESULTS

In the experiment for which we required the recently isolated strain we lost two calves, one dying a month after vaccination, and the other having to be slaughtered in a moribund condition after eight weeks. The vaccinating dose consisted of 5 mg. of a seven-day-old culture inoculated intravenously, a dose which in the case of strain LV285 we have used in 142 animals, mostly young calves, without producing any ill results comparable with those in the two animals mentioned above. In neither animal were there macroscopic tuberculous lesions severe enough to cause death, but histological examination of the internal organs revealed widespread changes of a nature usually associated with tuberculosis, which justified the conclusion that death was directly attributable to the vaccine.

Though 15 other calves in the same experiment were similarly inoculated without apparent ill effects, the vole strain was recovered from 5 of these animals when they were slaughtered six months after a resistance test with virulent bovine bacilli, and the survival periods of the vole bacillus in two instances were 565 and 544 days.

The fact that in its immediate effects G564 is more virulent than LV285 is borne out by work on guineapigs.

In one experiment 20 guineapigs were vaccinated subcutaneously with 1 mg. of G564 in preparation for a resistance test to be carried out three months later. On the day that the resistance test was to be applied, 2 of the animals were unfit for inclusion in the experiment and were slaughtered for examination. Infection still persisted at the site of inoculation, the regional glands were enlarged and caseous, and there were numerous small lesions in various internal organs. A third vaccinated animal in the series died eighteen days after the resistance test, which consisted of 0·00001 mg. of virulent bovine bacilli inoculated intramuscularly. In this animal infection was even more pronounced than in the previous 2 animals, and both the morphology of the acid-fast bacilli found in the lesions and their subsequent culture showed that the lesions were due to the vole strain, though it is possible that there was some exacerbation of the lesions under the stimulus of the resistance test.

By themselves the unusually severe sequelæ described above would not have been unduly disturbing, for an avirulent tubercle strain can bring about a fatal result if used in too large a dose, and it might be that we were not allowing a sufficient margin for safety. We have, however, additional evidence on which to condemn the strain.

A rabbit was inoculated intravenously on Dec. 21, 1943, with 0·1 mg. of a seven-day-old culture of strain G564. It bore the inoculum well, and no ill effects were noted until the middle of 1946, when an abscess began to develop in its neck. The animal was slaughtered for examination on July 5, 1946. Besides actively progressive abscesses found in submaxillary and neighbouring cervical glands, in which many typical vole bacilli were found, there were small tuberculous lesions in the lungs and kidneys.

Another rabbit inoculated on the same date with 0·01 mg. intravenously also showed no ill effects until in August, 1946, it was reported to be leaving much of its food untouched. It was slaughtered for examination on August 27, 1946, when severe tuberculosis of the left testis, epididymis, and vas deferens was found. Many acid-fast bacilli of typically vole morphology were found. Old-standing lesions, some calcareous, were found in lungs, liver, kidneys, and one rudimentary mammary gland.

Numerous calcareous and caseocalcareous lesions were found in the liver and kidneys of still another rabbit, which accidentally injured itself on Oct. 8, 1946, and had to be destroyed. This animal had also been inoculated on Dec. 21, 1943, with 0·01 mg. intravenously. The vole bacillus was recovered in culture from the lesions after a survival period of 2 years and 291 days in the rabbit.

Two guineapigs inoculated intravenously, one with 0·1 mg. and the other with 0·01 mg., were killed 194 and 114 days after inoculation owing to the onset of paralysis in the hind legs. In neither of these animals were there well-defined macroscopic lesions in thoracic or abdominal organs, but in both the central nervous system was involved, with lesions in brain and cord, in which acid-fast bacilli of vole morphology were demonstrated in histological sections. But for the involvement of the central nervous system the lesions in these animals might well have been dismissed as trivial and regressive.

The last animal to be described is a guineapig inoculated subcutaneously with 1 mg. on July 4, 1944. When it was examined a month later there was a double ulcer nearly healed at the site of inoculation, and the regional glands were enlarged. It was examined again three months after inoculation, by which time the local lesion had healed and the swelling of the regional glands had subsided. So far as could be judged clinically this animal had recovered completely, and nothing was noted recovery following nerve suture appeared nearly normal, the reinnervation had evidently not been complete, and the hypertrophy of the intact muscles had to some extent persisted.

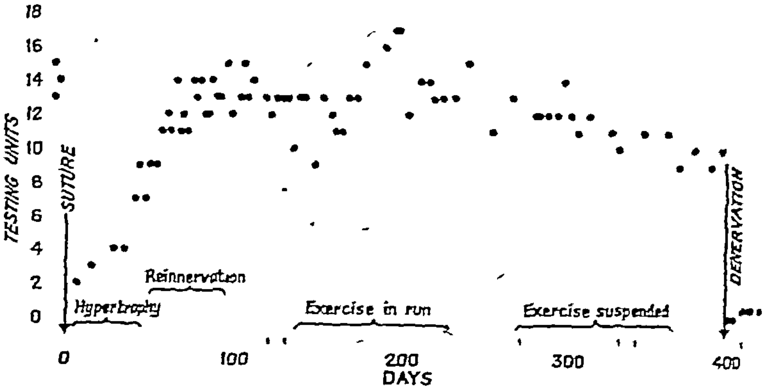

Fig. 6—Recovery of stretch reflex after central and lateral branches of crural nerve had been cut and sutured in a rabbit. Subsequent denervation of that part of the quadriceps previously left intact caused a great decrease of knee-jerk (cf. figs. 3 and 5). Recovery was about 40%.

One may assess approximately the degree of recovery of the stretch reflex after severance and suture by using a spring balance (see above) to determine the tensions represented by the magnitude of the response as it was recorded during the several phases of each experiment. To determine the tension developed by the muscles before operation, we first subtract the tension represented by the normal preoperation response from that represented by the response *immediately* after operation—i.e., before hypertrophy. The tension produced by the reinnervated muscles is represented by the response following severance of the nerve branches *originally* left intact and can then be expressed as a percentage of the normal. Thus, in one experiment the original response height was 13 units, representing 1150 g., and immediately after severance of the central and lateral branches the response was 2 units, equivalent to 490 g.; therefore the normal tension developed by those muscles innervated by the severed branches was 660 g. After reinnervation and recovery followed by a denervation of the muscles previously left intact, a response of 0–1 test unit, equivalent to 260 g., remained, representing a recovery of 39%. Similar calculations in four other animals in which there had been some increase of the response during the reinnervation period revealed a recovery of 19–70%. These figures are only approximate assessments; the variations are presumably correlated with differences in the closeness of apposition at the suture line, but detailed investigation of this has not yet been completed.

In eleven other animals the crural nerve was completely divided, the ends being united as well as possible with plasma or, in two experiments, with stitches. There was no return of a visible upward jerk in nine cases, though frequent tests were made in the 300 days which some of them were kept alive. A very slight response returned in the remaining two, which were kept alive for 149 and 532 days. Since a considerable amount of the recovered reflex contraction tension would have to be used to overcome the inertia factor in these experiments, the lack of a return of an upward jerk does not necessarily imply that there has been no recovery of the stretch reflex. The slight response which returned in the two animals represents a considerable recovery, of about 60%. In all these animals stimulation of the crural nerve at biopsy produced contraction of the quadriceps muscles.

These experiments therefore warn us that in the study of stretch reflexes the movement which can be elicited does not necessarily provide an index of the recovery of the nerve and muscles. Similar factors no doubt operate in the case of knee-jerks and ankle-jerks in man. By paying attention to the possible inertia factor it should be possible so to arrange the limb that even minimal stretch responses can be elicited.

When the crural nerve is interrupted by a crush lesion, the knee-jerk fully recovers. After severance of part of the nerve and suture, recovery may reach about 70% under ideal conditions but is very variable, presumably in correlation with the closeness of union of the severed stumps. Even after complete division of the nerve, when good unions are difficult to obtain, recovery of about 60% of the normal tension may take place.

These relatively good recoveries are surprising when one considers that both the sensory and motor pathways of the reflex have been interrupted. It is hoped that histological investigation of the muscles removed from these animals will show whether the muscle spindles have become reinnervated to an extent sufficient to make it likely that they are the stretch receptors. Some spindles undoubtedly receive sensory and others motor reinnervation, but preliminary results make it very doubtful whether any considerable number of spindles recover the full innervation after nerve suture.

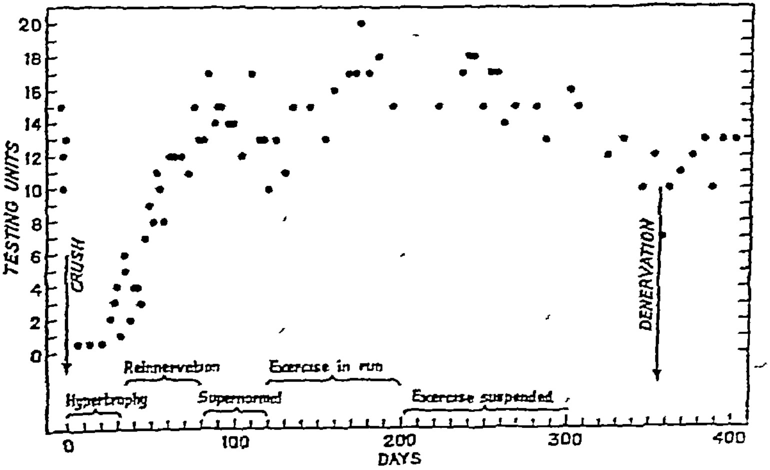

Fig. 5—Recovery of stretch reflex after central and lateral branches of crural nerve had been crushed in a rabbit. *Subsequent denervation of that part of the quadriceps* previously left intact caused only a slight decrease of knee-jerk, as in normal animal (fig. 3), showing that recovery *in those muscles affected by the crush* was complete.

SUMMARY

The extent of movement of the leg in the knee-jerk is not a linear function of the tension developed in the quadriceps muscles. Considerable tension must be developed before any movement can take place. Therefore, when the muscles are reinnervated after nerve injury, a recovery of 50% may be insufficient to produce any visible knee-jerk.

If two of the three branches of the crural nerve of the rabbit are interrupted, that part of the quadriceps which remains intact is just able to overcome this "inertia factor" and produce a small knee-jerk. Hypertrophy of the intact part of the muscle may then lead to a considerable increase of this residual jerk.

When two of the three crural branches are interrupted by crushing with smooth orceps, the knee-jerk fully recovers. Indeed, the ecovered response may be temporarily supernormal ecause of a hypertrophy of the intact muscles.

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VIRULENCE OF A STRAIN OF THE VOLE ACID-FAST BACILLUS (G564)

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This investigation is still far from complete, and it would be unwise to attempt to formulate any conclusions at this stage; but, in view of some of our findings and the increasing interest in the vole strain as a potential living vaccine for human beings, we wish to issue a warning.

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DISCUSSION

It is clear from our results that the use of the vole acid-fast bacillus as a living vaccine is not unattended by risk, and that no strain intended for use in man should be used before exhaustive tests have been made to determine its virulence and powers of resistance.

We find it difficult to believe that G564 is an exceptional strain and very different from all the other strains which have been studied, and we suggest that the virulence tests reported by the various workers who have contributed to the scanty literature on the subject have not been carried out in a manner likely to determine the highest possible virulence of the strains which they were using. We suggest that the cultures have been too old, that many of the animals have been tuberculin tested, and that the animals have not been left sufficiently long.

The cultures used by Wells and Brooke (1940) were two months old, by Brooke and Day (1944) eight weeks old, and by Corper and Cohn (1943) and Birkhaug (1946) six weeks old. Griffith (1942) did not state the age of the cultures from which his inocula were prepared, but it was by his advice that we adopted the use of seven-day-old cultures only for all our work. A seven-day-old culture is much more likely to contain a high proportion of viable bacilli than one six or eight weeks old.

We can see no point in tuberculin testing animals used for virulence tests. It can do no good and may do harm. We have found it necessary to tuberculin test our experimental cattle because it is essential to learn the limits and duration of the skin reactions in vaccinated animals to obtain a standard for use in field work, but we have never used tuberculin on any of our smaller laboratory animals inoculated for either virulence or protection tests.

With regard to the period over which the inoculated animals should be kept for observation, it is clear that the apparently trivial and regressive lesions noted in some animals killed after three to eighteen months must be reconsidered in a new light. In some of these lesions acid-fast organisms have been demonstrated microscopically, but they have not grown in culture. This, however, is no proof that the focus is completely inactive, for we have recovered the vole strain from this type of lesion by passage through the Orkney vole when direct cultures from the same site have proved sterile. It seems possible that as immunity wanes (apparently in 2–2½ years in small animals) there may be a recrudescence of activity in these foci and a severe and progressive infection. Three years would not be too long for a minimal period of observation in virulence tests on strains intended for vaccine work in man.

SUMMARY

Severe sequelæ have been observed in calves, rabbits, and guineapigs inoculated with strain G564 of the vole acid-fast bacillus.

No strain of the acid-fast bacillus should be used as a living vaccine in man before exhaustive tests have been made to determine the highest virulence which it is capable of attaining.

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RELEASE OF PROTEOLYTIC ENZYME IN ANAPHYLACTIC AND PEPTONE SHOCK IN VITRO

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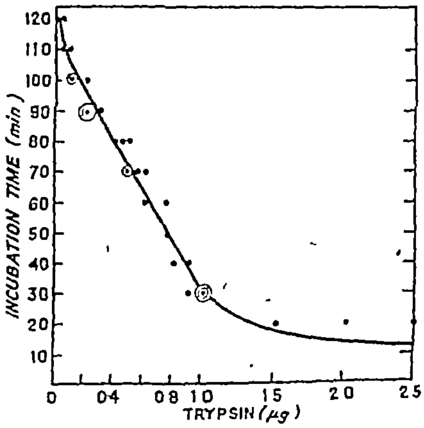
IT is now well established that histamine is released in anaphylactic and anaphylactoid shock and is the main factor responsible for the symptoms observed in these conditions. The next step in investigating the cause of shock is to explain the mechanism of histamine release. Since there is some evidence that histamine release is connected with proteolysis (Dragstedt 1941, Feldberg 1941, Rocha e Silva 1944), experiments have been made to find out whether proteolysis can be detected when sensitised tissue and homologous antigen are mixed, or peptone added to normal tissue, in vitro.



Titration curve of crystalline trypsin: abscissa, amounts of trypsin acting on 5 mg. of fibrinogen in 5 ml. of buffer (pH 7·6) solution; ordinate, incubation time which prevents clotting of the mixture on addition of thrombin; circles, two or three identical results.

METHODS

Proteolytic enzyme activity was estimated by a technique based on the very sensitive method described by Ferguson (1943), using fibrinogen as substrate and its clotting by thrombin as indicator.

To 2·5 ml. of a 0·2% solution of fibrinogen* in buffered saline (pH 7·6) 2·5 ml. of the solution or tissue suspension to be tested is added, and the mixture is incubated at 38°C. Every ten minutes 0·4 ml. of the mixture is removed and tested for clotting with one drop of a 1% solution of thrombin.* The end-point of the protease estimation is reached when the fibrinogen does not clot within fifteen minutes after addition of thrombin.

The results are compared with a titration curve obtained by using crystalline trypsin† and expressed in units. The unit chosen was the amount of enzyme which prevented the clotting of fibrinogen, in the conditions described above, after thirty minutes' incubation. This unit was 1 μg. of crystalline trypsin in the total volume of 5 ml.

As shown in the accompanying figure, the titration curve is practically a straight line between 0·1 and 1·0 unit, and only this part of the curve was used for estimations. When the end-point was reached before thirty minutes, the estimation was carried out on dilutions of the original solution.

Serum-antiprotease was estimated by a method based on the same principle.

A solution was prepared containing 1 unit of trypsin per ml. of saline. Amounts of 0·08 ml. of this solution were distributed in a series of small tubes to which was added 0·08 ml. of the serum to be tested diluted to 10^{-1}, 10^{-2}, 10^{-3}, and 10^{-4} for preliminary estimation. The mixtures were made up to 0·2 ml. with saline and incubated for thirty minutes.

After this pre-incubation, which ensured the optimal combination of enzyme and anti-enzyme, each tube received

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* Human fibrinogen and human thrombin, as issued by the Lister Institute, were kindly supplied by R. A. Kekwick, D.SC.

† Crystalline trypsin was prepared and kindly supplied by Mrs. C. E. Work, PH.D. It contained 41% of $MgSO_4$, and its activity was 0·139 T.U. per mg. protein N at 37°C.

0·2 ml. of the 0·2% solution of fibrinogen, and incubation was continued for a further thirty minutes.

The tubes were then tested with one drop of thrombin. In the tubes where clotting took place it could be assumed that the trypsin was neutralised by the antiprotease of the serum.

The final *estimation* was then done by the same method by adding to 0·08 ml. of trypsin decreasing amounts (from 0·08 ml. to 0·008 ml.) of the lowest concentration of serum which still allowed the clotting of fibrinogen. The unit of antiprotease was chosen as the amount of serum which, under the given conditions, neutralised 1 unit of protease.

Guineapigs were used in all the experiments. Anaphylactic sensitisation was induced by a single subcutaneous injection of 10 mg. of egg albumin (dried egg white). The animals were stunned and killed by bleeding 19–60 days after sensitisation. The blood was allowed to clot, and the serum was collected and tested within 6–24 hours. Immediately after the death of the animal the lungs, kidneys, and liver were excised and minced with fine scissors. In each case 1 g. wet weight of the tissue was suspended in 2·5 ml. of a solution of the antigen in saline (usually 10 mg.). The control consisted of a suspension of the same tissue in saline without antigen. To each suspension 2·5 ml. of the fibrinogen solution was added, and the mixture incubated.

In the peptone experiments the same tissues were used, but taken from normal guineapigs, and suspended in 2·5 ml. of a neutralised solution of bacteriological peptone (usually 25 mg.).

In each experiment the antiprotease titre of the serum was determined, and 1 ml. of the same serum was mixed with 1 ml. of the antigen or peptone solution and incubated for fifteen minutes at 38°C. After incubation the antiprotease titre of the mixture was estimated (taking into account that the serum had been diluted twice). If dilution has an effect in dissociating the protease-antiprotease complex, as is assumed by Macfarlane and Pilling (1946), it would presumably affect both the experimental and control samples equally.

TABLE I—RELEASE OF PROTEASE FROM TISSUES AND DECREASE IN SERUM-ANTIPROTEASE BY CONTACT OF ANTIGEN IN VITRO

No. of experiment	Interval after sensitisation (days)	Antigen (mg./g. of tissue)	Protease released (U/g. of tissue)						Antiprotease (U/ml. of serum)	
			Lung		Liver		Kidney			
			Control	Antigen	Control	Antigen	Control	Antigen	Control	Antigen
1	19	10	0	0·25	..	..	..	..	..	..
2	19	20	0	0·1	..	..	..	..	..	..
3	20	100	0	0	..	..	..	..	..	..
4	20	50	0	0	..	..	..	..	..	..
5	25	10	0	0·5	0·1	0·75	0	0·3	1000	200
6	26	10	0	0·4	0	0·5	0	0·4	1000	400
7	28	10	0	0·25	0	0·5	0	0·45	2000	200
8	30	10	0	0	0	0	0	0	800	1000
9	35	10	0	0·4 0·4*	0·1	0·55 0·5*	0	0·3 0·3*	1000	100
10	42	10	0	0·2 0·25*	0	0·25 0·25*	0	0·25 0·25*	2000	600
11	45	10	0	0	0	0·1	0	0	1000	800
12	54	10	0	0	0	0	0	0	1000	1000
13	60	10	0	0	0	0	0	0	2000	2000
14	†	10	0	0	0	..	..	..	..	..
15	†	10	0	0	0	0	0	0	800	800
16	†	10	0	0	0	0	0	0	1000	1000

* Samples filtered after 15 minutes' contact with antigen.

† Non-sensitised control guineapigs.

TABLE II—RELEASE OF PROTEASE FROM TISSUES AND DECREASE IN SERUM-ANTIPROTEASE BY CONTACT OF PEPTONE IN VITRO

No. of experiment	Peptone (mg./g. of tissue)	Protease released (U/g. of tissue)						Antiprotease (U/ml. of serum)	
		Lung		Liver		Kidney			
		Control	Peptone	Control	Peptone	Control	Peptone	Control	Peptone
17	200	0	0·5	..	..	0	0·5	1000	400
18	100	0	0·4	0·25	1·0	0	0·5	800	100
19	25	0	0·75	0	15·0	0	0·75	2000	400
20	25	0	0·75	0	5·0	0	0·65	1000	200
21	25	0	0	0	0	0	0	4000	4000
22	25	0	0·5	0	2·0	0	1·0	800	100
23	25	0	0·4	0	0·75	0	0·5	1000	400
24	25	0	0·8	0	4·0	0	0·75	1000	100

RESULTS

Table I summarises the results obtained on adding the antigen in vitro to tissue suspensions or serum of sensitised guineapigs. They show that release of free protease can be detected in these animals from the 19th to 45th days after sensitisation. The mean values of enzyme released were 0·44 unit (± 0·1 S.E.) in the liver, 0·35 unit (± 0·04) in the kidney, and 0·3 unit (± 0·05) in the lung. Addition of antigen to serum causes a fall of antiprotease by an average of 68% (± 11). After the 45th day (experiments 12 and 13) there is neither liberation of enzyme nor decrease of anti-enzyme. Experiments 3 and 4 show that excess of antigen inhibits the release of enzyme. This is probably mainly due to the antiprotease effect of egg albumin (Grob 1943). In experiment 8 the guineapig did not respond to the optimal amount of antigen. Three non-sensitised guineapigs (experiments 14, 15, and 16) were tested with negative results. In experiments 9 and 10 the tissue suspensions were filtered fifteen minutes after the addition of antigen, and protease estimation was done on the filtrate. The results obtained under these conditions were identical with those given by the unfiltered samples, showing that enzyme release takes place within fifteen minutes of contact with the antigen.

Table II shows that the addition of peptone to tissue suspensions and to serum has a greater effect than anaphylaxis in vitro. The mean amounts of enzyme released were 4·625 units (± 2 S.E.) in liver, 0·665 unit (± 0·07) in kidney, and 0·59 unit (± 0·07) in lung. Serum antiprotease was reduced by an average of 78% (± 4). In experiment 21 the guineapig did not respond to peptone, and it is worth noting that the resistant animal had an unusually high antiprotease level.

No enzyme could be detected in the controls, except in three cases where liver suspension was slightly active, probably owing to mechanical release of cell proteases.

The mean antiprotease level in guineapig serum was 1325 units (± 180) per ml. There was no significant difference between sensitised and normal animals. This contradicts the observations of Burdon (1942), who found, by a different method, a rise in antiprotease during sensitisation.

DISCUSSION

Some of the early theories of anaphylactic shock assumed the intervention of a proteolytic enzyme set free from its combination with an anti-enzyme. Jobling and Petersen (1914) showed that the antiprotease could be adsorbed by adding various agents to serum, but they could not show that this happened in anaphylactic shock. In fact, there was little valid evidence in favour of the enzyme theory of anaphylaxis, and when in 1922 Dale and Kellaway reviewed the problem they could justifiably exclude proteolysis from the factors leading to shock.

The last few years, however, have brought new data allowing the reintroduction of proteolysis into the mechanism of anaphylactic shock. Rocha e Silva (1939) showed that injection of trypsin gave rise to a condition indistinguishable from anaphylactic shock. This was confirmed by Arellano et al. (1940). Recent studies of fibrinolysis have brought further evidence. Fibrinolysis was discovered by Dastre (1893), and its connexion with peptone shock was first established by Nolf (1905). Rocha e Silva et al. (1946), by eliminating the effect of heparin, showed that fibrinolysis was a constant feature of anaphylactic and peptone shock in dogs. All the evidence given by Tagnon (1942), Christensen and MacLeod (1945), Macfarlane and Pilling (1946), and Christensen (1946) supports the view that fibrinolysis is brought about by a proteolytic enzyme similar to, but distinct from, trypsin.

It is usually admitted that blood-protease is normally bound to antiprotease, and that proteolysis takes place when antiprotease is put out of action and protease is set free. A different conception tends to be accepted now, mainly as an outcome of studies on streptococcal fibrinolysin. This conception, as expressed by Christensen and MacLeod (1945), assumes that blood-protease exists normally as an inactive pro-enzyme, comparable to pancreatic trypsinogen. In various circumstances the pro-enzyme could be activated by a hypothetical kinase. There is, however, no evidence at present that blood contains this pro-enzyme, or that it undergoes activation by a kinase (with the possible exception of the special case of streptococcal fibrinolysin). Activation can be explained by the setting free of the protease from its combination with the anti-enzyme. Combination between protease and antiprotease is probably not a simple reaction but requires the presence of one or possibly several other substances (Ungar 1945). Protease can accordingly be released by several mechanisms involving various components of the anti-enzyme complex.

The experiments described here cannot decide whether protease liberation is an essential feature of anaphylactic and peptone shock. Only minute amounts of enzyme were detected in the experimental conditions described above, and injection of these amounts would certainly not lead to shock in vivo. It is possible, however, that the quantities of enzyme really released are greater than the amounts detected. There is some evidence that protease release is a result of an explosive reaction (experiments 9 and 10 with filtered tissue suspensions), and that the enzyme recombines afterwards with the anti-enzyme. In a few experiments serum was left in contact with peptone for twenty-four hours, and the antiprotease titre was estimated at intervals. An hour after addition it was found to be 10% of the control, three hours later 60%, twenty-four hours later 100%. It is therefore likely that recombination takes place during the protease estimation and reduces the amount of detectable free enzyme.

Protease is released also in tissues which do not release histamine under the same conditions. Addition of antigen to lung or kidney of sensitised guineapigs releases appreciable amounts of histamine (Ungar and Parrot 1936, 1937, Schild 1939), but guineapig liver does not release histamine. This may be due to the difference in the amounts of histamine available in the tissues.

Another fact that requires explanation is the better response of tissues to peptone than to antigen in vitro, whereas in vivo peptone causes only a mild shock in guineapigs, contrasting with the high mortality in true anaphylactic shock.

SUMMARY

When specific antigen was added to tissues of sensitised guineapigs, protease was liberated. The same results were obtained by adding peptone to normal guineapig tissues.

At the same time a fall of the antiprotease titre was observed in serum to which antigen or peptone had been added.

The inference of these findings on the mechanism of anaphylactic and peptone shock is discussed.

I wish to thank Prof. C. Rimington for much valuable advice and for the kind hospitality offered in his laboratory, and Dr. M. Rocha e Silva for his helpful criticism.

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FAILURE OF OIL-SOLUBLE ANÆSTHETICS TO GIVE PROLONGED ANALGESIA

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OILY solutions for protracted local analgesia were first suggested by Yeomans et al. in 1928. Under various names, butyl *p*-aminobenzoate and benzocaine dissolved in olive oil are recommended for pruritus ani and fissure in ano, and for relieving pain after proctological operations. They can be used also for painful states such as fibrositis and neuralgia.

Butyl *p*-aminobenzoate is almost completely insoluble in water, whereas benzocaine is soluble only to the extent of 1 in 2500 (Martindale 1941). Both are readily soluble in oil, and it is assumed that the oil after injection will hold the agents in solution rather than yield them to the tissues.

Some of the earlier products caused pain on injection (Morgan 1935), and an improvement was made by adding a water-soluble agent, such as procaine, which secures immediate analgesia.

Having occasion to inject subcutaneously over the tibia a 3% solution of benzocaine in oil, I noted that analgesia of both skin and periosteum appeared within 2 min., and that sensibility had returned to normal 24 hours later. This observation was in contrast with the claim made in the manufacturer's brochure that the effects would last 14 days.

The formulæ of two of the most popular of these products are as follows:

'*B.A.B.A.N.*'	Ethocaine	1 part
	Butyl *p*-aminobenzoate ..	1 part
	Benzocaine	6 parts
	Benzyl alcohol	5 parts
	Olive oil to	100 parts
'*Proctocaine*'	Procaine	1·5 parts
	Butyl *p*-aminobenzoate ..	6 parts
	Benzyl alcohol ..	5 parts
	Olive oil to	100 parts

After careful observations on several patients, I satisfied myself that the analgesia produced by these agents did not last longer than a few hours.

EXPERIMENTS

I therefore performed the following experiment on myself several times:

3 c.cm. of the agent (proctocaine or B.A.B.A.N.) was introduced under the skin over the tibia so as to occupy a circular area 3 in. in diameter. The injection was painless, and the area of skin, which was slightly bulged by the oil, became totally anæsthetic within 20 sec. So also did the periosteum immediately beneath. But the anæsthesia lasted only 3 hours, and afterwards cutaneous sensation was normal; and the periosteum was abnormally tender for a few days.

For 48 hours a mild throbbing pain was felt in this area, and the skin was itchy for 3 or 4 days. The swelling due to the oil was distinctly visible for 10 days, and the subcutaneous tissues pitted on pressure. No diminution of cutaneous sensibility could be detected.

On one occasion the saphenous nerve trunk was interrupted by chance, giving a larger area of anæsthesia below the middle of the tibia on its medial side. In less than 2 hours, however, it had returned to normal.

No significant difference was observed between the effects of the two agents. The duration and degree of analgesia and the subsequent reactions were the same in both cases.

DISCUSSION

Duncan and Jarvis (1943), who blocked the facial nerves of cats with different oily solutions, reported that a mixture of procaine and butyl *p*-aminobenzoate caused a nerve block of only 3 hours' duration. Paralysis lasting 2 or 3 weeks was secured only with solutions containing 10% of benzyl alcohol, and they showed that the fibres of the facial nerve had degenerated and regenerated within this time. Benzyl alcohol in 5% solution produced little effect.

The observations of Duncan and Jarvis suggest a reason for the early claims made for oil-soluble local anæsthetics: these contained high concentrations of benzyl alcohol, which brought about degeneration of the nerve filaments and analgesia lasting several weeks. In the later solutions smaller quantities of benzyl alcohol were used, and the pharmacological effect of the earlier preparations was not obtained. Because of insufficient experimental support, however, claims have been made which cannot be substantiated.

The fact that oily solutions have been in constant use for a decade makes the more surprising their failure to live up to the claims made for them. Few have been heard to question their efficacy, since the reasons advanced on their behalf seemed convincing enough. The oil, it has been thought, would refuse to yield to the tissues the reagents which are soluble in oil but not in water. But the body fats and lipoid constituents of cells have been forgotten; and the mere fact that butyl *p*-aminobenzoate produces anæsthesia means that it is not inert but combines with some essential element of the nervous tissues. The question of solubility in water is irrelevant.

OIL AS A VEHICLE FOR OTHER AGENTS

There are many reasons for questioning the value of oil as a vehicle for the injection of therapeutic agents. It is recommended for the administration of drugs whose slow absorption is desirable. But theelin and stilbœstrol are absorbed in an unpredictable way after intramuscular injection of oily solutions (Emery et al. 1942, Emery and Matthews 1943, Brown et al. 1944). Bray (1943) found oil an unreliable vehicle for adrenaline, for absorption may be as rapid as from watery solutions, and deaths have been reported from overdosage. Freyberg (1942), who extensively investigated the use of gold salts in rheumatism, found that the insoluble salts were not absorbed at all, whether suspended in water or in oil, and that the absorption of the soluble salts was delayed only slightly by the use of oil as a vehicle. "At best," said Duncan and Jarvis, "the oil can be regarded only as a source of annoyance because of its slow absorption and the danger of improper injection."

SUMMARY

Experiments have demonstrated that the claims made on behalf of oil-soluble local anæsthetics cannot be substantiated, for the analgesia secured by subcutaneous injection lasts only 3 hours.

It is doubtful if oil has any general value as a vehicle for prolonging the action of therapeutic agents after subcutaneous or intramuscular injection.

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SALMONELLA ENTERITIDIS INFECTION

ASSOCIATED WITH USE OF ANTI-RODENT "VIRUS"

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IN a household of five children and three adults, a "virus" preparation was used three times for the extermination of mice. About ten days after its last use some members of the household were found to be infected with *Salmonella enteritidis*.

CASE-HISTORIES

CASE 1.—Towards the end of May, 1944, R. D., a well-developed and previously healthy boy, aged $3^1/_2$ years, complained of tiredness. He was flushed, with temperature 99·6°F and pulse-rate 100. He continued to have a daily rise of temperature to 100°F until September, 1944, when after immunotransfusion the temperature subsided. Occasional rises of temperature to 100°F were noted from November, 1944, to March, 1945, though the child was then clinically well.

On examination in May, 1944, no abnormal physical signs were detected. Towards the end of June the heart apex-beat became more forcible and was palpable in the midclavicular line; a soft systolic apical murmur developed. In July the systolic murmur became much louder and rougher, and the heart was thought to be slightly enlarged to the left. There was slight fullness in the epigastrium and tenderness in the gall-bladder region, though the spleen was never palpable. At no time did the child have diarrhœa. Radiography of the chest, Vollmer patch test, and Mantoux test gave negative results.

Laboratory Findings.—*S. enteritidis* var. *jena* was isolated three times in June, but not afterwards. Serum taken in the fourth week of the illness agglutinated *S. enteritidis* H to 1/125, O to 1/125. These titres gradually fell till, during the tenth week, the serum did not agglutinate *S. enteritidis* H but agglutinated O to 1/50. Blood-culture was sterile on three separate occasions.

A blood-count showed red cells 4,630,000 per c.mm., Hb 79% (12·36 g. per 100 c.cm.), colour-index 0·86, white cells

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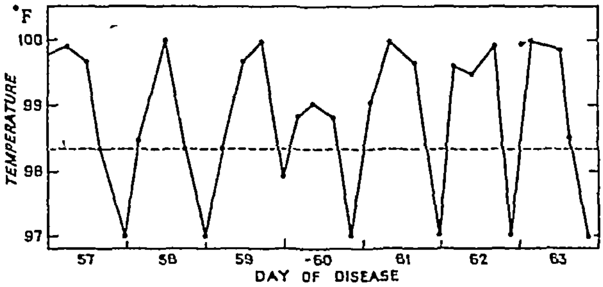
* Miss Orr-Ewing died before this work was completed.

5800 per c.mm. (polymorphs 41%, eosinophils 3%, lymphocytes 52%, monocytes 4%). The sedimentation-rate was 10 mm. in first hour (Wintrobe: corrected for anæmia). Blood-counts and sedimentation-rates showed no significant change throughout the illness.

The urine was normal.

Treatment.—It was thought that there might be a residual *S. enteritidis* infection of the gall-bladder causing the continued pyrexia. Hexamine gr. 40 was given daily without effect. Sulphadiazine 2·5 g. daily was also without effect. Finally the mother was immunised with a vaccine from the *S. enteritidis* strain isolated, and bled when her serum showed titres of 1 : 500 H and 1 : 250 O for the organism. An immunotransfusion of 300 ml. was then given to case 1. Four days later the temperature gradually fell and the general condition improved. At the same time the cardiac impulse became more normal, though there was still an apical systolic murmur. The clinical condition remained good, but some pyrexia continued until March, 1945.



Temperature chart of case I.

CASE 2.—At about the start of the illness of case 1, a baby, aged 7 months, had a sharp attack of diarrhœa, lasting a week, with blood and mucus in the stools. *S. enteritidis* was isolated from the stools three weeks after the attack, but was not demonstrable a week later. There was no pyrexia. The serum was not examined for agglutinins.

After the recognition of these two cases, the fæces and blood of the remaining members of the household were examined.

CASE 3.—The serum of a boy, aged 10 years, agglutinated *S. enteritidis* H at 1/125 and O at 1/25. Stool cultures were negative. It was then recollected that this child had had a very mild attack of diarrhœa about three weeks previously.

CASE 4.—In a girl, aged 11 years, no symptoms were observed, but the serum on June 23, 1944, agglutinated *S. enteritidis* H at 1/25 and O at 1/25. Stool cultures were negative.

The three adults in the house and the remaining child gave negative agglutination reactions, and a single stool culture from each was negative.

DIAGNOSIS

It is clear, from the bacteriological and serological evidence of case 1, that the prolonged pyrexia that characterised this illness began with an intestinal infection by *S. enteritidis*, though there was no diarrhœa or vomiting. The persistence of the pyrexia for so long after the organisms had ceased to be demonstrable in the stools requires explanation; and, though we can reach no definite conclusions, two suggestions may be considered: (1) the persistence of *S. enteritidis* infection outside the alimentary tract, or (2) the unstable nature of the child's thermoregulatory mechanism, together with the debility and slight anæmia that followed the initial infection.

In support of the first suggestion there is evidence that *S. enteritidis* may produce systemic infection. Many cases have now been described of septicæmia and typhoid-like illnesses that were attributed to infection by this organism. Rosher and Wilson (1921) and Guthrie and Montgomery (1939) have given references. Probably some of the earlier cases attributed to *S. enteritidis* were due to *S. enteritidis* Dublin, for this organism was not clearly distinguished from *S. enteritidis* until 1 (White). However, in the fatal cases of infantile with meningitis and cholecystitis described by and Montgomery the organism was clearly identified *S. enteritidis*. It may be noted that, in the typhoid-li illness described by Rosher and Wilson, a blood-culture and several stool cultures were negative, though the serological evidence pointed almost conclusively to *S. enteritidis* infection.

Also noteworthy is the observation that in case 1 the daily temperature chart from June 6 exhibited a characteristic and constant pattern (see figure) when *S. enteritidis* could be isolated from the stools, and this temperature pattern was maintained for about three months during which stool cultures were negative. This suggests that the initial cause of the pyrexia was still operating and was independent of intestinal infection.

Though striking improvement followed blood-transfusion, we are doubtful how far this should be attributed to the transference of artificially induced antibody.

SOURCE OF INFECTION

All members of the family were questioned about previous attacks of diarrhœa, the food eaten, and the possibility of food having been contaminated by vermin. It was found that between three weeks and ten days before the onset of pyrexia in case 1 a commercial "virus" preparation had been used for the extermination of mice. The preparation was used according to the directions, and bait soaked in the "virus" was left about the house. No member of the household was seen to touch the bait, but, about two weeks before the onset of symptoms, R. D. (case 1) was seen playing with the empty bottle in which the "virus" was supplied. No other possible source of infection was discovered.

BACTERIOLOGY

The strains of *S. enteritidis* isolated from cases 1 and 2 were investigated antigenically and found to be typical, having the formula IX, XII; g,m.... They were subjected to special biochemical tests with Bitter's glucose, rhamnose, arabinose, and dulcitol, and Stern's glycerol medium. The reactions subdivide the enteritidis species into four main varieties (Kauffmann 1935): (1) *jena*, responsible for human infections; (2) *danysz*, isolated from natural rodent infections; (3) *chaco*, isolated from men during the Chaco war; and (4) *essen*, isolated from man and ducks. The two strains isolated from cases 1 and 2 were of the *jena* variety.

As several anti-rodent "viruses" are known to contain living *S. enteritidis*, the preparation used in this household was investigated. The preparation labelled "mice" had been bought "over the counter"; it was supplied in a carton in which were three screw-capped bottles containing a semi-solid material. The instructions on the label were as follows:

> "Mix the liquid with sufficient stale bread or any cereal food favoured by the rodents to make a crumbly paste. Use a clean basin and a spoon for the purpose. Distribute all the bait at night close to the runs as soon as it has been mixed. Do not use after (date). Do not touch the bait with the bare hands, as rats and mice are very suspicious. Remove other food which may attract the rodents. The whole contents of the bottle must be used as soon as it is opened."

One of the bottles had been used, but swabs from it yielded *S. enteritidis* var. *jena*. R. D. had been seen handling this bottle. The second bottle was half empty; cultures from this material yielded *S. enteritidis* var. *jena*, a chromogenic coccus, and other organisms. The third bottle was unopened; on testing it yielded a pure growth of *S. enteritidis* var. *jena*, all the colonies of which appeared to be smooth to the naked eye. Ten of these olonies were tested with acriflavine (Pampana 1933); ne only of these gave a pure smooth reaction, so that the ulture was partially rough. A 24-hour broth culture as made from the "virus." When 0·1 ml. of this ulture was injected intraperitoneally into each of three ice all died in 48–108 hours, and *S. enteritidis* var. *jena* as recovered from spleen and heart blood.

DISCUSSION

Leslie (1942) tested six different commercial anti-rodent "virus" preparations, four of which contained *S. enteritidis* var. *danysz*, and two *S. enteritidis* var. *jena*. He found the "virus" preparation labelled "rats and mice" to be *S. enteritidis* var. *danysz*. We confirmed this finding, but the "virus" labelled "mice," prepared by the same firm, yielded *S. enteritidis* var. *jena*.

It has been recognised that these preparations may be a source of danger to man, either directly or as the result of contamination of food by the excreta of vermin infected with the virus (Ministry of Health 1933). Cases of enteritis, some fatal, attributed to "virus" preparations, have been described: that reported by Kristensen and Bojlén (1931) is the latest. Scott (1933) described an outbreak of food-poisoning due to *S. enteritidis* involving 38 people, with 1 fatal case, in which the food was probably infected by mice. A "virus" containing *S. enteritidis* had been used in the establishment, and this organism was isolated from apparently healthy mice on the premises.

In the series here reported there was strong presumptive evidence that the "virus" was the source of the infecting organism. There was no indication from the instructions on the bottle that this preparation may be dangerous to man, or that utensils used in the preparation of the bait should not be used for the preparation of human or animal food—an omission which should certainly be remedied.

SUMMARY

An outbreak of infection with *S. enteritidis* var. *jena* is described in which four children were involved.

An anti-rodent "virus" preparation containing an identical organism was being used in the house at the time of the outbreak, and was probably the source of the infecting organism.

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"... The increasing availability of money for research in medicine is beginning to embarrass our medical schools. Where is the trained personnel coming from to make use of these funds? ... There seems to be a widespread public belief in what might be called the magic-wand theory of medical advance.... According to this theory, our research laboratories stand ready at any time to turn money into scientific discoveries; in other words the bottleneck to further advance is the lack of funds; with adequate funds we can buy a cure for cancer or infantile paralysis or any other disease which afflicts mankind. The bottleneck, of course, is not the lack of funds; it is the lack of capable and thoroughly trained investigators to use the funds. The medical schools, to which we must look for these investigators, do not possess and cannot now obtain the fundamental facilities through which alone this increasing demand can be met. Indeed, many of our medical schools are in the position of a cook asked to prepare a wedding feast for which the champagne has been furnished but no water to boil the potatoes."—Mr. RAYMOND B. FOSDICK in the Rockefeller Foundation review of work for 1946, p. 23.

Reviews of Books

Dimensions of Personality

H. J. EYSENCK, PH.D., with a foreword by Prof. A. J. LEWIS, M.D. London: Kegan Paul, Trench, Trubner. 1947. Pp. 308. 25*s.*

THIS book records the results of testing 700 neurotic Service personnel at the Mill Hill Hospital by tests elaborated from those of psychological laboratories, and relating these results with the psychiatric traits recorded from each patient's personal history and symptoms. Briefly, a factorial analysis of thirty-nine traits has enabled two factors to be described. One, a general factor of neuroticism (associated with a badly organised personality, unsatisfactory parents or home, and general asthenia), and the other a bipolar factor with dysthymic tendencies at one end (affective states, obsessional traits, an autonomic lability), contrasted with hysterical symptoms, hypochondriacal complaints, low intelligence, sex anomalies, poor performance of finicky tasks, and good sense of humour (as defined) at the other. These two types can be contrasted throughout on physique, on dark-vision tests, on choline-esterase tests, on their aims, on the fluidity or rigidity of their outlook, and on body build (the dysthymics showed predominance of linear, hysterics of lateral growth, while as a whole neurotics were more leptomorph than normals). Dysthymics were found to be slightly more suggestible than hysterics. A useful variation of the complicated Rorschach test is described, and showed significant differences between normals and neurotics, and between serious and mild neurotics.

Dr. Eysenck and his collaborators have been most searching in checking their results mathematically, ensuring that only significant differences are recorded, and usually studying sufficiently large control groups. Their mass of evidence is formidable but welcome: it brings into psychiatry the method of mathematics and gives hope that we can be more accurate in our assessments, more certain in our pronouncements. But it would be a pity if Dr. Eysenck's modest claims led to facile statements by the less well trained—e.g., that "long persons are essentially neurotic" or "dull persons are potentially hysteric." Nor has he quietened all doubts. He seems himself to be too dogmatic in what he says of graphology, and those who are not allied too closely to the theory of type-identity will wish to know what happens in Dr. Eysenck's future assessment of the man who, at Mill Hill, was a conversion-hysteric and has now become suicidal and depressed, or of the apparent depressive whom electrical convulsive treatment has apparently (as it does sometimes) converted into a querulous somatic pain-ridden "hysteric." The apparent rigidity of some of the diagnoses—which he admits—points to the critical spirit in which this book must be received, but such a spirit should also appreciate the fresh channels of thought which it opens, and which Dr. Eysenck's team will clearly continue to provide.

Industrial Toxicology

ALICE HAMILTON, A.M., M.D., assistant professor of industrial medicine Emeritus, Harvard University; and RUTHERFORD T. JOHNSTONE, M.D., director of department of occupational diseases, Golden State Hospital, California. London: Oxford University Press. 1946. Pp. 186. 15*s.*

TEXTBOOKS on industrial toxicology do not usually deal with the treatment of cases of poisoning, probably because industrial medicine is preventive rather than curative in outlook. But the general practitioner needs to know how to treat cases of poisoning and this book contains a good section on treatment. Dr. Alice Hamilton, who has done pioneer work on industrial toxicology in the United States, sums up the known facts capably, giving much thought and space to the pathology and diagnosis of the really important poisonings, such as those by benzol, lead, and carbon monoxide. Dr. Rutherford Johnstone in a foreword to his section on treatment and prevention reminds us that "inability to eradicate completely occupational ill-health arises from the constant introduction of new substances with which the management and the medical profession are not familiar or the failure of small plants to maintain a program of medical supervision or hygiene." New occupational diseases are therefore bound to appear from time to time. Full details are given of the principles underlying the treatment of industrial poisonings together with practical therapeutic measures. The book can be recommended as both authoritative and easy to read.

Diagnosis and Treatment of Pulmonary Tuberculosis

MOSES J. STONE, M.D., assistant professor in medicine, Boston University; PAUL DUFAULT, M.D., F.A.C.P., superintendent, Rutland State Sanatorium, Massachusetts. London: H. Kimpton. 1946. Pp. 316. 17*s.* 6*d.*

"IN the British Isles, where tuberculosis is widespread in dairy-herds and pasteurisation rather exceptional, human tuberculosis of bovine origin is higher than in any other country in the world." Home-truths like this, encountered casually in a discussion on infection, give the British reader a disquieting jolt and cause him to reflect how salutary it is to read a "foreign" textbook occasionally, to see what students of another nationality are being taught. He will find that there are inevitably differences in approach and differences in the interpretation of factual evidence. Quite often he will find differences in the factual evidence itself; and these are by no means necessarily due to faulty or prejudiced observation. More and more fully is it being realised that tuberculosis varies geographically in its manifestations. Even in Great Britain morbidity and mortality rates vary from county to county and city to city, and the prognosis for a Yorkshireman with tuberculosis is noticeably better than that of a patient from Wales. It is therefore not surprising that there should be apparent discrepancies between the British, American, and Scandinavian concepts of the disease process. Erythema nodosum, for example, spells primary tuberculous infection in Scandinavia; in Britain it is regarded as a non-specific allergic reaction, but highly suggestive of tuberculosis; in this American textbook it is nowhere mentioned. Indeed the authors seem to pay scant attention to primary tuberculous infection in childhood, and its significance in adult life is barely mentioned except in a barmecidal chapter-heading: whereby questions are ignored which in Europe are regarded as crucially important in any campaign against the disease.

By our standards too, clinical examination is dismissed somewhat perfunctorily in eleven depreciatory pages. The student's surprising question, "When should we percuss? and auscult?" is answered equally surprisingly, "Every time you examine a new (sic) chest." Evidently all subsequent examinations should be radiological or biochemical. And yet surely it is common experience that physical signs developing over a radiologically proven lesion, hitherto silent, can draw attention to changes in that lesion earlier than they can be perceived in serial X-ray films? Among the "indications" for surgical operations it is startling to find phrenic paralysis and pneumoperitoneum regarded as "at best a palliative measure in advanced and almost hopeless bilateral cases." The techniques for all the different operative measures are faithfully described, but no underlying philosophy of adjuvant therapy is divulged—no indication as to whether the desiderata be the radiological disappearance of cavities or sputum conversion.

With much of the book, however, one cannot fail to be in complete and enthusiastic agreement. The chapter presenting Diseases which Simulate Tuberculosis more than compensates for deficiencies elsewhere (which after all may be due only to shift of emphasis and so more apparent than real). The section on Intrathoracic Dynamics (that formidable controversial topic!) is perhaps the least satisfactory. Much is far from lucid and in parts it is baffling. Can an intrapleural vacuum ever be anything else than subatmospheric? And surely to state that ultraviolet rays penetrate deeper than infra-red rays (whose action is "rather superficial and physical") is to contradict the consistent findings of Sonne, Coblentz, Bachem and Reed, and a host of other workers? At the end of each chapter, besides the references mentioned in the text, a list of works for "suggested reading" is supplied, which should prove helpful to the interested (or puzzled) student.

Studies on the Influenza A Epidemic of March 1941 at Groningen (Holland)

J. A. R. VAN BRUGGEN, M.D.; L. BIJLMER, M.D.; W. HOEK; J. MULDER, M.D.; L. J. ZIELSTRA. P[illegible] of the Institute of Preventive Medicine, Leyden, no. [illegible] 1947. Pp. 64. 10*s.*

THE epidemiological behaviour of influenza in H[illegible] during the war years seems to have differed c[illegible]ably *from that in Britain.* Thus the winter of 1940–4 afforded the sharpest epidemic of recent years, whereas *that of 1943–44* passed with only a moderate outbreak—the converse of British experience. Two-thirds of this monograph is an account of the clinical features of cases of uncomplicated influenza and of cases of pneumonia, the remaining third describing laboratory work on the virus strains recovered from the cases and on sera from the patients. This work was done on ferrets and mice: 5 strains of a virus related to the W.S. strain of influenza A were recovered, and serological tests showed *that* patients convalescent from influenza developed increase in neutralising and complement-fixing antibodies to the W.S. virus. The authors clearly think that the influenza virus plays an important part in causing the pulmonary complications seen during influenza epidemics: they were able to recover virus from the sputum of a patient with staphylococcal and streptococcal pneumonia and a patient with pneumococcal pneumonia, and from the throat washings of a patient with pneumococcal bronchitis. In their remaining cases however, the evidence for the existence of a virus in *addition to a bacterial infection of the lung* is inadequate, consisting merely in the demonstration of antibodies to influenza virus in the serum during convalescence.

Penicillin in General Practice (2nd ed. London: Staples Press. 1947. Pp. 110. 5*s.*).—This little book by Dr. J. L. Hamilton-Paterson provides an accurate, complete, and readable account of penicillin treatment as practised today.

The New-born Infant (3rd ed. London: H. Kimpton 1945. Pp. 314. 16*s.* 6*d.*), covering the first 6–8 weeks of life, is written by Dr. Emerson L. Stone, associate clinical professor of obstetrics and gynæcology at Yale. He describes fully the physiology, management, and pathology of the neonatal *period. He tries to discourage the perpetuation* of error, to sift new practices, and to survey published work; and his long experience informs the book. Some sections—such as that on congenital heart disease—could have been better left to specialists, and at this date it will not do to say of meningitis that serum is indicated for meningococcal infection, while for other types treatment is not specific. But the book is good and useful.

Poisons: Their Properties, Chemical Identification, Symptoms and Emergency Treatments (New York: D. van Nostrand. London: Macmillan. 1946. Pp. 209. 16*s.* 6*d.*).—This new compendium of poisons, their elementary chemistry, commonplace sources, lay symptomatology, and emergency treatment is designed by Vincent J. Brookes (sergeant in the New Jersey State police) and Hubert N. Alyea (associate professor of chemistry in Princetown University) for quick reference by those who may find the medical handbooks on the subject too technical or insufficiently practical. *Arrangement in alphabetical order*, a glossary, and some conversion tables increase its usefulness to the ambulance and first-aid officer, the police, and the casualty staff—and to doctors who hold classes in the subject.

Local Anæsthesia: Brachial Plexus (2nd ed. Oxford: Blackwell Scientific Publications. *1947. Pp. 56. 10s. 6d.*).—The copiously illustrated method described by Prof. R. R. Macintosh and Dr. W. W. Mushin in *their first edition* is retained. Those unfamiliar with the technique of injecting the stellate ganglion are reminded that by including sympathetic block while injecting the brachial plexus they will relieve vascular spasm of the upper limb. *Repeated small* injections—each preceded by an aspiration test—are now advocated, in place of continuous injection of the anæsthetic solution during the withdrawal of the first needle—which is in close proximity to the subclavian artery. *This modification* in technique should eliminate all risk of an intravascular injection.

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THE LANCET

LONDON: SATURDAY, MAY 24, 1947

On the Record

A FAMOUS American foundation, before granting funds to any hospital, insists on examining its records office. In this country we often pay too little attention to this department's work, as witness the small space allotted to its meagre staff, the casual overflow of documents into the cellar, and the methods of filing, each different from the other except that all have been inherited from a bygone generation.

The first purpose of records is of course to serve the patient, not only while he is in hospital but after he has left it: they may be needed, for example, to settle a claim for compensation, or when he returns for readmission. Next, they supply the governing body with a picture of the hospital's activities, and hospital administrators with a guide to the probable case-load of each department; regionally, they may help planners to decide the number of beds needed for each purpose, and centrally they can furnish an overall picture of trends in disease. Finally they can aid research not only into particular entities but also into the social origin and course of morbidity. Though causes of death have been registrable for a hundred years, there has never been any comparable index of the diseases that handicap without killing, and such an index is unobtainable without at least a complete return from all hospitals. Since 1944 the Bureau of Health and Sickness Records at Oxford, using punch-cards for a continuous record of all hospital admissions in the area of the Oxford and District Joint Hospitals Board, has brought to light information never before obtained in this country, and there is some hope that a start will be made by extending the Oxford experiment to cover hospitals all over the country. For such a survey to succeed, however, the hospitals will have to overhaul their practice to fit it for this new work; and by so doing they will enhance their own efficiency.

Inertia, local prejudice, and fear of expense mark the attitude of many hospitals to their records office; unlike any other hospital department, this is usually directed by someone who has had no special training and has been given no chance to compare the local system with others. Hence the Oxford proposal to provide courses for hospital records officers, equipping them, like the American "medical record librarians," to help clinicians both as experts on the form and size of records and as statistical advisers. Records officers could, in turn, be helped by ending needless reduplication of their work. Relief could, for example, be given by uniting the dates of annual returns: at present the records of many hospitals must be twice checked each year—for clinical returns at the end of the calendar year, and for financial returns at the end of the financial year.

Any system of recording and filing should aim at standardisation and simplicity, and have regard to future needs. Everybody agrees that the jumble of papers now known as the patient's "notes" should give place to forms of uniform size, held together and following each other in a settled order: but opinion is less unanimous on how to file them. Many statisticians and most clinical research-workers favour the unit record system, by which the notes for one patient are collected in a single file; but others prefer the binding of notes in chronological order, to prevent loss and ensure ready access. There is perhaps room for both systems, and possibly for others, the choice depending on the type of hospital and particularly on its readmission-rate. It is, however, noteworthy that a progressive county-council hospital in Middlesex has operated the binding system successfully since 1927, despite a readmission-rate higher than in teaching hospitals; and the staff, who include research-workers continually referring to the notes, emphatically favour binding. Working from a card-index file showing on one card the first and all subsequent admissions, they can find in a minute any note taken in the last twenty years, and 1000 full case-notes, recorded on paper of uniform size and bound in volumes of about 100, occupy only two feet of shelf. The experience of such a hospital, where the question of records has been carefully studied, should be valuable to others who are trying to evolve the system best suited to their needs, and visitors to this one in Middlesex will also find many of the incidental arrangements interesting.

For example it is the records officer who answers telephone inquiries about the condition of patients: and she who undertakes all the administrative work following a death, ranging from interviews with relatives to arrangements in connexion with an inquest. In the wards a 90% saving in forms has followed the replacement of the sister's weekly indent by a weekly visit from the storekeeper, who restocks a small cabinet. In the outpatients' department the use of coloured stars on the patient's personal card and on the notes has eliminated confusion between different departments and doctors; while the wise use of code-numbers has saved space and aided "at-a-glance" reference.

The ideal to which attention is now being given is the making of a birth-to-death health record for every person in the country. These could be kept at registries—perhaps one in each region—whose first function would be to supply data about patients whose notes were lost or whose previous history was uncertain. Any breach of confidence which the existence of such a registry might be taken to imply might possibly be overcome by storing the notes under numbers, the keys to which would be held only by the contributing hospitals and practitioners, and the patients. The hospitals could then make their contribution to the registry with little extra labour by submitting a carbon copy of the report sent to the general practitioner on the patient's discharge, which should be comprehensive and approved by the responsible member of the staff and should of course fit the envelope used for the practitioner's own notes. The contribution from the general practitioner himself would be less easily made: if, as seems probable, he must continue to write his own notes, the only additional work that can reasonably be asked of him is that of making a simultaneous carbon copy; and a carbon copy made with a pen might well be illegible. Again, if his own notes were copied by an unskilled typist errors might creep in; and a legible but wrong report is worse than none at all. Perhaps the best solution would be a typewritten abstract, prepared by a trained clerk at yearly intervals and initialled by the doctor, one copy going to the registry and the other, if it relates to illnesses now ended, superseding the previous year's notes, which would be filed for reference.

Opinions may differ on the advisability, or practicability, of central or regional registries, just as they differ on the technique of recording by hospital and practitioner. This, however, need not prevent early agreement on many important subjects, including the training of records officers, the classification under which diseases are to be tabulated, and the size and order of record and report sheets. A really good system of records, making the least possible demands on his time and temper, is one of the things that the doctor has a right to expect from a National Health Service; but he will have to help to create it.

The Vole Acid-fast Bacillus

SINCE 1937, when A. Q. WELLS reported[1] the occurrence of tuberculosis in the wild vole, *Microtus agrestis*, the investigation of this type of tuberculosis has gone steadily forward in spite of considerable war difficulties, and now WELLS[2] has brought together the results achieved in a memorandum issued from the Sir William Dunn School of Pathology in Oxford where much of the work has been done. The disease has been found in voles sent from nineteen places in Great Britain ranging from Perth to Buckinghamshire, the largest find being on the Liverpool corporation estate at Lake Vyrnwy in Wales. Out of 4309 voles examined up to the outbreak of the war in 1939, lesions of naturally acquired tuberculosis were found in 882. Cases were also discovered in bank voles, shrews, and wood mice

Macroscopically two types of the disease have been recognised—one a lymph-gland type in which the glands draining the intestine are most commonly affected; the other an infiltration of the subcutaneous tissues with a white gritty chalk-like substance containing enormous numbers of bacilli and superficially resembling rat leprosy. In both types the infection may spread to internal organs, usually the lungs in the first type and the liver and spleen in the second. Comparatively few of the animals were trapped alive, but there seems to be good reason for believing that the disease is very chronic. The route of the infection appears to be intestinal, either from soiled food or the eating of infected corpses, for the vole is a pugnacious little animal and has no nice feelings about cannibalism. WELLS has come to the conclusion that the vole acid-fast bacillus is a new strain of *Mycobacterium tuberculosis* for which he suggests the name "murine type." A vole-bacillus tuberculin can be prepared, and when the Wilson absorption method of agglutination is applied the bacillus yields serological results indistinguishable from those of the human and bovine strains The micro-organism is feebly pathogenic to the guineapig and rabbit but not to the fowl. Lastly, in fulfilment of KOCH's postulates, the culture produces characteristic lesions when injected experimentally into various types of vole.

The tissue reactions to experimental infection with this murine type of organism are discussed in the memorandum by ROBB-SMITH. In the vole itself th reaction is necrotic and histiocytic with a tendenc to calcification and the formation of minute calcareou bodies similar to those occasionally seen in the chronic tuberculosis of man. The number of bacilli found in the lesions is very large whereas the amount of fibrosis is small. This disproportion between the lesion and the number of bacilli is as striking, with the murine type of infection as it is with the other mammalian strains in the experimental lesions of the muridæ. In guineapigs necrosis is a prominent feature, while in the rabbit there is a localised cellular reaction with caseation and necrosis comparable with that observed in infections with bovine strain. On the other side of the picture, when the vole is inoculated with the bovine and human strains a typical cellular reaction with true epithelioid giant-cell systems or necrosis follows. One of the most interesting results, however, is the production in the guineapig of a chronic localised fibro-epithelioid reaction with caseation, suggestive of the tuberculous lesion seen in man. This was achieved by a preliminary infection with the murine strain followed by a bovine-strain inoculation

In studying the various cultures of vole bacillus isolated, WELLS notes that "G" strains, isolated from voles in Greskine Forest, Dumfriesshire, differ from other vole-bacillus strains in cultural reactions and in possessing greater virulence. In this issue Dr. YOUNG and Dr. PATERSON report some experiments made with a freshly isolated culture of a G strain (i.e., 564) which proved in their hands to be more virulent than others isolated. Using it for vaccine purposes they encountered untoward results in calves, which were confirmed in laboratory animals. This finding is reminiscent of the earlier experiments with the Calmette bacillus

The isolation of a new strain of *Myc. tuberculosis* has naturally opened up the possibility of a new prophylactic vaccine on the lines of B.C.G. WELLS, BIRKHAUG, and others have already made experiments to this end, both on animals and on man, and some broad facts have been established. In the first place neither the vole bacillus nor B.C.G. vaccine conferred immunity on the guineapig. Perhaps this is hardly surprising, for the guineapig's resistance to tuberculosis is so feeble that no vaccine has yet succeeded in giving it really adequate protection against even small-dose experimental infection; and literally thousands of attempts have been made Tests made with cattle by GRIFFITH and DALLING in the early stages of the war were, however, more encouraging—better indeed than with B.C.G. Preliminary tests have also been made by WELLS on man These were designed solely to determine the conditions for safe administration, and the nature of the local reaction to the vaccine. They produced results which followed fairly closely those of B.C.G. Thus of a group of 48 tuberculin-negative persons in two institutions inoculated subcutaneously, 43 developed ulcers and 2 local abscesses at the site of inoculation—a result similar to that of B.C.G. inoculation. When this route of vaccination was abandoned in favour of the modern multiple-puncture method, in 69 tuberculin-negative persons there was no general reaction, no ulcer formation, and only a series of raised papules which persisted for some weeks and then faded. Tuberculin reactions became positive. No claim is

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1. *Lancet*, 1937, i, 1221.
2. Wells, A. Q., Robb-Smith, A. H. T. The Murine Type of Tubercle Bacillus. *Spec. Rep. Ser. med. Res. Coun., Lond.* no. 259, 1947.

made that vole-bacillus vaccine produces resistance to tuberculosis in man; this can be determined only by long and patient trial, as in B.C.G. But there is some evidence that it retards disease in guineapigs and in cattle.

Naturally the question of stability of virulence of the organism has been raised, as it always should be when living-culture vaccines are used; it will be remembered that this subject created a good deal of controversy some years ago in the case of B.C.G. With the vole bacillus the issue is different. Although the early history of Calmette's bacillus is not as detailed as we should like, bacteriological records show that it was originally fully virulent and that it became avirulent through long years of subculture. The vole acid-fast bacillus on the other hand is a new strain, which, with the exception of the G culture variant, starts its laboratory history with a record of feeble virulence. Young and Paterson take the conservative line that no strain of acid-fast bacilli should be used as a living vaccine in man before exhaustive tests have been made to determine the highest virulence which it is capable of attaining, and they suggest a minimum period of three years' observation for this purpose. They also stress the importance of using only young cultures as a means of controlling virulence. It should be noted, however, that the G strain with which they obtained untoward results in animals was used along with others in the preparation of the vaccine employed by Wells in his tests on 121 persons (some of whom were inoculated more than five years ago), and that none of these persons have shown any signs of generalised infection. Nevertheless, as a precautionary measure, this particular strain was discarded in vaccination preparation three years ago. The guide to safety in all this work on the preparation of living-culture vaccines appears to be, as Jensen pointed out, the most careful standardisation of culture technique.

"Patent" Medicine Trade

The council of the Pharmaceutical Society are making a determined attempt to bring the sale and advertisement of proprietary medicines under stricter Government control.[1] In a 14,000-word report to the Ministry of Health, based on a five years' inquiry, they show that the position is now little better than it was when the Select Committee on Patent Medicines reported in 1914.[2] "Throughout the pages of most newspapers and periodicals in general circulation," says the society, "sufferers from all manner of diseases and ailments are offered beans, tablets, wines, powders, salts, pills, ointments, tonics, hormones, glands, and vaccines that will bring them youth, health, charm, slimness, strong nerves, inner cleanliness, lively livers, freedom from pain, increased (or decreased) weight, iron for the blood, purer blood, vitamins, contentment, resolution, immunisation, vitality, and so on. The advertisers' claims are frequently so fantastic that one would not be surprised to find them offering secure jobs and large salaries into the bargain." Obviously these accusations are directed against only one section of the proprietary medicine trade, but it is a large one. The report maintains that the advertisements of these firms are grossly exaggerated and often based on fraudulent claims[3]; they further the view that ill health is a normal human condition and so encourage self-medication; they lead the public to cover up their symptoms instead of seeking skilled advice, so prejudicing the success of treatment; they create an atmosphere of fear, whether of ill health, operation, premature old age, or incurable disease; they undermine public confidence in a State medical service and the doctors who will provide it; they extract excessive fees from the sick; and they use scientific terms to impress or deceive the uneducated and credulous.

Experience of National Health Insurance suggests that, far from reducing the demand for self-medicaments, the coming National Health Service may even increase it; the sales of proprietary remedies doubled in ten years after the introduction of N.H.I. The self-treatment habit is already deeply ingrained, and the society fears that the new service may usher in a golden age for "commercialised charlatanism."

How can the public be protected against the unscrupulous salesmen who exploit their ignorance? It has not been enough for newspapers to adopt a voluntary censorship, for claims to cure certain diseases to be banned, or for the contents of each bottle to be compulsorily disclosed. The Ministry of Health and the B.B.C. have taught people a little about the fundaments of health: but they have to contend against posters and other advertisements whose aim often is to perpetuate error. The only hope of stamping out a growing evil seems to lie in firm supervision of the trade itself. The society would make it a statutory duty of the Ministry of Health, with an advisory committee of doctors, pharmacists, &c., to maintain proper standards for proprietary medicines and their advertisements, and would prohibit the sale of any medicines which did not attain a place on the Ministry's register. If effective such legislation would put some medicine traders out of business; and so much capital, both in money and in brains, is involved that they will not go down without a fight. The support of the public is a first essential of success, so Government action should be preceded by an energetic campaign to show the public where its true interest lies.

Gowland Hopkins

The early organic chemists worked on natural substances; but their successors, in learning the art of synthesis, entered a new world composed of molecules made by themselves. Frederick Gowland Hopkins, whose obituary we publish this week, re-established biochemistry as a study of life—of vital processes. He urged the organic chemist to "get into touch with the animal," whose body "usually does the unexpected"; and he saw biochemistry as a borderland science, fit meeting-ground for many minds. "It is never," he said, "out of place to urge that the living cell should be thought of as a dynamic, and not a static, system," and to this new dynamic biochemistry he made great contributions both by experiment and by quiet leadership. Long ago E. H. Starling spoke truly of his power of "finding among the thickets of ignorance which surround us some path to knowledge which others had passed by unheedingly." His life was one for which we may all be grateful.

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1. *Pharmaceut. J.* May 17, 1947, p. 333.
2. See *Lancet* 1914, ii, 653.
3. See also Thompson, J. W. P. *Ibid*, 1946, ii, 281.

Annotations

ECOLOGY AT CAMBRIDGE

Cambridge University plans to establish a department of human ecology. By dictionary definition this subject covers the study of the whole of man's habits and modes of life, and his relations with his surroundings: but the faculty board have wisely mapped out a more limited territory for initial exploration. Some special opportunities are offered by East Anglia, which has both urban and rural populations and where some of the isolated villages of the Isle of Ely are almost closed communities, ideal for studies on epidemiology, hereditary factors in disease, and the effects of a fixed environment on susceptibility. In addition, the Fens provide plenty of rheumatism. Early investigations will include one into subclinical disease and carrier-states in closed communities, confined at first to those of streptococcal origin; the new department will carry out the clinical and epidemiological inquiries, while the bacteriology is undertaken by the Public Health Laboratory Service, which works in close association with the university department of pathology, and is equipped to identify fully the different types of streptococci. A clinical and anatomical survey of rheumatic conditions, which have long been suspected of a streptococcal element, is also planned.

One function of the department will be to share in founding a new university health service, designed not only for the individual benefit of undergraduates but also to discover defects and disorders before they reach a stage which might be harmful to the community. A pilot survey, carried out in Downing College in 1946, demonstrated clearly the need for such a service: of the 214 volunteers examined by the department of medicine and the county tuberculosis officer, 1 had active open pulmonary tuberculosis, of which he was unaware, and 1 had closed non-infective tuberculosis, which was advancing. The university department of experimental psychology could also contribute to the health service. An important part of this service will be the study of special risks run by technical staff in the university—for example, from ionising radiations. The ecologists will also naturally work with other university groups, investigating such subjects as the process of ageing, and the effects of climate on health.

The new department will develop as part of the department of medicine, until the moment comes to give it autonomy under a professor. It will be staffed at first with a reader assisted by two juniors; while the university health service is to have one senior and one junior medical officer, a chest radiologist, a statistician, and necessary secretarial assistants.

SALMONELLA IN THE HOME

INFECTION with organisms of the salmonella group is widespread; and it is generally assumed that outbreaks are caused by food contaminated directly or indirectly from an animal. In this country rats, mice, pigs, and cows are often infected, while inadequately cooked duck eggs cause numerous infections with *S. typhi-murium* or *S. enteritidis*. In the United States domestic fowls and turkeys are said to be the main reservoir for salmonella but there is less evidence that this is so here. *S. pullorum* and *S. gallinarum* rarely attack humans but do take toll of our hens, and *S. thompson* causes trouble among incubated eggs and in young chicks. Until 1942 almost all strains of salmonella isolated in this country belonged to one of fourteen native types, but with the arrival of American spray-dried egg the picture changed.[1] There is still doubt about the method by which the egg and the dried product become contaminated, and while infection can take place in the oviduct it seems likely that salmonella are often sucked through the shell from moist fæc as the egg cools.[2] Whatever the mechanism, it is clear that at least ten new types of salmonella were imported into the country along with the dried egg, and outbreaks of infection with such organisms as *S. oranienburg* were fairly common. As dried egg became scarce, so the American types of salmonella infection became rare and we seemed to be reverting to the home-grown varieties. Whether a further increase in the use of the newer dried-egg powder would again bring migrant salmonella we do not know, though it is likely that the product still carries its pathogens. It may also be that such organisms as *S. oranienburg* or *S. montevideo* have already found accommodating human or animal hosts and have taken permanent abode with us.

There is still much to learn about the ecology of the salmonellas, both home-bred and imported, and collaboration between medical and veterinary bacteriologists is needed. From time to time there are reports of salmonella infection in dogs and cats, and the daily press lately described an outbreak caused by the activities of a hospital cat. We do not know very much about the part played by cats and dogs in the spread of several other types of human illness, and when the source of sporadic infection is in doubt it may occasionally be worth interviewing these dumb but socially active members of the family. The risk of introducing salmonella infections into the house in the form of a "virus" intended to destroy rats or mice is sufficiently illustrated by the paper we publish this week.

TOO MUCH HEPARIN IN THE BLOOD

IT is well known that a serious overdose of X-ray or other radiation to the whole body, including exposure to atom-bomb radiation, is liable to cause an anæmic syndrome of which bleeding from mucous membranes is a striking and troublesome symptom; it often heralds the failure of treatment, when further internal hæmorrhages are found at necropsy. A similar syndrome follows overdosage with drugs that cause toxic depression of hæmopoiesis, such as gold. The blood-platelet count is strikingly reduced in these patients and it is usual to attribute the hæmorrhage to this thrombocytopenia. Allen and Jacobson[3] now suggest that the true explanation is the presence in the blood of an anticoagulant that they identified as heparin; there is, in fact, a hyperheparinæmia. Normally only a minute quantity of heparin is present in the blood, but the great increase in coagulation-time seen in anaphylaxis and peptone shock has been shown to be due to liberation of heparin from the liver into the general circulation.

Allen and Jacobson noted that reports of acute exposure of the whole body to ionising radiation mentioned not only thrombocytopenia but sometimes also a prolonged clotting-time of the blood. They therefore tried to reproduce the effect by exposing the whole body of dogs to a single dose of 450r of X radiation. About a week after exposure the animals develop a well-marked thrombocytopenia and the clotting-time of their blood is greatly increased—in fact, the blood may be almost incoagulable. It was found that the blood of such a dog would delay the clotting-time of normal blood, suggesting that an anticoagulant substance was present. Specific anti-heparin substances, such as toluidine blue, rendered the clotting-time normal again, both in the test-tube and when given in vivo in a dose of 1·5–3·0 mg. per kg. body-weight intravenously; and bleeding was controlled without the platelet count being affected. Finally, they isolated an anticoagulant substance from this blood and found that its anticoagulant potency, weight for weight, was about the same as the standard heparin salt; it was inactivated by toluidine blue and was heat-stable.

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[1] Topley, W. W. C., Wilson, G. S. Principles of Bacteriology and Immunity, London, 1946 vol. II, p. 1596.

[2] Haines, R. B., Moran, T. J. Hyg., Camb 1940, 40, 453

[3] Allen, J. G., Jacobson, L. O. Science, 1947, 105, 388.

The conclusion drawn from these observations is that excessive heparin in the blood is the cause of hæmorrhage in these cases. Vitamin K, ascorbic acid, calcium, and even fresh-blood transfusions are without effect on the bleeding once it has started, though toluidine blue successfully stops it. Allen and Jacobson are trying the effect of toluidine blue in other human hæmorrhagic disorders and have obtained some temporary relief. But the dose must be nicely balanced, because, although in low concentrations toluidine blue has an anti-heparin effect, in higher concentrations it acts as an anticoagulant and would therefore add to the patient's troubles.

B.A.L. IN GOLD-POISONING

THE brilliant work of Peters and his co-workers[1] during the war led to the development of B.A.L. (British anti-lewisite or 2,3-dimercaptopropanol) as an effective antidote to arsenical poisoning, especially that caused by lewisite. Recently B.A.L. has been used with some success in the treatment of arsenical poisoning arising during the treatment of syphilis.[2] The use of B.A.L. for eliminating mercury,[3] zinc,[4] and copper[5] from the tissues indicated that it might be of value in the treatment of toxic reactions after gold therapy. The treatment of gold-poisoning with B.A.L. has now been reported,[6 7 8] and although only 12 cases are mentioned favourable results were observed in all but one of the patients given B.A.L.

It is thought that B.A.L. acts by reactivating sulphhydryl enzyme systems poisoned by heavy metals. Ragan and Boots[7] observed an increased urinary excretion of gold in all their 5 patients treated with B.A.L. for gold dermatitis. Presumably B.A.L. caused the gold to be released or "washed out" from the tissues. Since arthritic symptoms returned shortly after B.A.L. therapy, Ragan and Boots suggest that the therapeutic activity of gold may be explained by temporary suppression of the processes causing activity in rheumatoid arthritis. The high relapse-rate observed[9] after gold therapy in arthritic subjects appears to support this hypothesis.

Gold is undoubtedly of value in the treatment of rheumatoid arthritis, and the possession of an effective antidote to its toxic effects would be a major therapeutic advance. However, B.A.L. may prove to be a mixed blessing, since Cohen et al.[6] have noted toxic symptoms after its use, including pains in legs, arms, abdomen, and head, nausea, vomiting, salivation, lacrimation, and perspiration. But the development of less toxic derivatives, such as B.A.L.-intrav (O-glucoside of dithioglycerol)[10] may reduce the undesirable effects. Prophylactic administration of B.A.L. during gold therapy might be of value. Very small amounts would be advisable, because the optimum concentration of gold in the tissues for anti-arthritic activity might be reduced by the washing-out action of B.A.L. already mentioned. Meanwhile, large-scale studies of the effect of B.A.L. on gold therapy are required, care being taken not to attribute to B.A.L. the spontaneous remission of toxic signs and symptoms which often follows simple removal of any toxic substance. If B.A.L. proves valuable in this way, its benefits must not encourage the slipshod or excessive use of gold.

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1. Peters, R. A., Stocken, L. A., Thompson, R. H. S. *Nature, Lond.* 1945, 156, 616.
2. Carleton, A. B., et al. *J. clin. Invest.* 1946, 25, 497.
3. Longcope, W. T., Luetscher, J. A. *Ibid*, p. 557.
4. McCance, R. A., Widdowson, E. W. *Nature, Lond.* 1946, 157, 837.
5. McDonald, I. W. *Ibid*, p. 837.
6. Cohen, A., Goldman, J., Dubbs, A. W. *J. Amer. med. Ass.* 1947, 133, 749.
7. Ragan, C., Boots, R. H. *Ibid*, p. 752.
8. Lockie, L. M., Norcross, B. M., George, C. W. *Ibid* p. 754.
9. Ragan, C., Tyson, T. L. *Amer. J. Med.* 1946, 1, 252.
10. Danielli, J. F., Danielli, M., Mitchell, P. D., Owen, L. N., Shaw, G. *Nature, Lond.* 1946, 157, 217.

OIL AS A VEHICLE FOR LOCAL ANÆSTHETICS

FOR some twenty years drugs have been injected in oily solution as a method of prolonging their action for days or weeks, the assumption being that a fat-soluble drug is released and absorbed more slowly from an oily than a watery solution. The manufacturers have issued various drugs in this form. Among the first to be used were oily solutions of local anæsthetics, recommended for the treatment of such conditions as anal fissure and pruritus.[1] Later other drugs such as insulin, adrenaline, desoxycortone, œstrin, stilbœstrol, histamine, various metallic salts, and penicillin were prepared in oily vehicles.

There can be no question that the action of some drugs can be prolonged in this way—penicillin is a familiar example—but doubt has arisen as to the part played by the oily vehicle in local anæsthesia. Protracted anæsthesia following the injection of such oily preparations has in some cases been shown to be due to degeneration of the nerve, the duration of anæsthesia being the time taken for regeneration. On this view the gradual release of the drug from the oil is an insignificant factor. Duncan and Jarvis[2] attribute the nerve degeneration to the presence of benzyl alcohol in the solution. In their experiments they were unable to prolong anæsthesia by the use of the oily vehicle alone. Even benzyl alcohol will not produce degeneration if its concentration is below 10%, and such solutions are probably of little value for, say, fissure in ano.

Dr. Kelly, in his paper in this issue, goes further and throws doubt on the efficacy of oil as a vehicle for any drug. His observations deserve the attention of clinicians, for it may be that, through error in observation or a disinclination to oppose accepted beliefs, we have been deluding ourselves, if not our patients, about the efficacy and mode of action of some oily solutions.

SPREAD OF PART-TIME NURSING

THE proof offered by Gloucestershire[3] that part-time nursing can be made to work, and work well, should be followed by rapid development of part-time schemes elsewhere, especially for the care of the chronic sick. Unfortunately many authorities seem backward in overcoming difficulties. No doubt these are often considerable: sometimes the geography of an area is awkward; sometimes the distribution of population is such that transport of part-time workers is expensive; sometimes prejudiced matrons oppose the idea; sometimes the officers given the task of organising the scheme are half-hearted and apathetic; sometimes an energetic and capable officer finds that his council themselves present problems. Far-sighted authorities, however, now recognise that, unless our health service is to break down completely, part-time nursing in long-stay hospitals must become general and honoured. In no other way is it now possible to provide good—or even adequate—care for the aged sick.

The Wiltshire County Council, facing the difficulties in a practical and determined spirit, have just launched a very good scheme, closely modelled on the Gloucestershire pattern. There are seven infirmaries for nursing the aged and chronic sick in the county—at Amesbury, Chippenham, Warminster, Salisbury, Devizes, Trowbridge, and Swindon. Children's nurseries are attached to the infirmaries at St. James's Home at Devizes and at Swindon. All these institutions need part-time nurses; between them they have beds for 269 men and 250 women, and are supposed to carry an establishment of 126 full-time resident nurses. When the scheme was launched, on

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1. Yeomans, F. C., Gorsch, R. V., Mathesheimer, J. L. *Med. J. Rec.* 1928, 127, 19.
2. Duncan, D., Jarvis, W. H. *Anesthesiology*, 1943, 4, 465.
3. *Lancet*, March 8, pp. 294 and 300.

April 18, there were only 45 permanent staff in the hospitals, including nurses supplied by cooperative agencies. Within a month from that date the staff had been augmented by 31 part-timers—a fair beginning.

As in Gloucestershire the four-hourly shift is the usual unit of duty—from 8 A.M. to NOON, from NOON to 4 P.M., or from 4 to 8 P.M. Night duty, for those who wish to undertake it, is from 8 P.M. to 8 A.M., with two hours off duty. Some of the matrons have found it difficult to use recruits who were not able to fit in with one of the formal shifts, and this seems a pity, since Gloucestershire has shown that such casual workers can be useful as relief nurses, and that once they have formed an attachment to a hospital and its patients they will often rearrange their lives to fit in with accepted shifts. The Gloucestershire rates of pay—2*s.* 6*d.* an hour for a State-registered nurse, 2*s.* for an enrolled assistant nurse, 1*s.* 9*d.* for a nursing attendant, and 1*s.* 6*d.* for a nursing orderly—have been adopted, and transport is provided when necessary. Meals are not quite so well arranged as in Gloucestershire: one light meal is available during each shift, but while some infirmaries provide this free of charge, others charge canteen prices. It seems most undesirable that a charge should be made: rates offered to part-time nurses—even these rates, which in some respects improve on the Rushcliffe scale—are not attractive unless they carry good amenities. Leave and sick-pay are given on the liberal Gloucestershire plan; new uniforms have been ordered, and in the meantime appropriate white uniforms are lent and laundered. The scheme already shows good prospects of success: at the Lodge, Semington—the Trowbridge infirmary—a fully cooperative matron is finding her part-time recruits a welcome addition to her staff, and confirms previous experience that part-time nursing attracts a good type of woman. She points out that adequate staffing will make it possible to do much more for the patients, many of whom are more feeble and rheumatic than gravely ill; and she looks forward to the change from listlessness to active and hopeful interest among the old people, which is one of the most striking results of a successful part-time scheme.

CALORIE INTAKE IN HOT PLACES

Do we need less food in warm weather and hot climates than in cold? Most of us would say that we do, though if pressed we should have difficulty in finding actual observations to support our belief. From such authorities as Mottram,[1] DuBois,[2] and Leitch[3] it seems that the need for calories is possibly a little higher in very cold climates but not much different in very hot climates; the whole difference is anyway said to be small. The few quantitative observations relate to measurements of the basal metabolic rate, which might differ, between very cold and very hot climates, by at most about 20%, which is only about 400 calories daily.

To this we may now add a much more direct series of data collected by Johnson and Kark[4] on the average calorie intakes of troops of the United States and Canadian armies, located in temperate, desert, mountain, jungle, arctic, and subarctic areas of three continents. The writers compare the average daily intake of food of similar groups of soldiers, all healthy and physically fit, performing the same duties and all able to have as much food of a wide variety as they wished. A graph of calorie intake and local mean temperature shows that there was a close linear relationship between these two factors, from 3100 calories consumed daily at 92°F to 4900 calories at −30°F. This is a considerable difference and no doubt greater than many of us would have expected. It seems that we have not made sufficient allowance for the effect of climate when drawing up standards of dietary requirements. On the other hand, the observation that the greater calorie intakes in the colder climates were associated with the consumption of an increased proportion of fat was not unexpected.

It is not easy to explain this large effect of environment on calorie intake. It is not to be explained by differences in the B.M.R. It is possible that some, if not all, of the high intake at low temperatures can be explained by a greater heat production needed to maintain the body temperature, and the increased exertion necessitated by wearing and working with heavy and clumsy clothes and equipment.

COSMIC RADIATION AND CANCER

THE discovery that the cosmos contributes to what physicists called "spontaneous ionisation" was of great interest, not because of its magnitude but rather because of the questions it raised. Where does this very very feeble ionising radiation come from? The subject is still in dispute, but inevitably, after Muller had shown that mutations could be produced by very small quantities of X rays, it has been asked whether cosmic radiation has any effect on biological processes. Figge[1] has now tried to find out whether cosmic rays have any effect on the production of cancer. He had to use an indirect method, because to shield an enclosure from cosmic rays would require a lead roof 50 feet thick. He arranged for one batch of mice, housed normally, to act as controls to another batch kept in cages with lead covers whose function was to increase the normal cosmic radiation by producing what have been called "cosmic-ray showers." The mice were all injected with 0·25 mg. of the carcinogen methylcholanthrene in sesame oil. The mice were kept under observation for five months and the appearance of tumours noted. Figge says that "the rate of induction of cancer in the mice kept under the lead plates was found to be consistently and definitely higher than in the controls." The experimental data are few on which to draw definite conclusions—thus there are no data on the relative degrees of ionisation in the whole group of cages, the total of 184 mice is not enough to allow one to estimate accurate quantitative differences in tumour appearances, and it may be that environmental factors have not been given due consideration. Experiments are now being planned on a bigger scale.

BLOOD TEST FOR MUMPS

IT has been known for some years that the blood of patients with mumps commonly contains an increased amount of amylase, and this has been used as a test for the infection. Wolman and his colleagues[2] in New York have applied the test to 101 men in hospital with mumps and 47 healthy controls. They find that the serum amylase is nearly always raised in the first week of the illness and the increase usually then fades away. The test seems reliable enough to be useful in doubtful cases of swelling round the jaw. The salivary amylase is usually low in mumps, so it seems that the enzyme from the inflamed parotids leaks into the blood instead of reaching the mouth. This view is supported by the observation that there is no rise in serum amylase when mumps is confined to the submaxillary or sublingual salivary glands; neither is there a secondary rise when the testicles become involved when the parotids are subsiding.

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2. DuBois, R. Basal Metabolism in Health and Disease, Philadelphia, 1936.
3. Leitch, J. N. Dietetics in Warm Climates, London, 1930.
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2. Wolman, I. J., Evans, B., Lasker, S., Jaegge, K. *Amer. J. med Sci.* 1947, 213, 477.

Reconstruction

THE VICIOUS CIRCLE OF AUSTERITY

Adjusting Our Food Habits

F. Le Gros Clark
M.A. Oxfd

A moment may be reached, for a man or even for a whole community, when austerity can no longer be reated as a temporary expedient. It has become the normal state of existence. Have we in Britain now reached that stage in respect of our daily diet? For if we have, we had better not delay the process of adjustment. We are at present existing on a kind of patchwork diet composed of all we can manage to retain from our pre-war pattern of food habits. The diet as a whole may or may not be physiologically adequate; but there is not enough of any of the foods upon which we set a raditional value. We do not dare to be open-handed with ourselves, and, what is worse, we dare not be hospitable in the old way.

We are warned that this may continue for a further three years or more. But even then, to what can we look forward? Rationing will have lasted almost half a life-time for many of our young adults. Should we not, therefore, renounce the old pre-war pattern of diet and begin to work our way towards a new tradition of national dishes and meal customs? Our first task is clearly to consider not the kinds of food we should prefer to eat but the kinds of food we are likely to acquire.

SUPPLY—

By the coming harvest we may have enough bread grains, though of this there is no certainty. But the end of bread-rationing, while it will come as a relief, will not restore the sense of sufficiency. So far as other foods are concerned, we must not forget that there is a slow shift at work in the world markets, upon which we have to depend for more than 90% of our fats, 75% of our sugar, and more than half our meat. The Scandinavian markets are showing a slight tendency to move to the eastern countries of Europe, from which supplies of coal and later of useful manufactured goods may be expected. South America is becoming industrialised, and no-one would care to predict when and under what conditions the Far Eastern markets for rice and vegetable oils are likely to be re-established.

—AND DEMAND

Our potential demand for food has also increased and may increase considerably above the pre-war level. Not only do we have a larger population than we had in 1939, with a larger proportion of adult consumers, but there is an increased demand for various foods, sustained on a high level of employment, a tolerable level of wages, and a subsidised food market. If we allow for all these factors, we may well suppose that in a completely freed market, provided that prices are kept stable, the total demand for meat, fats, fruit, and bacon would rise by 20% above the pre-war level. The demand for sugar might rise by anything from 10 to 15%. As for milk, we have not only allotted a fair proportion of it to our special classes of consumers but we are looking forward to an expansion of the milk services, and at the same time we are fostering a taste for milk that is pressing heavily upon the supply. In brief, if we aim at restoring the pre-war pattern of the British diet, we shall have somehow to acquire far larger supplies of many kinds of food than we secured in the thirties.

We could of course remove the subsidies, which are now approaching £400 million a year. Retail prices would rise and food consumption would be curtailed, at all events in some commodities. But low food prices have now become part of the economy of the country, and any attempt to shift the structure would lead to unpredictable consequences, not only for nutrition but in the industrial field. The Government does not appear to meditate such a step with any conviction. The use of subsidies implies control, and yet there seems no prospect that a fall in the price of food will enable us to dispense with subsidies for an indefinite time ahead. In that case the stability of prices means a very large potential demand, and that, if we are to have a fair distribution of the foods in short supply, involves us in continued rationing.

CHANGING THE PATTERN

There is only one way by which we can break the vicious circle—by cutting at the very roots of our traditional diet, of which our present dietetic pattern is a faint and unconvincing reflection. We have assumed since 1939 that the time would come when our pre-war habit of eating, or the habit we should have adopted if we could afford it, would be restored to us. Should we now relinquish our wearisome attempt to live on a diet of shreds and patches and cultivate a taste for a simple and wholesome basic diet, to which variety could be added as the means become available?

This reads as though it were a plea for the simple peasant diet; but it is of course nothing of the kind. It merely implies that if we have to rehabilitate our economic structure on a system of rigid priorities, and that, I suppose, is fairly evident, then we had better begin by establishing a scheme of priorities in the complex food market. It is surely preferable to plan for a few basic foods to be in full supply as soon as practicable than to subsist on a diet that has to be precariously balanced from period to period.

We have made a good start with the ground-nut scheme in East Africa. It seems improbable that Asia will remain a source of exported vegetable oils. We might further examine what land in Africa could be opened up for the production of feed grains, some sugar, and of tropical fruits. In home farming it seems to me advisable to embark on a policy of expanding milk production and the production of high-quality feeding-stuffs. The residue from oil-bearing plants may soon no longer be exported to this country as cattle-feed and ultimately as manure. It may be used in its country of origin to maintain herds and soil fertility. If we are to become one of the great milk-producing countries, we may consider the advantage of processing the surplus into cheese and dried milk. Milk is the least wasteful of animal products as a mode of converting vegetable foods into animal protein. Moreover, its uses are very varied.

We could, in other words, let meat and butter take their chance on the import market, and breed for milk and cheese. I do not suggest that this is the only solution but it is probably the surest.

Our main fats would in that case, of course, be derived from imported vegetable oils, no doubt at a later stage processed in the countries of origin. Meat would have to be imported as and when we could procure it; but the milk herds will yield fair quantities of beef as a secondary product. If we get about 75% imported wheat and the same proportion of imported sugar, the rest lies with potatoes and with a scientific research into the market for home-grown vegetables. It is time that such a research was begun.

THE CONSUMER

Our basic diet will have to be adapted to the kinds of food that we can make available, and that will be a problem in adjustment, for which we have few precedents. We are dealing with the food of a people, who are not only themselves mainly urbanised and have had for a century and a half ample supplies of coal for cooking but who have subsisted increasingly over the last two centuries on cheap supplies of imported sugar, wheat, spices, dried fruits, bacon, and meat. The typical peasant fare, on the other hand, is represented by the rice bowl in the East and the stew pot or pot-au-feu with hunks of bread in Europe. This is a basic meal form which is far easier to deal with, when superficial adjustments have to be made. Provided the foundation of the dish is accessible in the shape of rice, potatoes, meal, or cabbage, its other ingredients may be varied to almost any extent. The dish is in any case a composite one, and where he cannot add to it small quantities of meat or fish, beans or bacon, the primitive consumer resigns himself to the basic ingredients.

SUMMARY

We need a food plan, and the essence of our plan must be to decide upon what foods we intend to concentrate in a convinced effort to bring them into full supply. The decision will have to be reached through the adjustment of our dietetic needs to our chance of obtaining the necessary supplies. We are living in a world that is in process of change; and it is not safe to assume that the world markets will resume their pre-war structure. We should play for security. I have suggested one possible line of solution, and no doubt there are others. In effect, we should attempt in the next ten years or so to become a milk and cheese producing and consuming country and enlarge our sources of vegetable oils, feeding-stuffs, and sugar on the African continent. Meat, bacon, butter, and a few other traditional foods might have to remain on ration indefinitely if they are to be fairly distributed, but the quantities on ration would depend on supplies from period to period.

As for the public, it would have to be persuaded to barter its uneasy dream of a return to its pre-war food pattern for a plan and an enterprise. Perhaps there is after all one remote precedent for such a choice—the fleshpots of Egypt were set long ago against the vision of a land flowing with milk and honey.

BURSARIES FOR FUTURE HOSPITAL OFFICERS

To encourage recruitment of suitable personnel, King Edward's Hospital Fund for London is offering bursaries for those seeking training as hospital administrators, domestic supervisors and welfare officers, and caterers.

Hospital administration.—Six bursaries are to be awarded this summer. There will be (1) three junior bursaries, of the value of £350 a year, for men or women aged 20 to 30; and (2) three senior bursaries, without a rigid age-limit, and with a salary of £600 a year. The courses will provide for 18 months' training in three different hospitals, and holders will normally be expected to sit the examinations set by the Institute of Hospital Administrators.

Domestic administration.—Six bursars are to be appointed, at a salary of £250 a year, exclusive of board and lodging. The training course, of one year, will be divided into three terms, spent in three hospitals. Candidates should be women of good educational standard; it is desirable that they should be experienced in personnel management or welfare work, in institutional management or domestic science, and in other administrative work.

Catering.—Eight bursaries are to be offered, each with a value of £300–£600 a year, to prospective catering officers. Bursars will be appointed to one or other of the London hospitals for a 12-months course. Knowledge of catering, nutrition, institutional management, and administrative work will be taken into account when the appointments are made. In 1943 the Fund published its first Memorandum on Hospital Diet,[1] in which it was suggested that while hospitals had, by the appointment of dietetic experts, applied modern principles of nutrition to special diets, they had not in the past applied these principles to general-ward diets; catering, it was proposed, should be in the hands of one responsible catering officer. The recommendations have been widely adopted, and there is now a large demand for caterers and dietitians.

Applications should be addressed to the secretary of the Fund, at 10, Old Jewry, London, E.C.2.

In England Now

A Running Commentary by Peripatetic Correspondents

THE toddlers' clinic had thrown up an evil-looking small boy with a permanent scowl, who made a habit of pouring bottles of lighter-fuel into gas-fires. I made a diagnosis of original sin, but felt guilty about it, and when I met my tame psychiatrist I confessed. He became really expansive, and suggested that anyone who talked of naughtiness should be off the Register—the child's sexuality was obviously fixed in some organ other than the usual one. I asked him what one did about it, and whether it couldn't be persuaded to move on. He was rather less happy at that, and said that it all depended, and why didn't I test him, and see what his constitutional type was? I left with a book, ready to meet the scowling child on equal terms.

Among the tests in the book I felt rather like Alice in Wonderland, and decided that the delinquent child had better have a bite out of the nearest psychological mushroom—at least I could score him on one of the less ferocious quiz-papers and work out the details of his sexuality when there was a lull. He looked as if one might be able to time his reactions if not predict them. "Now I want you to say the first word that comes into your head when you hear me say each of these words—as quickly as you can." The scowl deepened. "Dog," I said hopefully. The child dug in a pocket and transferred something to his mouth. After a full half minute he ceased to scowl, and remarked "We got a dog." Then he began to chew. The outlook was unpromising. We met with less success with the blots of ink which filled the latter half of the book. After distinct signs of inhibition and non-coöperation had appeared, and the bottle of acetone for patch-tests had gone for six (whereupon the scowl changed to a guffaw), I wrote a note to the child-guidance clinic and advised that an exploratory use of the slipper might move the sexuality back again if one found the right spot, and waited for somebody to tell the G.M.C. about me.

When the door closed I had another go at the book of tests, to see where I had failed. Another quiz met my eye: "Do you frequently have the feeling that you cannot cope with your work?" Yes, frequently. "Do you feel that the top of your head is compressed by a weight?" Less often than in former times, but still sometimes. "Do you often feel that other people hold foolish and mistaken views on important questions?" You bet. "Have you ever had a vision?" Not yet. But I might, at any moment now. When I added up my total I realised why I could never cope with child delinquents—I belonged to all the possible reaction-types. I could make a living by hiring myself out to the D.P.M. examiners. At the end of each questionnaire I expected to find: "If you answer yes to more than six of these questions, then Buggins's Pills will restore you to radiant health," but there was positively no advertising matter. I was booked.

My psychiatrist was apologetic. "I'm afraid I gave you the adult tests by mistake," he said. "And, of course, all these things need practice." It was only when the guidance clinic reported that I recovered my sang-froid. "This child is thoroughly out of hand. He would benefit from more discipline and a less haphazard parental attitude. I agree that when his escapades cause trouble he should be punished in moderation, but his insecurity at home would be relieved if he had more outlet for his energy—I suggest school." So did I. I am going to get my grandmother down to the clinic next week, and see if I can't get her a Diploma in Child Guidance. She is a remarkable old lady who can cope with small boys and usually knows the right place to swat their ectopic sexualities. She might even get her D.P.M. for the asking.

* * *

How many nostalgic Servicemen in convoy at the Cape have bussed to Kensington or Windermere, two juxtaposed coloured-native townships of Capetown, to return sadly and rapidly? For Windermere is, if possible, a worse slum than Kensington. Made roads are few (there is a technique of taking sandy patches fast and in second gear); one trudges through sand to a maze of tin shanties ("pondokkies") half the size of stables; jam-tin labels and pre-war coloured illustrations of motor-cars often serve as wallpaper; and pigs and chickens squabble for food between "houses." As I write, it has been hot and dry for four months, and enteric is on the increase. How distant seem thy placid waters and sweet rolling hills, O Cumberland!

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[1] Obtainable from Messrs G. Barber & Son, Ltd., 23, Furnival Street, London, E.C.4. 6*d*.

* * *

HÆMATOLOGIA

Here in the file
I see the old names,
Raymond, Riley,
Robinson (James).

Raymond, Riley,
Robinson, Rudd,
Died of malignant
Disease of the blood.

Hodgkin's, leukæmia,
Carefully docketed
In the right hole
Where fate had them pocketed.

Dead with an accurate
High-power diagnosis,
Hodgkin's, leukæmia,
Myelosclerosis.

Here are the blood films,
Bone-marrow and blood,
Raymond, Riley,
Robinson, Rudd.

Raymond's a beauty,
Acute monocytic.
Remember his gums
Which were quite characteristic?

Remember his wife, too?
"He was always so strong.
Are you quite sure, doctor,
No chance of being wrong?"

Beautiful blood cells,
In all the wrong places.
"Got your powder-puff? Right.
Mustn't guess from our faces."

Robinson (James)
A straight myelosis
Had a perfect remission
That shook my prognosis.

Looked like a cure,
Really most satisfactory,
Until a relapse
Proved completely refractory.

Nitrogen mustard,
Radiophosphorus,
Some other new remedy,
What does it prosper us?

Go through the motions,
Penicillin, transfusion,
Until it's quite clear
There's but one conclusion.

Staining the blood cells
Like a technician,
Telling the relatives
Like a mortician.

Staining for granules
Or diffuse basophily,
Don't slow down to think
Or life seems too silly.

Raymond, Riley,
Robinson, Rudd,
All of them dead
Of disease of the blood.

Letters to the Editor

HOSPITAL WARD PLANNING

SIR,—The article by Dr. McIntosh and Mr. Coales in your issue of May 10 is of particular interest at a time when many of us are considering the specification of new hospitals.

Some of the ideas expressed in this article are particularly welcome; firstly the suggested ratio of single-bed wards to total beds (30% in two of the proposed plans) provides for the needs of patients who are very ill, immediately postoperative, infective, or disturbing to others; secondly the advocacy of small wards of four to eight beds; thirdly the linkage of the ward units with due regard to traffic problems; and lastly the number (but not the distribution) of the ancillary rooms.

Nevertheless there is much to criticise. Cross-ventilation is considered as an isolated function, whereas the problem of ventilation is complicated by the necessity of considering the heating of the ward unit. In practice cross-ventilation is often negatived by patients or nurses seeking comfort; consequently windows are often closed to prevent draughts or to keep the wards warm, so that in actual use the modern Continental and American approach is probably as effective as our more spartan ideals.

My main objection however is to the use of transverse corridors which necessitate nurses working out of sight of the wards. In these wards it would often take some time to locate a nurse or sister. On the other hand the Continental plan, with ample use of glass in corridors, enables the ward to be under better observation and the nurse to be nearer the patients and to reduce her walking distances.

Lastly, though I cannot speak as an architect, I suspect that the great length of the perimeter would make for expensive building, and further, that the deeply indented plan must reduce the total insulation of some of the wards, particularly if the main aspect had to face S.E. or S.W.

London, W.1. HUGH GAINSBOROUGH.

BACKACHE

SIR,—I read the article of Mr. Burns and Mr. Young (May 10) with extreme interest. For the past four years I have held the opinion that the majority of cases of low back pain are due to disk lesions and I am therefore in entire agreement with their views on the pathology of backache and sciatica. Where I disagree is with their somewhat dogmatic statement that "operation is the rational form of treatment for all cases of severe backache with disk lesion." The only alternative they offer is rest in bed for a maximum of three weeks, or a corset. The plaster jacket is dismissed in one sentence as "cumbersome and less comfortable than a corset, which is as efficient in restricting movement at the lumbosacral junction." It would appear that they have no great faith in conservative treatment.

Bed rest to be effective must be absolute, and this is seldom the case. In hospital the bedmaking routine takes place twice daily, and at home the patients get up to go to toilet. In my experience a well-moulded plaster jacket is far more effective than a corset in immobilising the lumbosacral joint, and it remains in situ for 24 hours per day and is not taken off on going to bed. It produces rapid relief of symptoms, it is comfortable and not unduly cumbersome, and a patient in a sedentary occupation can return to work wearing the plaster jacket. I am firmly convinced that immobilisation in a plaster cast for an adequate time will cure 90% of disk lesions.

Figures can be misleading. Burns and Young state that out of 248 cases of sciatica treated by them in 1939–42 and not operated upon 79% were still having symptoms in 1945. This is not altogether surprising, since at the time in question manipulation followed by vigorous exercises was the treatment in vogue and the effects of complete rest were seldom tried. My results for the same period would be equally bad, if not worse. As regards their figures for cases operated on during 1941–45, they deserve every congratulation for their brilliant results, and nobody will dispute that in their hands operation involves no risk and offers every prospect of cure. But, to my mind, there has been no control series treated by really adequate conservative measures, and I wonder just how many of their cases might have been cured by immobilisation in plaster.

During the past four years I have treated over 300 cases of disk lesion, some with only backache, some with sciatica, by immobilisation in a plaster jacket. Approximately 90% were completely relieved of their symptoms, 5% though improved had some pain, and 5% underwent laminectomy. Nowadays the 5% not wholly relieved would also have been referred to an orthopædic surgeon. I find that the great majority of patients experience rapid relief of pain following the application of the jacket. In a small minority the pain becomes worse. This I regard as a clear indication for surgical intervention and waste no further time.

Admittedly many cases in my series were diagnosed early in their first attack and treated before degeneration of the disk had occurred. A follow-up, now in progress, shows that a small number of cases have had relapses, but I am confident that the figures will be at least as good as the 80% complete cures of Burns and Young.

The only drawback to conservative treatment in a plaster jacket is the length of time the jacket must be worn—in my series an average of 9½ weeks. Patients treated lately have required a longer period of immobilisation than was formerly the case. This, and the increased incidence of the lesion I attribute, in part, to the poor quality and quantity of our protein intake.

I could not agree more with what the authors say about faulty posture, and would go further. Posture is often protective rather than faulty, and on more than one occasion in the past I have provoked an attack of sciatica by prescribing corrective exercises for severe lumbar lordosis. Like Burns and Young I have usually found epidural injection ineffective, but on occasion it may produce dramatic relief. In 1941 I failed to cure a girl of 17 with sciatica by manipulation, the treatment then in vogue. She had what I now know to be a typical disk lesion, though at the time I wrongly diagnosed it as sacro-iliac strain. In desperation I gave her a massive epidural injection with normal saline. She experienced instantaneous relief of her pain and I can only conclude that a nerve-root was adherent to the damaged disk and that the injection freed it. The patient was so impressed that she decided to become a physiotherapist! She works in a hospital which I visit and remains absolutely symptom-free.

In the future, as the "disk syndrome" becomes more generally recognised, early diagnosis should considerably reduce the incidence of chronic backache and sciatica.

London, W.1. E. J. CRISP.

SIR,—In their article of May 10, Mr. Burns and Mr. Young say in effect that nearly all recurrent attacks of backache, and nearly all cases of chronic backache, are due to disk lesions: if bone changes are excluded by routine radiography, there remain disk lesions and rarities. "We see little evidence," they observe, "of rheumatism, which is supposed to be associated with, or made worse by, cold and damp, as a cause of painful backaches."

There is a complex syndrome, which, although of highly individual form and reproduced in innumerable instances, has no accepted name. In common speech it is called "muscular rheumatism." Hundreds of thousands of people in this country know its symptoms well; and know beyond any doubt the sharp aggravation brought by certain climatic conditions, notably by cold and a *rising humidity. Its pathogeny is unknown;* but it is very possibly a disorder of skeletal muscle consequent on a disturbance of autonomic regulation, especially the regulation of the muscle's blood-supply. In an able monograph on *Neurotonia* published in 1925, Guillaume drew attention to the complaint made by many victims of autonomic instability of "pains of a neuralgic type, localised or vagrant, or of pains in the muscle masses, vague pains like the stiff tired back of chronic lumbago (*à type de courbature lombaire*)."

This type of "rheumatic backache" abounds in rheumatism clinics. If they are all disk lesions, as I take it they must be, it follows that sufferers from the common rheumatism are peculiarly liable to disk lesions—that the pathogenesis of this complex syndrome is also, in many instances, that of the morbid change in the annulus fibrosus which we must postulate to account for nuclear protrusion without antecedent trauma.

If, in their next series of proved disk lesions, Mr. Burns and Mr. Young would observe how many of these patients also suffered from a vagrant myalgia or any of the many marks of disturbed autonomic function, either coincidently with their backache or in the past, information of the highest value in the elucidation of the pathogeny of the disk lesion might be secured.

I imply no criticism of their work in suggesting that they might invite a physician to join them in these observations. Indeed, I am writing this comment on their conclusions largely because of the opportunity it gives of pleading for a close association between orthopædic centres and the rheumatic units about to be created.

London, W.1. KENNETH STONE.

SIR,—Mr. Burns and Mr. Young are to be congratulated upon their excellent article. The work done by orthopædic and neurological surgeons during recent years has thrown valuable light on this hitherto obscure subject. While applauding the conclusion that backache is mainly mechanical in origin, I doubt whether the question is as simple as they seek to make it and whether all cases of backache and sciatica of mechanical origin are due to lesions of only one—the intervertebral disk—of the many structures involved in the mechanical breakdown. In most cases the sequence of events would seem more likely to be as follows.

As a result of some strain, often quite trivial and usually when in the forward-bending position, the lumbosacral articulation becomes internally deranged. The intervertebral disk between L 5 and S 1 (as well as many other structures) is involved in this strain, but at this early stage probably not to the extent of protrusion. The acute pain, so-called lumbago, is probably due to irritation of nerve-endings in the synovial membranes of the joint and in the surrounding soft tissues. Contraction of ligaments and muscles in the area immediately causes increased pressure on the intervertebral disk. If, as generally happens, the condition is not properly diagnosed and treated, the patient walks about, thus causing an increasing and constant strain on the intervertebral disk until the nucleus pulposus eventually protrudes, as Mr. Burns and Mr. Young have shown. The time taken for this to occur depends upon the degree of injury to the posterior longitudinal ligament and the annulus fibrosus of the disk. Quite often, even without treatment, the disk never protrudes at all.

Unlike Mr. Burns and Mr. Young, osteopaths, by manipulation, get very satisfactory results in backache and early sciatica and surprisingly good results even in old-standing cases. I can only explain this by suggesting that the manipulative technique of the osteopath is superior to that of the orthopædic surgeon. Whereas orthopædic surgeons learn and perform their manipulations on anæsthetised subjects when all tissues are temporarily relieved of strain, the osteopath prefers to study the problem as it really is and develops his technique in keeping with the degree of strain of the joints and tissues. Further, while the orthopædic surgeon after he has performed his manipulation hands his patient over to the care of a physiotherapist, the osteopath himself conducts the treatment until the affected joint is completely mobilised. Considerable trouble is taken by the osteopath, not only to establish normal movement of the deranged joint but also to build up and restore posture. It is highly probable that, as a result of the patient being anæsthetised, far more force than is necessary is exerted by the orthopædic surgeon, possibly even to the extent of creating further injury.

If the disk has been allowed to protrude extensively, the protrusion is unlikely to be corrected by manipulation, but I am convinced that there is a stage in backache when the disk is either only squeezed or is so slightly protruded that it will respond completely to osteopathic manipulation. I am further convinced that if lumbago were diagnosed for what it usually is—namely, a derangement of the joints of the lumbar spine and pelvis, involving the intervertebral disk, not to the extent of protrusion —and if from the start it were efficiently treated by osteopathic manipulation, very few would develop a degree of protrusion requiring operation.

Although this end is not immediately attainable, owing to the lack of properly trained osteopathic specialists, it is encouraging that osteopathic methods are now being offered to the medical profession through postgraduate training. It can be hoped, therefore, that with enough osteopathic specialists within the medical profession, the orthopædic surgeon will be relieved of performing the number of laminectomies that are now necessary.

Finally, it must be remembered that backache is by no means confined to the lumbar region. It can occur throughout the whole spine, although naturally it is commonest in the areas under the greatest strain from the erect posture. I have no doubt that eventually the osteopathic explanation of many cases of intercostal neuralgia, brachial neuralgia, neuralgia and headache will be universally accepted.

London, W.1. GEORGE MACDONALD.

COMPENSATION FOR I.M.S.

SIR,—Officers of the Indian Medical Service faced with finding a new career can hardly be expected to look upon the proposed terms of compensation with anything but the gravest misgivings. The maximum sum is £6000 for those who were 39 years of age last birthday, which will apply to a comparatively small number of officers who joined the Service during the years immediately prior to the war.

Civil officers, as set out in table I of the white-paper,[1] are to be compensated on a years-of-service basis, and the maximum of £8000 is paid after 16 years of service. Many I.M.S. officers with similar periods of service will only draw about one-third of this amount, or less, which will be hardly sufficient to guarantee rehabilitation with reasonable freedom from want and anxiety.

SERVICE MEMBER.

SHORTAGE OF NURSES

SIR,—Your last issue contains a memorandum from hospital doctors on the nursing shortage. I entirely agree with them about the character and incidence of the shortage. I agree, too, that alternative forms of employment are easy to obtain. But nursing in itself is so fundamentally "womanly" and enjoyable that remedies can surely be found.

Propaganda of the *advantages* of nursing may well be necessary, but the main need is for a complete overhaul of nursing education. The present apprenticeship system asks for an impossibly high theoretical knowledge; bedside teaching of practical nursing scarcely exists, and training is prolonged as a form of cheap labour. Can one wonder that there is a shortage of recruits?

In my opinion the memorandum does not go far enough. Nursing education must be put on a proper footing, and should be financed by the Ministry of Education. Fees should not be charged, but the student nurse should cease to be a paid employee. She should become a bona-fide student with a maintenance grant sufficient to meet her expenses where necessary.

Also I believe the writers have somewhat mistaken the idea of the short basic course of nursing. It must be *preceded* by a well-designed preparatory course in *elementary* anatomy and physiology, and practical hygiene of a very vital type, linked to practical elementary bacteriology. Good plain cookery, service of meals, household arts and crafts, and so on, should also be taught. This course could be carried on in one of three ways—as a full-time pre-nursing course, as part of the one-day-per-week-in-school plan envisaged for girls of 15–18, or as a part-time or evening course. It should be designed to awaken an objective interest in health, and need not be confined to intending nurses.

During the basic training, which requires a full two years, only a minimum of time should be spent in instruction away from the bedside. Theory there must obviously be—but let it be designed for nurses and not a dropped-down medical curriculum. The block system is wrong in principle in that it removes the student nurse from the object of her study. The main point about this scheme is that the nurse must receive continuous bedside instruction. Ward sisters are saddled with a multitude of responsibilities, and relatively few make serious efforts to teach their art. That is why the soul is going out of nursing. The status of ward sisters must be raised. There must be more of them (and fewer beds per ward). They must have adequate assistance for their ward management, and they must then realise their teaching responsibilities. I am certain that far more teaching could be done even today, if only the existing trained nurses would make the effort.

Lastly, postgraduate training. This should be conducted by university faculties of nursing. All who show sufficient promise during their basic training should be given the financial assistance needed for entering these courses, which should be designed to give a two-year or three-year comprehensive training to equip the student for a fairly wide field of activity. Under the existing schemes, twelve years can be spent (on a pittance) in getting all-round qualification. That is nonsense.

The university schools would have power to dovetail trainings to prevent overlapping, and the necessary practical experience should be obtained only in the first-class schools of nursing and other nursing fields. The ward sister, district nurse, industrial nurse, and so on would take a two-year diploma course. A general or special nursing degree could be taken in three academic years.

To suggest university schools of nursing is not simply to put forward the average American university scheme. Most British nurses feel that our own nursing has values peculiar to itself, and we should be sorry to see any high-falutin step taken which would lessen our practical skills. Many of us feel that the new General Nursing Council's regulations, which now lie before the Minister of Health and await his signature, are fundamentally wrong. We ask with deepest sincerity that these regulations should not be signed, but should be sent back for further consideration.

The establishment of several types of experimental schools of nursing is long overdue. In our hidebound profession it is a sin to have "ideas." Nevertheless, the right staffs should be found and the schools begun.

Meanwhile, the nursing profession must tighten its belt and be determined that no more wards shall be closed. Florence Nightingale would have answered this crisis by a new call to action. MEDITRINA.

SIR,—The shortage of nurses has been discussed freely in the press by every group associated with nursing except by that most important group of nurses, the ward sisters and senior staff nurses.

To these women alone falls the responsibility for the intensely personal nursing care of the hospital patient. In a sense, therefore, all other nurses, senior and junior to them, are subservient to them in function and exist largely to maintain them at their task. In the main, ward sisters, &c., love their work and ask no other, and they not infrequently reject the opportunities of promotion and increased pay and power, mainly to administrative and teaching posts, because it means their leaving real nursing. They are in a lifelong work and know it.

It is they, too, who train the probationers at the bedside, and either teach them to get satisfaction from their work or in some cases cure them forever of the itch to nurse. It is, in fact, probably the satisfaction they themselves get from their work which makes them take little interest in things outside their wards and hospitals, so that their voice is little heard in the politics of nursing. They are liable, thus, to have change inflicted on them and their patients without their voices being heard.

Presumptuous as it is to attempt to speak for them, it must be attempted, and suggestions are offered for improving their lot and that of others.

1. *Improved living conditions.*—Their residence should be a home for them and run on club lines by a committee elected from among themselves. Control should be by the purse-strings; a matron or superintendent should seldom have to interfere, but their right to do so should be maintained.

Permission and encouragement to live out should be given.

Administrative sisters should not live in the residence, but either in hospital, a separate home, or privately.

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[1] Cmd. 7116. H.M. Stationery Office. See *Lancet*, May 10, p. 652.

Some, certainly, will have to live in hospital. The key to the ward sister's happiness is no interference in her "home life." Thus home-sisters are not required, but non-nursing housekeepers without disciplinary powers.

2. *For all nurses.*—Reasonable care of the health of all nurses. A daily nurses' surgery; special single and double wards for sick nurses in the hospital; and a great deal more care and sympathy, from the doctors down to the sisters themselves, for any ill member of the staff, than is commonly meted out today.

Improvement in food should be arranged, but the sisters' committee should be able to speak out for them.

3. *Training of probationers* is an integral part of a ward sister's post, but there are some who cause a wastage of up to 100% of probationers under them, who leave nursing discouraged. Ward sisters should therefore be trained in (*a*) the teaching of nursing as a *practical subject, and* (*b*) *the understanding and handling* of the young nurse. Those sisters who cannot teach or handle their probationers, though otherwise good nurses, should find other tasks in nursing.

4. *Pay.*—It should be possible for a ward sister, without leaving active nursing, to reach in time, by some type of graded promotion, pay equal to that of an assistant matron.

5. *Better propaganda.*—Newspapers today stress the hardship of a nurse's life—the best way of discouraging new entrants to nursing. The compensations in the career of nursing are many, and the task of nursing itself and the community of a hospital are among them. These are not mentioned.

ROBERT PIPER
HILDA PIPER.

Gerrard's Cross, Bucks.

SIR,—Student nurses would agree with your correspondent that old-fashioned restrictions should be swept away; but it is doubtful whether the abandonment of the nurses' home in favour of second-rate or third-rate lodgings would do anything to increase the supply of nurses. Many parents would not permit their daughters to enter a training-school, perhaps 100 miles distant from their home, if it meant their living in lodgings. The true answer to the problem is to improve the nurses' quarters and permit them to ask their friends to their rooms for tea. Who would care to entertain parents or friends in one of the common-rooms or in one of the grim little bedrooms, even were this permitted? Authorised visiting hours could be laid down.

That "living in" is not repugnant in itself, is shown by the keenness of university students to live in college rather than "digs."

There is no doubt that the corporate spirit is fostered by "living in," and this spirit is still valued by nurses.

S.R.N. 1947.

MULTIPLE-PRESSURE VACCINATION

SIR,—With the development of passenger air-transport this country is now only a few hours distant from such endemic sources of variola major as Egypt and India; and the possibility of persons incubating the disease and reaching here in an infective but undiagnosable state, or of introducing articles carrying the virus,[1] is much enhanced.

Smallpox introduced by ex-Service personnel from abroad has lately broken out in England; and this risk is likely to continue for a few more years. It follows that vaccination is no longer a relatively academic problem; and contacts, who may have already been infected when first seen, should be vaccinated by the method offering the best hope of a "take," since in these cases there is no second chance.

It is my conviction, supported by the additional evidence in Dr. Mole's recent paper,[2] that the multiple-pressure technique is less likely to fail than the standard scratch method, which is that officially advised for both civilians and the Services. During the recent war I was twice vaccinated by the scratch method, and on both occasions the absence of reaction was interpreted as being due to a high state of immunity. Before going overseas it was necessary that I should be vaccinated a third time, and having recently read an account of the multiple-pressure technique[3] I decided to try this method on myself. This vaccination was followed in about a week by pronounced local reaction (intense itching and pustulation), leading to the formation of a scab, which separated in 2–3 weeks. It is reasonable to suppose that despite the results of the two "scratch" vaccinations my previous immunity had been minimal.

I was sufficiently impressed by this result to use the multiple-pressure method when, as pathologist to a Service hospital in the Middle East, I was responsible for the vaccination state of the unit. Servicemen were vaccinated biennially in that command and on arrival at their unit overseas, no matter how recently they had been vaccinated in Great Britain.

Nevertheless, with the multiple-pressure method accelerated reactions were quite common and failures remarkably few; and not a few long-service men who had been repeatedly vaccinated with little effect were surprised at their own reactions.

More recently a colleague in this country was vaccinated by the scratch technique, with an equivocal result. Since his work brought him in close contact with variola virus it was necessary to be quite sure of his immunity. He was therefore revaccinated a few days later (using the same batch of lymph) by the multiple-pressure technique; and he developed a typical accelerated response.

In view of the mounting evidence in favour of the newer method, it would be interesting if one of the Services, in these (for them) more leisurely days of peace, were to compare on recruits the scratch and multiple-pressure techniques. With suitable organisation and a rapidly evaporating skin detergent, such as ether, the multiple-pressure technique is little, if any, slower than the standard practice. It is essential to use a sharp needle, and my preference is for a triangular cutting or Hagedorn needle, which can be touched up as required on an oil-stone. The drawing of blood, always hard to avoid on a skin rendered hyperæmic by a warm climate and the passive congestion sometimes induced by a rolled-up sleeve, seemed not to impair the result—if anything, the reverse. Excess lymph was wiped off; and, except on the rare occasions when mild secondary infection occurred from repeated trauma due to tight sleeves, a dressing was unnecessary, though it may be advisable if vaccination is carried out on a subject with dirty underlinen.

The symptom of itching was found to be a most useful guide in deciding whether a minimal reaction was due to immunity. It is easy to make a few "pressures" with the sterile needle on the cleansed skin site above the place where the lymph has been deposited; and this enables the effects due to trauma, with or without mild infection, to be distinguished from the fleeting allergic reaction often induced in the immune individual by foreign proteins in the lymph.

A minor advantage of the multiple-pressure technique is the smallness of the eventual scar, even after a primary reaction.

Liverpool.

A. C. T. VAUGHAN.

ANALGESIA IN LABOUR

SIR,—I have read the correspondence asking for wider use of gas-and-air analgesia in labour; but it is my experience, and I am sure that many other midwives will agree, that the majority of patients derive small benefit from it.

At Moreton-in-Marsh District Hospital the Oxford vaporiser with ether is used with most satisfactory results. The patient benefits without the exhausting deep inspiration necessary with Minnitt's apparatus; the mask need not be held in such close apposition to the face; it may be used for long periods without causing vomiting or affecting the force of uterine contractions; and the percentage of ether can be adjusted to suit the patient's individual need—2–3% of ether is usually sufficient during the first stage of labour, and 5–7% may be necessary towards the end of the second stage; both these percentages are well tolerated without producing cough or spasm. It is also a very great advantage that, should interference be necessary, the percentage of ether is simply increased to produce complete anæsthesia.

P. ZACHER
Sister Midwife to Moreton-in-Marsh
District Hospital.

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1. *Lancet*, April 26, p. 592.
2. Mole, R. H. *Ibid*, May 3, p. 597.
3. Russell, F. R., in Virus and Rickettsial Diseases, Cambridge, Mass. 1941.

Parliament

ON THE FLOOR OF THE HOUSE

THE House rises for Whitsun on May 23 and from the point of view of Members and of Ministers it is high time. Of late, night sittings have peppered libraries and smoke-rooms with recumbent forms, some past their first elegance, sprawling in disordered sleep. But despite difficulties the achievement of legislation is prodigious. In the last few weeks the National Service Bill, the Town and Country Planning Bill, and the National Health Service Bill (Scotland) have all been passed—not to mention the Budget debates and the Finance Bill. Indeed it is a criticism often made in Parliament at present that the Government are attempting to bring in too much legislation and to make too many changes and that they would do better to pay more attention to administration.

Exactly the same criticism can be made of world organisation, where the United Nations are attempting to bring the world back to peace, solve the question of Germany's and Japan's internal economy, while at the same time they are considering the establishment of a world police force and the world-wide economic network of their Food and Agriculture Organisation.

Viscount Bruce of Melbourne, a former prime minister of Australia and chairman of the preparatory commission on world food proposals, in a maiden speech in the Lords, pointed out that the world today had its greatest opportunity for international organisation if we went forward using the latent resources of the undeveloped countries of the world to improve the standards of the 1000 million people who were living below health level.

Neither the Labour Government in this country, nor governments in other countries, nor the world authority of the United Nations can hold back the rush of work that must be done. We must make the best arrangements we can in our national, in our Commonwealth, and in our international life to direct the forces that are urging us on. But we cannot deny their pressure, for something is happening in the world as a whole and vast changes are demanding fulfilment.

MEDICUS, M.P.

FROM THE PRESS GALLERY

University Education

We are committed to a great increase in our university population, but as Lord LINDSAY OF BIRKER pointed out in the House of Lords on May 14, we could not enlarge it without considering the effect this revolution would have upon our university system. The Government had been generous in providing money for the expansion of the universities: would they provide a little of that rarer quality—reflection—and he asked for the appointment of a departmental committee, or a subcommittee of the University Grants Committee.

University education in England was of a very high standard, but it was confined to a small proportion of the population. For instance in 1934 in Italy 1 in every 808 of the population went to a university; in Germany 1 in 604: in Sweden 1 in 543; in France 1 in 480; in Scotland 1 in 473; in America 1 in 125; but in England 1 in 1013. Yet the Barlow report had stressed that the success of our industry depends on the extent to which it is fertilised by research, and research depended on the number of scientists which the universities could supply. The Butler Act increased the need for teachers, and if we were to have a properly equipped health service we must have a far greater number of trained doctors. They ought, in his view, to be university-trained, and they ought to have some idea of what research meant. That would involve a great increase in the number of medical undergraduates.

If we were to double the number of our students—and Lord Lindsay doubted whether that would be enough—how was it to be done? Were we to ask existing institutions to preserve their character and to double their numbers? Was there room for new university colleges? These would be small but they could also be experimental, for they need not all necessarily be of the existing type. At present the universities, through shortage of staff, were finding it difficult to do their proper job. The highest training depended on the student being in close touch with the scientific swell. If you had too many students you lost your great scientist in administration. Lord Lindsay rejoiced in what the Government had done for the universities, but he thought there might be a danger of stereotyping the present set-up and making the development of university education in this country too rigid unless some body of considerable weight wrestled with these problems.

Viscount JOWITT, on behalf of the Government, agreed that our universities must have complete independence and freedom. He also agreed that our university population was much too small. The Barlow report recommended that it should be doubled in ten years, and he thought it likely that in the next ten years it would have to be doubled again. The difficulty at present was not money. The limiting factors were staff and building. The University Grants Committee estimated that the programme of development in the next five years would require £50 million, of which some £40 million was for new buildings. But the Minister of Works did not think we could undertake more than £20 million of building during the next five years.

It was not true, Lord Jowitt continued, that the University Grants Committee were in favour of developing the existing institutions, as opposed to developing new institutions. But it felt that with these shortages it was probably a better policy for the time being, if they were to achieve a rapid increase, to see how far they could get people into the existing establishments. The committee had been strengthened and had been given new and wider terms of reference. He thought therefore it would not be wise at present to appoint another committee. It would be better to stick to the University Grants Committee and give them what help they could with enlarged personnel and the apparatus of subcommittees so that they might take that all-over view which Lord Lindsay desired.

Scottish Health Bill

At the report stage of the Bill in the Lords on May 15 the following amendments were accepted:

Clause 8.—Making it clear that endowments could be allocated only for purposes within the field of the hospital services; and allowing the Endowments Commission 7 instead of 5 years in which to complete their task.

Clause 11.—Specifically requiring regional hospital boards to have wider consultations than with universities alone in framing their schemes for the constitution of boards of managements of hospitals or groups of hospitals.

Clause 14.—Providing that for dual appointments, the advisory appointments committee constituted to draw the short list of candidates should be composed half of university representatives and half of hospital representatives.

Clause 17.—Bringing within the scope of research the development of medical or surgical appliances, including hearing-aids.

Clause 34.—Conferring a right on any person to change, as well as select, their family doctor.

Clause 43.—Ensuring that doctors who were brought before the tribunal should have a clear statement of any complaints made against them at the time when they were being examined by the tribunal.

In moving the third reading Lord MORRISON thanked Noble Lords for their constructive criticisms and said the Secretary of State had been encouraged by their view that it was a better Bill for Scotland than a mere translation of the English Act would have been.

QUESTION TIME

Expenditure on Research

Mr. PHILIPS PRICE asked the Secretary to the Treasury how the estimated amount of £68,000,000 expenditure on research during the year 1947–48 is divided.—Mr. GLENVIL HALL replied: The division is as follows:

Medical Research	£698,000
Agriculture and Fisheries	£2,070,000
Industrial Research	£14,780,000
Defence Research	£49,731,000

University Grants Committee

Replying to Sir E. GRAHAM-LITTLE, Mr. H. DALTON gave the names of the University Grants Committee. The chairman is Sir Walter Moberly, the deputy chairman Mr. A. E. Trueman, F.R.S., and the medical members Prof. G. W. Pickering and Prof. J. C. Spence.

The members of the advisory committee on medical education are Sir Walter Moberly, Dr. Trueman, Professor Pickering, Professor Spence, Sir Edward Salisbury, F.R.S., Mr. L. Farrer-Brown, Mr. W. Kelsey Fry, M.R.C.S., L.D.S., Mr. G. F. Gibberd, F.R.C.O.G., Dr. H. F. Humphreys, Prof. Dorothy Russell, M.D., and Sir John Stopford, F.R.C.P., F.R.S. There is one vacancy on this committee for an expert on surgery which it is hoped to fill at an early date.

Psychiatric Cases in the Army

Replying to a question Mr. JOHN FREEMAN stated that approximately 100,000 men were discharged from the Army between September, 1939, and VJ-day on psychiatric grounds; 288,000 on account of other diseases and accidental injuries; 26,000 on account of injuries due to enemy action.

Recruitment of Nurses

Sir P. HANNON asked the Minister of Health when he would be in a position to give a definite assurance that the whole resources of the Ministry will be brought to bear on the recruitment of nurses in this country to meet the needs of hospitals and homes.—Mr. BEVAN replied: Next year, when the Act is in operation.

Production of Penicillin in Germany

Mr. S. HASTINGS asked the Secretary of State for Foreign Affairs if he would make a statement as to the present state of progress in the production of penicillin in Germany.—Mr. H. MCNEIL replied: Present production is by surface culture. Although encouraged, it does not exceed 3600 mega units a year in all four zones. The possibility of production by the deep-culture process is under discussion by the British and American authorities.

Tuberculosis in Berlin

Dr. S. JEGER asked the Minister whether he would give details of the incidence of, and the death-rate from, tuberculosis in Berlin; and what reports he had received on the outbreak of pellagra due to nutritional shortage in the U.S. zone of Germany.—Mr. BEVIN replied: The average monthly number of cases of all forms of tuberculosis reported in the first quarter of 1947 was 1696. Deaths in this period averaged 606 monthly. I have no information about any outbreak of pellagra in the United States zone of Germany.

Day Nurseries

Mr. K. LINDSAY asked the Minister whether he was satisfied that the number of day nurseries provided by local authorities was adequate to meet the needs of all the women who responded to the Government's recent appeal to enter industry.—Mr. BEVAN replied: I believe that, in general, local authorities are providing as many day nurseries, nursery schools, and nursery classes as existing resources allow. Mr. LINDSAY: Is the Minister aware that throughout the country there are springing up private nurseries for which a charge of over £1 a week is being made, and also nurseries in factories, none of which can be inspected by his department?—Mr. BEVAN: I should imagine that nurseries in factories would be inspected by the factory inspectors if they are part of the factory premises. However, I will look into the point.

Patients in Broadmoor Asylum

Mr. HECTOR HUGHES asked the Home Secretary how many prisoners there were now in Broadmoor Criminal Lunatic Asylum; how they were graded; what curative treatment was applied to them; how cures were tested and registered; how many releases had been made during the last 20 years; what were the ages of those released; and how many of them afterwards relapsed into crime or lunacy or both.—Mr. C. EDE replied: There are at present 822 patients in Broadmoor. The allocation of patients to the appropriate part of the institution, their treatment, and the degree of liberty which they can be allowed within the institution are decided in the light of the mental condition and history of each individual patient. The methods of treatment adopted are those employed in other mental hospitals, and include occupational therapy, electric convulsive treatment, and in appropriate cases psychological treatment. During the years 1927–46 inclusive, 381 patients were discharged; of these 37 (3 of whom had been charged with fresh offences) were subsequently readmitted to the asylum. Of those released during this period 7 are known to have received treatment in other mental hospitals. I regret that the other information asked for is not available.

Obituary

FREDERICK GOWLAND HOPKINS

KT., O.M., M.A. CAMB., M.B., D.SC. LOND., HON. SC.D., LL.D., F.R.C.P., F.R.S.

Sir Frederick Hopkins, who died in Cambridge on May 16 in his 86th year, was both great and greatly beloved. Living to become the Grand Old Man of biochemistry, he had long been recognised as the leading figure in the science which he did so much to develop.

His scientific renown was based on exploration of four or five avenues of biochemistry: his name will be remembered for his investigation of lactic acid in muscle activity; for the discovery of the amino-acid tryptophane, and the demonstration of its "specific biological value"; for his classical experiments on the need for accessory factors in normal diets (by which he is most widely known); and for his isolation of the cell-catalyst, glutathione (which will perhaps prove the most important of all his researches). As he once himself half-humorously said, the scientist who wishes to become famous should first discern where the next big advance is likely to come, and should then take care to be the first to start work there himself! Endowed with an instinct for scenting a trail, and with rare experimental skill in following it, he started many a scientific hunt, from which great treasures have come, and are still coming. One reason perhaps was in his mode of approach. An American pupil remarked: "The other lecturers in this university talk to you about what is already known; 'Hoppy' points out what we still don't know and still need to know." The latter approach could be the more invigorating.

But he himself would probably have been most proud to know that, in the eyes of his fellow workers, his greatest contributions were those which would not appear in *Who's Who* or the official records—that he had inspired and encouraged generations of younger men, and that he had founded the world's most distinguished, and almost its earliest, school of biochemistry.

Unusually slight in build, he had nevertheless an unmistakable dignity of carriage, and indeed a handsome presence, which at once commanded notice. Ever kindly and approachable to all, devoid of the slightest particle of "side," he won the affection and respectful admiration of his subordinates.

Born in Eastbourne in 1861, Frederick Hopkins lost his father when a small child. The confinement of school life did not appeal to one of his inquiring and roaming outlook, and for the most part he was privately educated. At the age of 17, he was placed with an insurance company in the City, but his own bent had always been scientific, and he soon determined on other courses. In turn he assisted Percy Faraday Frankland at the Royal School of Mines at South Kensington, attended lectures at University College, became an associate of the Institute of Chemistry, and then received an appointment as analytical chemist under Sir Thomas Stevenson, the Home Office analyst and medical jurist at Guy's Hospital. He was considered at one time as destined to succeed Stevenson, but wisely decided to join the medical school at Guy's and become medically qualified. His early scientific discipline as an analyst, combined with his interest in living things, provides perhaps the clue to his later achievements. For, on the technical side, his investigations consisted essentially in employing the scientific skill, resource, neatness, and precision of the expert analyst to the processes of separation, isolation, and identification, in the immensely complicated chemistry of living matter.

His scientific papers possessed a literary distinction and distinctiveness, being customarily cast in the form of a persuasive narrative, subtly phrased, and with something of the black-and-white contrasts of a Macaulay.

It is perhaps possible to trace a continuity throughout the researches which seem at first sight so varied. As a youth Hopkins had been interested in natural history, especially in lepidoptera (his first publication was a note contributed at the age of 17 to a naturalists' magazine), and his first researches were concerned with a pigment in butterflies' wings—a fascinating problem with some unexpected connexions, to which he returned in later life. The pigment proved to be a uric-acid derivative, and this led him to devise an improved technique for estimating uric acid. Interest in uric acid focused his attention on the supposed influence of dietary protein on uric-acid output—and so began the experiments with purified proteins and artificial diets.

Towards the end of the century Hopkins had been called to Cambridge by Sir Michael Foster, then professor of physiology, to develop chemical physiology (as it was then called), and he remained in Cambridge for the rest of his life. His first great discovery there was the isolation and identification with S. W. Cole in 1901 of the amino-acid tryptophane, and later with Edith G. Willcock he published one of the earliest researches on nutritionally essential amino-acids, showing that zein, an incomplete protein of maize, could be improved nutritionally by the addition to it of tryptophane.

Press Portrait Bureau

Animal feeding studies of this kind with purified diets soon convinced Hopkins, as it had convinced others before, that normal growth could not be sustained on the known "major constituents" of diets, and that still unidentified "accessory food factors" were needed in addition. But he went one step further than any of his predecessors in suggesting that these accessory factors present in *normal diets* were one and the same as the substances needed to prevent *deficiency diseases*. As he put it in a lecture to the Society of Public Analysts in 1906: "In diseases such as rickets, and particularly in scurvy, we have had for long years knowledge of a dietetic factor; but though we know how to benefit these conditions empirically, the real errors in the diet are to this day quite obscure. They are, however, certainly of the kind which comprises these minimal qualitative factors that I am considering."

It was appropriate, therefore, that a good many years afterwards, when the new view had become firmly established, Hopkins was to share a Nobel prize in medicine with Eijkman who had been the first in 1890 to produce a deficiency disease (beriberi) experimentally and to recognise (along with Grijns 1901) that it was due to the lack of something from the diet.

Hopkins's famous paper in the *Journal of Physiology* in 1912 (Feeding Experiments Illustrating the Importance of Accessory Factors in Normal Dietaries) did more than anything to convince his contemporaries of the truth of the then still heretical doctrine that man cannot live by fat, protein, and carbohydrate alone, but that organic accessories are necessary. After this, progress was rapid, although Hopkins himself published relatively little more on the subject: the "vitamine hypothesis," as it was at first, grew into a reality . . . and the number of vitamins still grows.

In the meantime, Hopkins's association in Cambridge with a leading expert on muscle physiology, Walter Fletcher (later the first secretary of the Medical Research Council), led to their collaboration in the celebrated study which helped to clarify the phenomenon of the production of lactic acid in muscular activity.

Returning to his interest in accessory factors, Hopkins gave his attention to the sulphur-containing substances in food, and eventually traced the sulphydryl reaction back to its source. By 1921 he could announce the isolation of the "autoxidisable constituent" of the cell, which he named glutathione. In 1929 he established its precise constitution as a tripeptide. From glutathione followed other important studies relating to tissue oxidation.

In all, he published around 100 papers, including scientific communications and presidential and inaugural addresses. One of his last public appearances was at the inaugural meeting of the Nutrition Society in Cambridge in 1941, when he gave an inspiring introductory address, in which he looked back over the past half-century's work and concluded by blessing the new venture.

Despite declining health and a growing loss of sight in his last years, he retained his intellectual vigour and all his kindness and charm and magnetism.

L. J. H.

His life, from its strenuous beginning up to those declining years in silence and darkness, was one of almost continuous, and happily fruitful, labour. His long familiarity with actual work at the bench, added to his natural genius and untiring application, endowed him with an uncanny flair for a theme and for brilliant methods of attack.

A chemist by instinct, he was one of those earliest pioneers who had faith in the importance of chemistry to the medical sciences, and in particular to the subject of physiology: he was chiefly instrumental in the establishment of biochemistry as an independent subject in England.

His publications, for so famous a man, were not numerous, but they were, almost without exception, of superb value and distinction. Nearly all were individual, the product of his own hand and mind, and nearly all were spearheads of advance into new territory, still yielding harvests to many workers who followed after. He had no pupils and founded no school, in the modern sense of groups of led, or driven, teams. He was a man of simple ways.

C. L. E.

There is extant a large almost full-length portrait of Michael Foster, picturing him in front of a blackboard which carries chalked on it, in characteristic bold Fosterian handwriting, the sole word "proteids." "That dates it," said someone looking at it: "Pre-hopkins." So prevailing was Hopkins's *maitrise* in his subject that his own fame and that of his subject are identical over large tracts of inquiry.

Already by 1899 his position as a biochemist was pre-eminent. The University of Liverpool at that time founded what was, I fancy, the first chair in biochemistry to be endowed in this country, and offered it to Hopkins. But Cambridge had, through the prevision of Michael Foster, already secured him. He went forward from discovery to discovery. His ways were his own. There was curiously little reflex of Continental work; such liaison as there was seemed to trace mainly across the Atlantic.

I have memory of an address given by him at a British Association meeting. In an uninviting gaunt lecture-room he decanted for nearly an hour on the cell as a theatre of chemical processes. Without any deliberate attempt at eloquence, and in a voice that as he became more interested fell to such a purely conversational level as to be a little difficult to hear, he conjured up for his audience—some 30 persons all told—a picture of the cell as a tiny sponge-work containing perhaps a thousand foci of different actions coöperatively confined within a unitary whole. An organised factory manifoldly hydrolysing, pulling to pieces, and contemporaneously constructing and reconstructing. And this unity bounded outwardly by a mosaic of countless chemical poles and leaking like a sieve. As I listened I felt I was being privileged for the time to see something of the microcosmic world in which my friend's scientific thoughts took shape and did his bidding. One mental factor which, it seemed to me, such thinking must demand, was a peculiar intensity of visual imagination, continuously checked in factual knowledge. The great organic chemist, conjuring with stereographic formulæ, must have something of the same faculty. It is lived with. Kekule hit on his famous key-formula when riding on a London bus.

Hopkins owed little to Continental influence. He was a Londoner; his speech mildly declared it. On his 80th birthday he gave a talk in a small room—he was best in a small room—in his laboratory to pupils working then with him. The subject was his own career and what he inferred from it. I fancy that after biochemistry his greatest interest lay in "Socialism." His views were quite far to the "Left." He had associated with Ramsay MacDonald in the early days of both of them. He remained a propagandist. However, he was a biochemical discoverer first and foremost. Even in the last years when health was failing he paid a visit to the laboratory almost daily to pursue original inquiry at first hand.

C. S.

Sir Frederick Hopkins's monumental discoveries in biochemistry are well known. But it is not alone in their published works that great scientists influence advance in their chosen fields; in addition, as teachers, they are indirectly responsible for progress and achievement in fields sometimes closely allied but often far removed from their own.

Most men of Hopkins's calibre set out to train successive generations of junior workers who go forth to practise the master's methods and spread his views. It is doubtful whether, in this sense, Hopkins ever trained anyone; his intuitive habits of thought and his uncanny and incommunicable skill in handling material largely precluded this method of teaching. Nevertheless his scientific influence on workers of many nationalities and at all stages of development was stupendous. On entering his department one was immediately in close touch with the professor; the contact was maintained in an apparently haphazard manner but was close, intimate, and fructifying. The newcomer quickly gained the impression that he himself was a person of scientific importance and that his work and thoughts were of great interest to the professor; also that he too was a person capable of original thought.

The gift of producing this impression was most apparent at the weekly tea-club meetings. Here each worker in turn was invited to give an account of some piece of research in progress or just finished. Though such communications varied in value and might even occasionally appear dull or unimportant, as soon as the professor opened the discussion the subject was illuminated, the facts were placed in perspective, and interesting implications were pointed out. By the time the chairman had finished his remarks everyone, including the author, was convinced of the value and significance of the communication.

The professor's weekly lectures were regarded as occasions never to be missed. They were frequently reminiscent in character and historical in form; they were attended as a matter of course by every member of the department in the hope, never disappointed, of hearing old facts and theories take some new and significant shape as they passed through the professor's mind.

Hopkins was so available to all and sundry that it was a matter of surprise that he found time for his research. Yet research was his great preoccupation and indeed his only hobby, and Sunday mornings always found him in his laboratory, when, so he said, he carried out experiments too foolish for his assistant to know about. When at work he employed an intense concentration. His gift, which he never seemed able to impart, of separating crystalline compounds of great physiological importance from complex messes, was found, when one was privileged to see it in operation, to be due to an intensely acute observation and a retentive memory for important detail.

One of his poses was an ignorance of organic chemistry, but no organic chemist who ever conversed with him on the types of compounds he had studied was able to substantiate this claim.

He has gone, but his influence remains, not only in his published works and in the records of the Royal Society but in the many minds he stimulated and enriched.

D. M. N.
M. S.

I have good reason to remember the consideration and generous encouragement he gave to his pupils and junior colleagues. In Vienna after the first world war the small team commissioned by the Medical Research Council and Lister Institute to investigate the ætiology of rickets received a kindly visit from him. Not only did his prestige enhance the value of the unit in the estimation of its Austrian colleagues, but the sympathy he showed for the workers, and his appreciation of the difficulties inherent in the research itself as well as in its prosecution under the existing conditions, remained a lasting encouragement and an inspiration for the continuance of the work.

H. C.

In the years round about 1910 Hopkins, whom we then regarded especially as the discoverer o tryptophane, gave at Guy's Hospital medical schoo occasional advanced lectures in physiology for th University of London. The lectures were wonderfu in their matter, but not attractive to students in delivery At that time he was engaged in a systematic search fo "the accessory food factor," the absence of which in a synthetic diet led to cessation of growth. After one o these lectures, during tea in the physiological laboratory, he told us, in a rather despondent tone, that "it isn't creatine"—meaning of course that he had devoted an experiment to the addition of creatine to the synthetic diet with a negative result. Nowadays when it is difficult to keep abreast of the literature relating to even a single one of the many "accessory factors," the statement that "it isn't creatine" may seem rather meagre; at the time it was a comprehensive report on the present *state of vitamin research by our greatest biochemist.* He had at that time one-half of his life still before him, and the vast increase in knowledge which has taken place in that time demonstrates what can be done under modern conditions when the beginning of the right path is found by pioneers like Hopkins.

E. L. K.

I first met Gowland Hopkins at Guy's Hospital in 1883. At that time he was assistant to Thomas Stevenson, and it was his duty to prepare the experiments for Stevenson's chemical lectures, in addition to analytical work in connexion with famous poisoning cases. He was a highly skilled chemist; I was a first-year student commencing the study of the medical sciences.

Finding I was interested in chemistry, he kindly allowed me to potter about in his laboratory at odd times, and when he was not too preoccupied he would discuss chemical problems in physiology which interested and perplexed me. I remember the consideration he gave to my crude imaginings and the delicacy with which he demolished them. The benefit of these unceremonious talks was gratefully appreciated and I became perhaps the first of his loving pupils.

As we became intimate in those old days at Guy's, I had the youthful effrontery to urge him to abandon his career as an analyst, study medicine, and subsequently devote his chemical talents to researches in physiological chemistry. At first he was amused, and then attracted to the idea; but, although he was enterprising enough to contemplate a further four years of studentship with equanimity, for financial reasons the proposition was an impracticable one. However, a few years later he did embark on the medical course, and he qualified in 1894. After a while as demonstrator with Starling at Guy's, he accepted an invitation from Michael Foster to join the staff of the department of physiology at Cambridge. To my mind, his pre-eminence as a biochemist was due to the perfect fusion of his knowledge of chemistry and physiology, in the disciplines of both of which he was equally at home.

Hopkins was the gentlest, kindest, and most modest man I have known. He was not uncritical, but I cannot recall hearing him say an unkind word about anyone. The universality of his kindness was almost a defect, for sometimes a little ruthlessness appeared to be more appropriate to the situation. His modesty was such that when one discussed a subject of which one was ignorant and he was a master, he somehow managed to suggest that it was he who had benefited by the conversation!

A great man and a good friend has gone from among us. His departure is mourned by young and old, but the memory of "*Hoppy*" will long remain an inspiration to those who have enjoyed the privilege of working with him.

C. J. M.

While at Guy's Hospital, in 1896, Hopkins took part in establishing the Clinical Research Association, offering a pathological service to practitioners, and gave it much hard evening work. In his early days at Cambridge he was supervisor of medical studies at Emmanuel College, but in

910 his election into an honorary “ prelectorship ” in physioogical chemistry at Trinity College enabled him to devote his time more fully to biochemical investigation and teaching. n 1902 a university readership in chemical physiology had been reated for him ; in 1914 he was given a special professorship n biochemistry ; and in 1921 he became the first holder of the Sir William Dunn chair of biochemistry and head of the associated Sir William Dunn institute.

He was an original member of the Medical Research Council and the first chairman of its Accessory Food Factors Committee. He was elected a fellow of the Royal Society in 1905, and became its president in 1931. He was knighted in 1925, was chairman of the British Association in 1933, and vice-president of the Chemical Society in 1921. Among his numerous honours and distinctions may be counted the Royal medal and the Copley medal of the Royal Society, the Baly medal of the Royal College of Physicians, the Society of Apothecaries' medal, and the Albert medal of the Royal Society of Arts. He received the Nobel prize for medicine in 1929, and was appointed to the Order of Merit in 1935. In 1938 he was awarded the Conway Evans prize by the presidents of the Royal Society and the Royal College of Physicians.

He is survived by his life's comrade and helpmate, Lady Hopkins, who before their marriage in 1898 was Jessie A. Stevens. Their son, Frederick Hopkins, is a doctor, and their two daughters, Barbara Holmes and Jacquetta Hawkes, are well known for their research and publications in biochemistry and archæology respectively.

ALAN GORDON ADRAIN

M.R.C.S.

Dr. Alan Gordon Adrain, who died on April 28 in Durban, worked for a time on the Congo as a pharmacist before he came to this country to study medicine at St. Mary's Hospital. In 1928 he took the Conjoint qualification, and after holding a resident appointment at the Royal Northern Hospital he returned to South Africa, where he took up practice in Zululand. At the time of his death he was senior medical officer to a large group of sugar plantations in Natal.

As medical officer to the Durban division of the old South African R.N.V.R., Adrain was mobilised on the outbreak of war in 1939. He saw extensive service afloat, and later was appointed liaison officer at Durban, where his cheery presence and comprehensive local knowledge eased the problems of visiting naval medical officers. A man's man, Adrain was a fine example of the resourceful single-handed practitioner. A visit to Stanger meant the traditional hospitality of South Africa and a round of the hospital and outlying clinics with the accompanying shop so missed at sea.

Dr. Adrain married Miss Norah Collins, S.R.N., and they had two children.

W. S. P.

Public Health

Smallpox

Two further cases of smallpox have been reported in connexion with the outbreak at Bilston. One was in an unvaccinated woman, aged 27 years, who was taken ill on May 9 and developed a scarlatiniform rash on May 12. On the 16th it was recognised that she was suffering from hæmorrhagic smallpox and she was removed to hospital, where she died the same day. The source of her infection is at present unknown. At Birmingham a medical student who visited the Bilston Smallpox Hospital on April 24 and was unsuccessfully revaccinated the same day has developed a mild attack of smallpox with an atypical eruption.

A patient with smallpox was removed to hospital from a Salvation Army hostel in Bermondsey on May 16. This was an unvaccinated man, aged 22 years, who had come to London from a lodging-house at Barnsley on May 6. His illness began on May 12 and the rash appeared on the 16th. Inquiries at Barnsley revealed that three residents of the lodging-house where the Bermondsey patient had stayed were suffering from smallpox. In two men, aged 72 and 76 years, the onset appears to have been on May 12 and in a woman, aged 50 years, on the 15th. All were removed to a smallpox hospital on May 16.

Infectious Disease in England and Wales

WEEK ENDED MAY 10

Notifications.—Smallpox, 2 ; scarlet fever, 1002 ; whooping-cough, 2222 ; diptheria, 194 ; paratyphoid, 3 ; typhoid, 6 ; measles (excluding rubella), 10,134 ; pneumonia (primary or influenzal), 561 ; cerebrospinal fever, 74 ; poliomyelitis, 12 ; polioencephalitis, 2 ; encephalitis lethargica, 0 ; dysentery, 110 ; puerperal pyrexia, 151 ; ophthalmia neonatorum, 73. No case of cholera, plague, or typhus was notified during the week.

One case of scarlet fever was notified at Coseley, Staffs, the other at Sheffield. Of the 110 cases of dysentery, 72 were notified in Lancashire *(including 40 at Prestwich, 18 at Liverpool, and 10* at St. Helens).

Deaths.—In 126 great towns there were no deaths from scarlet fever, 1 (0) from an enteric fever, 1 (1) from diphtheria, 5 (0) from measles, 15 (2) from whooping-cough, 95 (14) from diarrhœa and enteritis under two years, and 10 (0) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 263 (corresponding to a rate of 25 per thousand total births), including 31 in London.

Catching Up

Since the end of the war the following reports have been published by the Registrar-General :

Statistical Review for 1941, tables, part I—March, 1946.
„ „ „ 1941, tables, part II—July, 1946.
„ „ „ 1942, tables, part I—October, 1946.
„ „ „ 1942, tables, part II—May, 1947.
„ „ „ 1938 and 1939, text volume—May, 1947.
Decennial Supplement for 1931, part IV, Multiple or Secondary Causes of Death—April, 1947.

The Statistical Review for 1945, tables, parts I and II, will be published within the next two or three months, and it is hoped that the corresponding volumes for 1943 will appear before the end of this year.

Diary of the Week

MAY 25 TO 31

Tuesday, 27th

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
5 P.M. Mr. William Gissane : Tendon Injuries of the Hand.
ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
8 P.M. *Medicine.* Dr. E. R. A. Merewether, Dr. Charles Fletcher, Prof. Matthew Stewart : Pneumonoconioses.
LONDON SCHOOL OF DERMATOLOGY, 5, Lisle Street, W.C.2
5 P.M. Dr. Hugh Gordon : Cutaneous Affections due to Sunlight.
EDINBURGH POSTGRADUATE BOARD FOR MEDICINE
5 P.M. (Royal Infirmary.) Dr. Reginald Passmore : The Fat of the Land.

Wednesday, 28th

ROYAL COLLEGE OF SURGEONS
5 P.M. Sir Reginald Watson-Jones : Fractures of the Neck of the Femur.
ASSOCIATION OF INDUSTRIAL MEDICAL OFFICERS
2.45 P.M. *Scottish Group.* (Institute of Hygiene, University of Glasgow.) Dr. D. M. Watson : Industrial Sickness Absence. Dr. Edward Collier : Prevention and Control of Industrial Oil Dermatitis.

Thursday, 29th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Dr. L. W. Proger : pathological specimens (Erasmus Wilson demonstration).
5 P.M. Mr. S. A. S. Malkin : Conservative Treatment of Bone and Joint Tuberculosis.
6.15 P.M. Mr. B. H. Burns : Open Fixation in Fractures of the Shafts of Long Bones.
LONDON SCHOOL OF DERMATOLOGY
5 P.M. Dr. J. L. Franklin : Cutaneous Syphilis.
UNIVERSITY OF DURHAM
5.15 P.M. (Royal Victoria Infirmary, Newcastle-on-Tyne.) Prof. G. Grey Turner : Rutherford Morison and his Achievement in Surgery (Rutherford Morison lecture).
EDINBURGH POSTGRADUATE BOARD FOR MEDICINE
4.30 P.M. (Royal Infirmary.) Prof. R. J. Kellar : Endometriosis (Honyman Gillespie lecture).

Friday, 30th

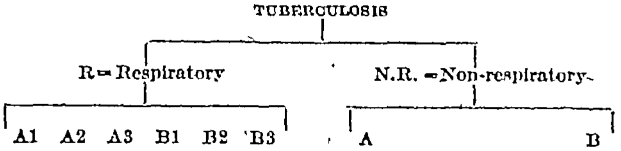
ROYAL COLLEGE OF SURGEONS
5 P.M. Miss Maud Forrester-Brown : Operative Procedure in Poliomyelitis
6.15 P.M. Mr. W. Rowley Bristow : Derangements of the Knee-joint.
MEDICO-CHIRURGICAL SOCIETY OF ANDERSON'S COLLEGE AND ST. MUNGO'S COLLEGE
7.30 P.M. (Royal Infirmary, Glasgow.) Sir Stanford Cade : Recent Advances in the Treatment of Cancer.

Notes and News

TUBERCULOSIS CLASSIFICATION

THE Minister of Health has adopted recommendations by the Joint Tuberculosis Council for the revision of the classification and terms to be used in annual returns. Under the new classification, published as an amended version of part of the appendix to memorandum 37/T (revised), tuberculous patients will be divided into classes A and B, according to whether tubercle bacilli have not or have been recovered. Patients may be transferred at any time from class A to class B; but those from whom tubercle bacilli have not been recovered within the first eight weeks of observation should be placed in class A. Single positive bacteriological reports, unconfirmed by further search and unsupported by clinical or radiological evidence of tuberculosis, may be ignored.

Respiratory cases are to be further divided into three groups: (1) group 1, in which constitutional disturbance is slight, and there are few signs or radiological changes; (2) group 3, in which there is profound systemic disturbance or constitutional deterioration, and pronounced impairment of function; and (3) group 2, to include all cases which cannot be placed in groups 1 and 3. We thus have the following scheme:



An uncomplicated pleural effusion for which no other cause can be found should be regarded as tuberculous, and the case placed in group 1 of class A or B, according to the bacteriological report on the fluid.

PROTECTION AGAINST RADIOACTIVE SUBSTANCES

NEW rules for the protection of those working with radioactive substances have been announced by the Minister of Labour. In the Factories (Luminising) Special Regulations, 1947, it is laid down that all employees working with or near luminous compound shall be examined within seven days of starting work, and thereafter at intervals of not more than one month; and a health register, to include all employees, must be kept. Those engaged in the manipulation of luminous compound are to wear photographic film for one week in every three months. This is to check the sufficiency of other precautions, which include the prohibition of more than 48 hours' work a week, and provision for three months in other employment after each full year's employment on processing. Measures are also given for keeping the air and all surfaces free from luminous compound and for direct protection by special clothing and by screening.

INJECTIONS WITHOUT NEEDLES

A Detroit engineer has invented an instrument for injecting solutions directly through the skin. A British United Press report describes the apparatus as a metal cylinder about the size of a flashlight, with a powerful spring inside. The ampoule containing the solution is fitted into the end of the cylinder and this is placed on the patient's arm. The doctor then presses the button and the solution, forced through a hole 1/300 inch in diameter at a pressure of 3200 lb. per sq. inch, passes through the skin in a fraction of a second, causing no pain. The idea of the apparatus came from the observation that oil from diesel engine jets often penetrates the skin of engineers.

RURAL WATER

THE uneven development of our water-supplies was deplored by Mr. Aneurin Bevan, Minister of Health, in his speech at the centenary conference of the British Waterworks Association on April 23. It was a reproach to us, he declared, that so much of rural England still lacks piped water. But the Rural Water Supplies and Sewerage Act of 1944 provided £15 million towards the cost of water schemes and projects to the value of over £20 million had been submitted of which £4 million-worth had been approved. These schemes had to be considered critically, for often those which satisfied local requirements proved to be inadequate against a background of wider needs. The surveys of these larger areas which were now being undertaken by technical officers of the Ministry and the county councils would prove invaluable in designing a national water-supply on a regional basis. The rural water-supply must keep pace with the hoped-for expansion of rural housing; for, said Mr. Bevan, "we must not make th agricultural worker's wife a beast of burden or she will be dissatisfied, and she won't be long in conveying dissatisfaction to her husband and then we shall lose agricultural workers."

A MORE SENSITIVE WASSERMANN REACTION

No serological reactions have been more intensively stud than the complement-fixation and precipitation tests for t diagnosis of syphilis, and they must hold the record for t number of modifications and refinements of technique devis to increase their sensitivity According to a British Unit Press report from Washington, workers at Duke Universit under the auspices of the U.S. Public Health Service, ha isolated and concentrated a serum protein fraction which th have identified as the reagin responsible for the positi Wassermann reaction, and they have isolated another fracti which has a specifically inhibitory effect on the "reagi concentrate" in a false-positive but not on the "reagi concentrate" from sera of known syphilitics. On this bas a practical test has been devised, and the results from more th 2500 sera indicate that "practically all sera from patien with clinically diagnosed syphilis give the syphilitic type reaction." More detailed reports will no doubt appear shortl

EXECUTIVE COUNCILS

THE statutory rules and regulations (no. 889) have no been published dealing with the executive councils whic under the fifth schedule of the National Health Service Ac are to be set up to deal with general medical services of eac local health area. Most local authorities and local medic committees have already sent the names of those they hav appointed to the Minister who is now considering the appointments he will make. The term of office of members of th councils as laid down by the new rules will be three years, an a third of the council will retire annually.

MEDICAL BENEFITS FROM MILITARY SERVICE

IN a survey of the medical advantages gained by thos accepted for universal training in the United States Army Major-General Norman T. Kirk, the surgeon-general, enumerated: (1) the thorough application of preventive medicine giving maximum protection against smallpox, enteric fever tetanus, influenza, and other communicable diseases; (2) th periodic physical examinations, which often uncover unsuspected pathological conditions; (3) the high standard o medical and hospital care; and (4) the rigid sanitation In the army, he said, there is no deterrent, as there sometime is in civilian life, to seeking prompt medical attention; an the greater ease of gaining admission to hospital often mean a shorter illness and fewer complications. "The situation i the army," said General Kirk, "is unique in the action whic can be taken in the various fields of safeguarding health There is no other comparable situation where entire group of men can receive thorough training and indoctrination i the principles of health protection." Under a system of universal training, the army by medical care and education would offer benefits which would accrue "not only to these young men themselves but also inevitably to a certain degree to their families, communities, and to the entire country."

FOOD AND HOW TO EAT IT

A NEW journal on nutrition—*Nutrition, Dietetics, Catering*—is to give quarterly official news of the British Dietetic Association and the Food Education Society. In a foreword to the first issue, Sir Jack Drummond, F.R.S., remarks that we have a grand tradition of good cooking in this country, dating from the prosperous early years of the 18th century, but that it has since been beaten down by many depressions, during which the well-to-do took to bastard French meals and the poor, in their poverty and ignorance, "boiled the life and soul out of their daily dinners." The journal takes up arms against bad cooking and bad catering in this country. We hope, with Sir Jack, that those who guide its policy "will prudently and happily marry scientific instruction to gastronomic appreciation." The first issue certainly offers a fine international menu for the discriminating palate: Prof. J. R. Marrack on food or nutrients, Prof. John Yudkin on nutrition in West Africa, Miss Diana J. Ten Haaf on the food-supply of the Netherlands during the war, Mrs. D. Elrene Palmstrom on food habits in Norway, and Miss J. Isobel Mills on the diploma course in dietetics at Leeds. The text makes rather hungry reading, but, provided good digestion waits on appetite, readers will find themselves mentally nourished. We congratulate the anonymous editor on his fare.

iversity of Cambridge

On May 10 the following degrees were conferred :

M.D.—J. A. Dudgeon, C. R. Morison, J. M. Naish, E. A. Pask.
M.B., B.Chir.—J. G. Kilner (by proxy).

niversity of Sheffield

Dr. J. G. McCrie has been appointed full-time dean of the ulty of medicine.

Dr. McCrie, who will take up his duties on Sept. 1, has been ior administative officer in the school of medicine of the Univer- y of Leeds. A native of Edinburgh, he graduated at the university medicine with first-class honours in 1925, and after holding ident hospital posts he became clinical tutor and senior clinical istant at the Edinburgh Royal Infirmary and assistant in the partment of medicine of the university. Later he was appointed turer in medicine in the University of Edinburgh, assistant ysician to the Royal Infirmary, and physician and deputy ector of the medical unit in the Edinburgh municipal hospitals. ring the late war he served as a physician in the Army in France d later in North Africa and Italy, rising to the rank of colonel d being awarded the O.B.E.

Dr. G. L. Hermitte has also been appointed lecturer in stology, and Dr. F. T. Thorpe lecturer in mental diseases.

niversity of Manchester

The following appointments have been made: Dr. H. J. rennan, lecturer and director of the subdepartment of æsthetics; Dr. F. A. Langley, *lecturer in gynæcological* athology; Miss Annie Hain, D.SC., lecturer in gynæcological ndocrinology; Dr. Harold Jackson, lecturer in bacteriology; r. F. B. Jackson, assistant lecturer in bacteriology; Dr. . G. Reid and Dr. W. McL. E. Topping, assistant lecturers radiology: Dr. G. W. Boden, assistant lecturer in radio- erapy.

oyal College of Surgeons of England

The War Organisation of the British Red Cross Society and rder of St. John of Jerusalem have made a grant of £20,000 o the college towards the cost of replacing its museum which as partly destroyed by enemy action. They have made the ift in recognition of the help the Red Cross and St. John have eceived from the medical profession.

Jacksonian Prize.—The subject for this prize for 1947 is he Surgery of the Lower Œsophagus and Cardiac End of he Stomach, and dissertations must reach the college by P.M. on Dec. 31. The subject for 1948 is Malignant Disease f the Thyroid Gland. Further information may be had from he assistant secretary of the college, Lincoln's Inn Fields, ondon, W.C.2.

The first number of the *Annals of the Royal College of urgeons of England* will be published in July. The journal, hich is to appear monthly, will contain college lectures, ews, and a diary of forthcoming events. The annual sub- cription is 25*s*. post free, and the cost of single numbers will e 2*s*. 6*d*. plus postage.

oyal College of Physicians of Edinburgh

At a meeting of the college held on May 6, with Dr. D. urray Lyon, the president, in the chair, the following elections ere made :

Fellows.—P. M. Wood (Halifax, Yorks), R. A. Bennett (London), . E. Elliot (Edinburgh), C. L. Grant (Chislehurst, Kent), J. D. llan (Bothwell), G. M. Greig (Watford, Herts), T. F. Rodger Glasgow), Harold Scarborough (Edinburgh), R. W. Craig (Edinburgh).

Members.—H. E. Seiler, Jacobus Siebert, S. L. Forrest, N. A. ossiter, D. A. Duthie, W. A. L. MacFadyen, H. A. Reid, D. C. oss, C. H. Davidson, C. G. Robertson, J. M. Staveley, A. G. S. Hill, . R. C. Batchelor, A. J. A. F. Al Amari, H. N. Robson, B. B. ukherji.

oyal College of Surgeons of Edinburgh

At a meeting of the college on May 15, with Mr. James M. raham, the president, in the chair, the following were dmitted to the fellowship :

Abdel Hamid Ahmed El Baghdadi, M.R.C.S., W. E. B. Boscence, .B. Adelaide, G. P. Charlewood, M.B. Cape Town, G. R. Clarke, .B. Birm., Norah H. C. Clarke, M.B. Lond., A. D. Cuthbert, M.B. lasg., George Degnan, M.D. McGill, A. C. Duncan, M.D. Manitoba, . G. A. Du Toit, M.B. Cape Town, Ahmed Talaat El-Mansuri, .B. Cairo, H. C. Fishman, M.D. Manitoba, T. G. Fyshe, M.D. McGill, F. G. Hollands, M.R.C.S., M. J. Lange, M.R.C.S., J. E. Leddy, M.D. McGill, J. T. MacDougall, M.D. McGill, A. B. McLean, M.B. Melb., E. B. Z. Masterman, M.R.C.S., Bindra Ban Ohri, M.B. Punjab, Donald Robertson, M.B. Edin., J. C. B. Sergeant, M.B. Edin., Tulsidas Prabhudas Shah, M.B. Bombay, L. G. P. Shiers, M.R.C.S., Samuel Skapinker, M.B. Witw'srand, Cyril South, M.B. Sheff., R. Y. Stevenson, M.B. Lond., A. M. Stewart, M.B. Edin., Dattatraya Vishnu Virkar, M.B. Bombay, Sydney Wassyng, M.B. Witw'srand, B. W. Wells, M.R.C.S., T. E. Wilson, M.D. Melb., Benjamin Winter, M.D. Toronto, James Wishart, M.B. Glasg., G. N. Wright, M.B. Lond., R. B. Wright, M.B. Glasg.

Society of Physiotherapists

This society, which was founded 15 years ago as the Association of Bio-Physical Assistants, has now been wound up. The Chartered Society of Physiotherapy has agreed to accept biophysical assistants, on the society's sponsorship, for enrolment on the C.S.P. register.

C.B.C. Mothers' Clinic

On Thursday, June 5, at 2.30 P.M., Mrs. Marie Stopes, D.SC., will give a demonstration on contraceptive technique. Tickets are only obtainable in advance from the clinic, 108, Whitfield Street, London, W.1.

Rheumatic Fever Library

The University of Colorado School of Medicine is collecting reprints of all articles dealing with rheumatic fevers. When the material is assembled it will be cross-indexed and made available to workers of all countries through a 'Photostat' and abstract service. The address of the library is 4200, East Ninth Avenue, Denver, 7, Colorado.

Admission Officer

The London Hospital is creating a new medical appointment of senior admission officer with a salary of £750 per annum non-resident (or £650 resident). The holder will rank above the first assistants and registrars, and will be responsible for the admission and distribution of all patients, and for the clinical work of the receiving-room, where he will be required to teach medical students. Further particulars will be found in our advertisement columns of May 17.

Association of Surgeons of Great Britain and Ireland

The annual meeting of the association will be held in Oxford on July 3, 4, and 5 under the presidency of Sir Hugh Cairns. Mr. J. H. Kellgren, Dr. W. K. Livingston, Prof. J. Paterson Ross, and Prof. Geoffrey Jefferson, F.R.S., will open a discussion on the Surgical Relief of Pain; Mr. Geoffrey Keynes, Prof. H. P. Himsworth, Mr. T. A. Hindmarsh, and Dr. Oliver Cope on the Modern Treatment of Toxic Goitre; and Mr. P. R. Allison, Dr. L. G. Blair, Mr. T. Holmes Sellors, Mr. Vernon Thompson, and Mr. N. C. Tanner on Cancer of the Cardiac End of the Stomach and Lower End of the Œsophagus. Further information may be had from the offices of the association, 45, Lincoln's Inn Fields, London, W.C.2.

Commonwealth Fund

Dr. Donal Sheehan, professor of anatomy of the New York University College of Medicine, has been appointed general director of the Commonwealth Fund in succession to Mr. Barry C. Smith.

Dr. Sheehan, who is 40 years of age, graduated B.SC. at the University of Manchester in 1926 and M.B. three years later. In 1932 he was awarded the gold medal for his M.D. thesis, and in 1936 he obtained his D.SC. for research into the anatomy of the autonomic nervous system. He held the lectureship in neurological anatomy in the University of Manchester for two years before he was appointed to his American chair in 1937. During the war he acted as dean of the College of Medicine. He is a trustee of the Josiah Macy, Jr., Foundation and recently completed a mission in Czechoslovakia for the Rockefeller Foundation.

Colonial Studentships

On the recommendation of the Colonial Medical Research Committee, ten studentships are being offered to British graduates in medicine and cognate sciences who wish to prepare themselves for research in tropical medicine. The studentships will carry an allowance of £260 per annum, free of income-tax, and will normally be held for two years. They will be tenable at any university or other appropriate institution. It is intended that students who successfully complete their courses will be offered posts in the projected Colonial Medical Research Service. Application should be made, through the head of the candidate's department, to the secretary, Colonial Medical Research Committee, Colonial Office, London, S.W.1.

The National Association for the Prevention of Tuberculosis is also offering six scholarships to doctors and other medical personnel of the British Colonial Empire who wish to study tuberculosis in Britain for six months. Two scholarships (value £120 each) will be open to doctors in the Colonial Medical Service; two (value £100 each) to medical graduates of native medical schools in the British Colonies; and two (value £80 each) to matrons, nurses, health visitors, or other members of Colonial sanitary departments. Applications should be made through the Colonial medical departments, who will forward them to the Colonial Office, which will make recommendations to the council of the N.A.P.T.

A Psychologist on Germany

Dr. H. V. Dicks, professor of psychiatry in the University of Leeds, will broadcast on German Character Structure in the Third Programme at 6 P.M. on Whit Monday.

Short-wave Congress

An international short-wave congress will be held in Amsterdam from July 19 to 24, 1948. Further information may be had from the secretary's office, Weteringschans 73, Amsterdam.

Anæsthetic Appointments

Dr. E. A. Pask has lately taken up his appointment as director of anæsthetics at the University of Durham. Dr. W. W. Mushin has been appointed to the post of director of the department of anæsthetics in the University of Wales, and he will begin work at Cardiff in July. Both have been assistants in the Nuffield department of anæsthetics at Oxford.

British Association of Urological Surgeons

The annual meeting of the association will be held in Glasgow on June 13 and 14 at the hall of the Royal Faculty of Physicians and Surgeons, 242, Vincent Street. There will be a discussion on tumours of the bladder, and short papers will be read by Mr. Hugh Donovan, Mr. W. M. Borthwick, Mr. W. S. Mack, Dr. H. H. Pinkerton, and Mr. Hamilton Bailey. Films will also be shown by Mr. T. J. Millin, Mr. David Band, Mr. T. L. Chapman, and Mr. E. W. Riches, and there will be operating sessions at the Western Infirmary, the Royal Infirmary, the Victoria Infirmary, and the Royal Cancer Hospital.

Lebanon Hospital for Mental Diseases

Dr. R. B. Robertson has been appointed medical superintendent of the Lebanon Hospital at Asfuriyeh at Beirut

Dr. Robertson, who is 33 years of age, graduated M.B. at the University of St. Andrews in 1935, and in the following year went to Ethiopia, where he worked throughout the Italo-Abyssinian war as second-in-command and surgical specialist of the British Red Cross ambulance unit. Later he joined the R.A.M.C. and served in India and Palestine. At the outbreak of war he became second-in-command of a field ambulance in the Western Desert, and was mentioned in despatches. After two years as D.A.D.M.S. at Cairo headquarters, in 1943 he was appointed O.C. a field dressing-station which he took to Tripoli and Italy. In Italy he was again mentioned in despatches, and he was appointed M.B.E. in 1944. For the past two years Dr. Robertson has been assistant medical officer at the East Sussex Mental Hospital.

Tribute to Dr. George Buchan

On his retirement after 35 years as M.O.H. for Willesden, Dr. George Buchan has been made an honorary fellow of the Society of Medical Officers of Health, and with Mrs. Buchan and his daughter he was entertained to luncheon on May 16.

Sir Allen Daley, the president, said that nobody had done more for the society; its mainstay for nearly 40 years, he had been very largely responsible for its growth in numbers, prestige, and financial stability. "But today," said Sir Allen, "we pay tribute to George our friend and companion who holds a lasting place in our affections." Dr. James Fenton said that Dr. Buchan had at all times sacrificed himself and his leisure for the public-health services, and had left his mark on public health. Sir George Elliston spoke as the former secretary who had borne the brunt of his untiring energy, and Dr. Frank Gray described him as "a champion of the depressed classes" who had done much to bind important sections of the profession together. Sir Wilson Jameson declared that "George Buchan has never undertaken to do anything that he didn't do well, and that he didn't do in the time he said." He left Willesden having established a set of personal health services which were the envy of the rest of the country.

In reply, Dr. Buchan said that throughout his career in public health he had believed in the value of the work—though good work was slow work and its recognition was likewise slow. The M.O.H., he thought, ought ideally to have the following qualities: he should be a man of the world and cultivate knowledge, sympathy, and understanding; he should be a faithful servant of his local authority; he should have a sense of fairness to his profession; he should not try to be all things to all men; he must learn how to handle his staff politely but firmly; and before pursuing any proposition he must assure himself of its soundness. The question of the future of public health was difficult to answer but it behoved everyone to make the best of the National Health Service Act, and there was no reason why we should not ultimately have the best health service of any nation.

Appointments

ANDERSON, D. E. W., M.R.C.S., D.P.M.: first asst. M.O., St. Lawrence's Hospital, Caterham.
BROWN, ALEXANDER, M.B., D.P.H.: asst. M.O.H., Walsall.
CHITTY, E. C., M.C., M.B. Aberd., F.R.C.S.E.: senior resident surgeon, St. Stephen's Hospital, L.C.C.
DOBSON, S. C., B.M. Oxfd: asst. pathologist, St. Mary Abbots group laboratory, L.C.C.
ELLIOTT, C. C., M.D.: asst. school M.O., Cornwall.
FERGUSON, MALCOLM, M.B. Durh., D.O.M.S.: ophthalmologist, Sheffield Education Committee.
GREEN, R. D., M.D. Lond., M.R.C.P.: deputy medical superintendent, Paddington Hospital.
HOLLINGSWORTH, GEOFFREY, M.B. Edin., D.R.C.O.G., D.M.R.: radiodiagnostician, Northampton General Hospital.
KITCAT, C. DE W., M.R.C.S.: chief county tuberculosis officer, Somerset.
MOHUN, A. F., M.B. Lond.: asst. pathologist, Archway group laboratory, L.C.C.
PECKAR, V. G., M.B. Lond.: radiodiagnostician, Lambeth Hospital, and St. Charles' Hospital, L.C.C.
PONIEDEL, CLARENCE, M.B. Leeds: clinical tuberculosis officer, Leeds.
ROSS, G. M., M.B. Edin., D.M.R.: asst. radiodiagnostician, Hammersmith Hospital.
SHARKEY, JOSEPH, M.D. N.U.I.: deputy medical superintende Northern Hospital, L.C.C.
STALLWORTHY, K. R., M.B. N.Z., D.P.M.: asst. physician, St. Jan Hospital, Portsmouth.
THOMAS, R. G., M.B. Lond., F.R.C.S.E.: deputy medical superint dent, Queen Mary's Hospital for Children, Carshalton.
THROWER, A. L., M.B. Lond.: asst. M.O., school health servi L.C.C.
WEIL-MALHERBE, H., M.D. Heidelberg, D.SC. Durh.: director research, Runwell Hospital, Wickford, Essex.
WILLIAMS, D. I., M.B. Lond., M.R.C.P.: asst. physician, skin depa ment, King's College Hospital, London.

Royal Liverpool Children's Hospital:

HALL, MURIEL, M.D. Lpool: medical psychologist.
HAY, JANNETT, M.D. Lpool: dermatologist.

Kingston-upon-Hull Health Department:

CAMPBELL, M. S., M.B. Lond., F.R.C.S.E.: senior chief asst. surgery, Beverley Road Hospital.
COATES, J. C., M.B. Leeds, F.R.C.S.: senior chief asst. in surge Anlaby Road Hospital.
GROVES, CHARLES, M.B. Edin.: senior chief asst. in medici Anlaby Road Hospital.

Colonial Medical Service:

ADAMSON, P. B., M.B. Lond.: M.O. (pathologist), Briti Somaliland.
ALDERDICE, A. A., M.B. Sydney, M.R.C.P.: M.O., grade A (phy cian), Trinidad.
ALLERHAND, MAKSYMILIAN, M.D. Lwow: M.O., St. Lucia, Win ward Islands.
BYRNE, A. A., M.C., L.R.C.P.I.: health officer, Malaya.
CAMPBELL, N. G. D., B.M. Oxfd: M.O., Sierra Leone.
DOMAINGUE, F. G., M.B. Lond.: M.O., Mauritius.
GILMORE, T. J., M.R.C.S.: M.O., Falkland Islands.
HUDD, H. R., M.B. Wales: M.O., Tanganyika.
HUDSON, E. G., M.R.C.S.: M.O., anæsthetist, Malaya.
MCCLELLAND, R. S., M.B. Belf.: M.O., Northern Rhodesia.
ROCHESTER, W. R., M.B. Durh.: M.O., Sierra Leone.
WYLIE, H. W., M.B. Manc.: M.O., North Borneo.

Births, Marriages, and Deaths

BIRTHS

BURN.—On April 14, at Cleethorpes, the wife of Dr. J. K. Burn—a son.
CRAIG.—On April 1, the wife of Dr. N. S. Craig—twins (daught and son).
DAY.—On May 6, in London, the wife of Dr. F. M. Day—a daught
FRASER.—On May 15, in London, the wife of Mr. Donald Fras F.R.C.S.—a son.
HALL.—On May 16, at Sutton, Surrey, the wife of Dr. G. F. Hall—a son.
JENKS.—On May 9, in London, the wife of Dr. M. O. Jenks— daughter.
LONGRIDGE.—On May 14, at Exeter, the wife of Mr. Davi Longridge, F.R.C.S.E.—a son.
MACMANUS.—On May 14, the wife of Dr. Niall MacManus—a so
MILLER.—On May 15, at Godalming, the wife of Major J. E. Mille M.C., R.A.M.C.—a son.
REYNARD.—On May 9, at Oxford, the wife of Dr. W. A. B. Reyna —a son.
ROSSITER.—On April 17, at London, Canada, to Dr. Helen an Prof. R. J. Rossiter—a son.
SMITH.—On May 12, at Glasgow, the wife of Dr. John Smith—a so
TALLACK.—On May 5, at Zanzibar, the wife of Dr. R. J. K. Tallac —a daughter.

MARRIAGES

CHASE—PITCHFORTH.—On May 17, at Powerstock, Anthony Chase, M.B., to Jean Pitchforth, S.R.N.
CROOK—BATTEN.—On May 8, in London, Anthony Crook, M.C., major R.A.M.C., to Frances Eleanor Daphne Batten.
STANLEY—GENDLE.—On May 15, at Exeter, Ernest Gerald Stanley, F.R.C.S., to Dorothy Gendle.

DEATHS

HOPKINS.—On May 16, at Cambridge, Sir Frederick Gowland Hopkins, O.M., F.R.C.P., F.R.S., aged 85.
PEARSON.—On May 13, Charles Yelverton Pearson, M.D. N.U.I., F.R.C.S., aged 80.

GROUP TECHNIQUES IN A TRANSITIONAL COMMUNITY

A. T. M. Wilson
M.D. Glasg.
LATE LIEUT.-COLONEL R.A.M.C.

Martin Doyle
M.R.C.S.
LATE MAJOR R.A.M.C.

John Kelnar
M.R.C.S.
LATE LIEUT.-COLONEL R.A.M.C.

Late in 1941 people with special experience began to draw attention to the problems of repatriated prisoners-of-war, who then numbered over 100,000. In 1942 repatriated medical officers began to express views on this matter. Particular interest was aroused by an article by Philip Newman (1944) on his own experience before and after repatriation.

The problems presented by return from Stalag and Oflag emerged within the Army in the ordinary run of everyday work, first, as a result of the high invaliding-rate among repatriated officers who had been back to duty for some months, and secondly, through disciplinary difficulties encountered in repatriated soldiers with previously outstanding military records.

Evolution of Civil Resettlement

(A. T. M. W.)

In 1942, as a first technical step, groups of repatriates were seen by Army psychiatrists on repatriation and 3–6 months after their return to service in this country. In 1943 considerable light was thrown on the deeper psychological background by Major W. R. Bion, R.A.M.C., attached to a special unit set up to offer advice to repatriated officers on military re-employment and retraining. At this time, too, an experimental scheme for the reorientation of repatriated medical personnel was designed by psychiatrists and implemented under medical control. Some time later authority was given for the formation of a small pilot unit which would concentrate exclusively on the resettlement of repatriates leaving the Army for civil life. Finally a Civil Resettlement Planning Headquarters was set up in April, 1945, and by January, 1946, it had become an executive body with twenty regional civil resettlement units (C.R.U.), each capable of taking some 250 repatriated prisoners-of-war for a period varying from a few days to three months, and averaging between four and five weeks (Wilson 1946).

The repatriated officers and men who attend these C.R.U.'s do so as volunteers, and the numbers in which they have volunteered have exceeded what was anticipated. It is not easy to explain this on any other basis than the reality of the repatriate's psychological need. The satisfaction of this need was made possible by the fact that, from the beginning, the problems were elucidated by the help of repatriates, particularly former men of confidence. As an important matter of policy, repatriates have participated throughout in studying their problems, devising methods to deal with them, and running the initial pilot and working units. Without this full participation, from the beginning, of the repatriates themselves, it would have been impossible for these men to overcome a suspicion of the Army and its intentions, which, in soldiers, is partly of historical origin and partly the result of expatriation. In men who have been prisoners-of-war there is an additional difficulty arising from the attitude towards authority forced on them by their exile in the prison camp.

Though men who have been prisoners-of-war may have difficulties resulting from their special experience, their problems show little essential difference from those of other repatriated Servicemen. Expatriation over eighteen months is, by itself, an extremely trying affair, and often a traumatic experience. The significance of this particular period of time was demonstrated by some work done by Major S. Truelove and Major R. Bennett in assessing differential morbidity and other rates in troops overseas, particularly in relation to malaria, venereal disease, and other disorders in which morale played a large part. Expatriation for that period produces acute problems of isolation and frustration, and of mistrust and longing in relation to the home community; against these feelings, expatriates of necessity develop defensive frames of mind.

For these reasons, return home, the need for remaking social relations, and particularly the reintegration of the war-time split family, make severe demands not only on the returning father but also on his wife and children, who have complementary problems of their own. Resettlement therefore involves mutual adjustments between the home community and the returning Service groups.

The steps by which the problem of resettlement emerged and was tackled within the Army were as follows:

(1) Repatriation of prisoners-of-war provided both within and without the Army a problem which was anticipated but not fully allowed for because of the widespread double-edged attitude towards these men.

(2) The problem could not be solved by the capacity for readaptation of the repatriates. Nor could it be solved by the usual medical or administrative actions. It was therefore referred for specialist psychiatric consideration.

(3) Within the field of military psychiatry and psychology fuller diagnosis of the problem was undertaken.

(4) This finally led, still under technical control, to the formation of a pilot therapeutic unit, which provided basic data for the planning staff for a larger organisation.

(5) Control of this organisation reverted to non-technical military authorities, who were, however, advised by psychiatrists and psychologists.

Thus the problem was originally non-medical; it was next referred to psychiatrists, and finally the treatment was carried out by non-specialist personnel under specialist advice. This situation is reflected in group therapy, where an emotional problem is raised in, and discussed by, the group as far as possible, and is then interpreted by a psychiatric group member and returned to the group for further working out and assimilation.

CIVIL RESETTLEMENT UNITS

The *staff* of the civil resettlement organisation was specially selected—as far as possible by technical methods—since the C.R.U. must necessarily work by methods which impose a severe strain on the authoritarian. The best education for the staff was to meet repatriates and discuss their problems with them. The units were formed by budding from the initial pilot unit, and so achieved some integration of policy and method. In setting up a new unit it was necessary to make certain that relations with the neighbouring civilian community were established in such a way that the unit was regarded as an organ of the community as well as of the Army. This was achieved on a basis of sociological planning and not merely through good will.

The staff of the C.R.U. consists, on the one hand, of a central coordinating group, a commanding officer, a second-in-command, and so on, and, on the other, of officers who are case workers. The latter group consists, first, of four syndicate officers, selected regimental officers, each of whom acts as a parent to some sixty men, of whom fifteen arrive each week from a total weekly intake of sixty. Secondly, the C.R.U. has five specialist officers: a vocational officer (with a staff of vocational N.C.O.'s), a Ministry of Labour liaison officer, more recently a Red Cross liaison officer, a professional woman social worker, a technical officer in charge of workshops, and one or, in some cases, two medical officers. It has not been possible to provide all the units with resident psychiatrists.

Atmosphere.—A C.R.U. is a mixed community where more than half the permanent staff members are A.T.S. The atmosphere is designed to encourage initiative, spontaneity, and the ventilation of personal problems,

would supplant the democratic atmosphere essential to the scheme. The recognition by the neurotic element of the effect they were producing on the rest of the community solved the immediate social problem. Their altered attitude and behaviour became reflected in the unit as a whole, which was now not only tolerant of the "bad boys" but also took up a rather protective attitude, removing them from public places if drunk and likely to become a nuisance, and so shielding them and the unit as a whole from the outside world.

Practically no further difficulty was experienced in disciplinary matters after this showdown; nor has one arisen later with similar intensity at any of the other C.R.U.'s subsequently opened. The solution of this single "psychiatric event" was important not only for the community but also for the growth of the whole scheme. So far as the psychiatrist was concerned, it brought him full community status, and his functional rôle became fully established; his services were sought as a valued aid to resettlement instead of being the last resort of a desperate authority. He emerged from his confinement into the general life of the community, taking a natural part in interviewing, discussion groups, or the highly important casual contacts that took place in the N.A.A.F.I., bar, grounds, or corridors, or at the dances. The staff conferences and informal discussions provided a rich channel of communication with the administration and other specialists.

The increasing rate of the demand for psychiatric help is shown by the following figures: during the first month about 5% of the repatriates were seen, all referred through a medical or other officer; whereas in the third and fourth months some 60% were spontaneously seeking advice.

Psychiatric Methods in a C.R.U.

(J. K.)

It is my practice to make contact with every repatriate within a week of his arrival by meeting each syndicate group of fifteen for an introductory group discussion. At this discussion—in contrast to those which I shall describe later—I suggest the theme to be discussed. My favourite questions are, "What do you think resettlement is for?" and "If you were provided with a building and equipment for a C.R.U., how would you plan it and run it, and what would you put into it to help you in your resettlement?" I find this discussion instructive in indicating what problems of resettlement are uppermost in the mind of the repatriate, in that what he puts or asks for in a C.R.U. naturally points to his needs. In other words, this discussion can be used for group diagnosis or screening, which becomes, in psychological terms, a *social projection technique* simultaneously diagnostic and therapeutic; and it is well worth while, in observing and listening to such a discussion, to attempt to forecast which men will, in all likelihood, require further psychological help at a later stage.

After a month at the C.R.U., spent in "establishing my practice," I found that I was seeing, in my psychiatric capacity, about 15% of the intake of other ranks, and about 25% of the officer intake, figures which remained fairly constant for a period, but recently have been rising again considerably. Of the other ranks two-thirds are referred from other members of the staff (medical officer, vocational officer, social worker, and syndicate officer) and about a third come spontaneously. Officers invariably come spontaneously. This relatively large and increasing proportion of both men and officers who come spontaneously is significant. It indicates that, in the C.R.U., a psychiatrist is certainly not a frightening object but a benevolent figure who will understand the mental suffering of which one is perhaps a little ashamed. It indicates also that a considerable proportion of repatriates have insight into the psychological nature of their resettlement difficulties.

PERSONAL INTERVIEWS

Every man who comes to the psychiatrist is seen individually at least once or twice to enable the psychiatrist to get a general picture of the man's background, besides the story of his particular needs. At these individual interviews I usually explain briefly the nature of the man's symptoms and assign him to a group, unless he makes it clear that he will talk only privately, in itself often a significant diagnostic pointer. Unless a man is seen individually at first he may not be ready to accept the idea of being treated in a group, and the personal interview has the inestimable value that the repatriate is made to feel that side by side with the requirements of group therapy his individuality is being respected. No matter how many individual interviews the psychiatrist may previously have had with the repatriate, the subsequent group situation will invariably show up aspects of the case which are new and may even prove to be its most significant features.

GROUP DISCUSSIONS

As regards both the underlying psychological problems involved in resettlement and the general setting of the C.R.U., group therapeutic discussion is the psychiatric method of preference. I have found the optimal number for a group to be from eight to ten men, and that the only important factor to be borne in mind in the selection of its members is to avoid too great a scatter of intelligence levels; otherwise men of low intelligence tend to be browbeaten by the more intelligent members and thereby discouraged from attending. Nowadays three therapeutic group discussions—besides the screening—are held each week, each lasting about $1^1/_2$ hours, and themes being invariably selected by the group.

So far as the psychiatrist is concerned, the principles of the analytic approach are used throughout; the men are told that they can bring up anything they wish, that they need not stick to any particular subject, and that they should continue expressing any theme which comes up in their minds. Sometimes it is explained how this helps them see the nature of their difficulties better, but just as often the group can be left to discover this for itself. Once the discussion is in full swing, it is best for the psychiatrist to recede somewhat into the background, to observe the nature of the interpersonal relationships and to note intragroup tensions which appear. But this is not to say that the psychiatrist removes himself from the picture; on the contrary, he is a *member*, as well as being an observer, of the group, and must choose the right moment to penetrate below the surface, take the unconscious dynamics of the group situation into account, and bring them to light in the interpretations he offers. In this way the group is brought up against its own resistances and defences and makes its difficulties manifest and conscious.

Nothing brings out the real difficulties which repatriates face in their resettlement so well as the material they offer in group discussion. No matter what clinical symptom brings a repatriate for consultation—nervousness, insomnia, or inability to mix with people—such symptoms are but the manifest signs of basic psychological difficulties related to "resocialisation." It is instructive to hear a man, who during the individual interview had complained of irritability or depression, express in the group a most vehement anger and mistrust of authority, and a cynicism and bitterness about life as he has found it since his return. Underlying the repatriate's symptoms is the complaint that the world to which he has come back is hostile and violent, where little that is done is genuine or sincere. He feels that his world has let him down, and that his sense of confidence and security has been undermined. His defence against consequent feelings of guilt and frustration is an embittered withdrawal from social relationships, which we see as apathy and depression.

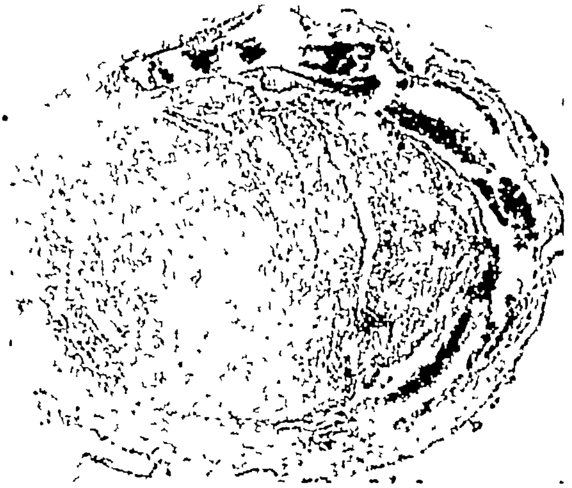


Fig. 3—Left middle cerebral artery; abscess in muscular coat and infected thrombus (case 3).

Destruction of muscular coat and abscess formation in three-quarters of its circumference (fig. 3). Elastic membrane stretched and torn in area corresponding to infiltration of muscular layer, and endothelial lining absent. Lumen of artery obliterated by fibrin clot except a small area corresponding to better-preserved part of wall of artery.

. Intense polymorph round-cell infiltration with partly degenerated cells in region of thrombus attached to diseased wall of artery; round-cell infiltration decreased markedly towards centre of thrombus.

Right middle cerebral artery showed thrombosis in a stage of advanced recanalisation at level of bifurcation of artery and extending into ramus horizontalis posterior. Muscular layer of ramus horizontalis very thin and completely defective in a circumscript area. Moderate round-cell infiltration of muscular layer (fig. 4).

Summary of Histological Findings.—The site of the infection of cerebral arteries in all 3 cases was the fork of branching vessels or its immediate neighbourhood. The anterior cerebral artery was involved once, the middle cerebral artery three times (fig. 5). Inflammation was greatest in the muscular coat amounting to abscess formation. There was incipient cylindrical aneurysm and impending or early rupture. The occlusion of infected arteries was due to thrombosis. The histological picture indicated a highly acute infective process in 2 cases and a subacute to chronic inflammation in the third case. The possibility of recanalisation of an infected thrombus situated in a cerebral artery was illustrated by the third case. Evidence of systemic arterial disease was absent in all three cases.

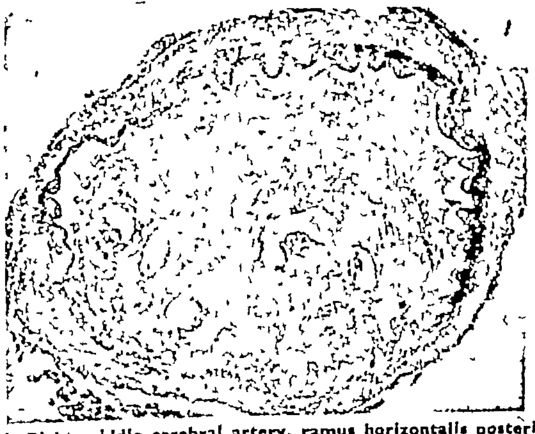


Fig. 4—Right middle cerebral artery, ramus horizontalis posterior; defect and thinning of muscular layer and recanalised thrombus case 3).

DISCUSSION

The site of the arterial lesions and the absence of systemic involvement of arteries indicated embolic infective particles as the cause of the thrombosis. For that reason and because of the prominent involvement of the media layer and practically normal adventitial layer it was thought that periarteritis nodosa could be excluded.

There was no evidence of a compact embolus occluding the infected arteries, the final obstruction being due to secondary thrombosis; this was especially well seen in case 3. It was thought that the arterial emboli were of minute dimensions, in themselves unable to occlude the arteries involved.

The usual sources of infective emboli in cerebral arteries, infective endocarditis, suppurative lung lesions, and lesions of the systemic circulation in the presence of a patent foramen ovale were not found. It was concluded that the infective material must have passed the capillary filter of the lung. Probable primary foci have been recorded in 2 of these cases—chronic tonsillitis and chronic otitis media. It remains a matter of speculation to decide if the original emboli were purely bacterial, suggesting a low-grade septicæmia or pyæmia; minute particles from an infective thrombus in the systemic circulation; or an intermediate capillary thrombus in the lung. The site of the embolic lesions suggests that the embolus was of microscopical size in two dimensions but possibly filiform.

In 3 out of 7 cases of cerebral softening in young adults, the cause has been shown to be embolism of cerebral arteries by infective particles from the distal systemic circulation in the absence of a patent foramen ovale. On this evidence it seems probable that this mechanism, usually regarded as exceptional, is responsible for a considerable percentage of cases of cerebral softening in young adults.

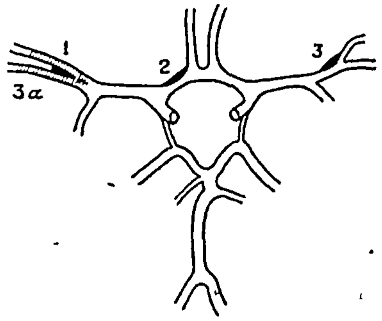


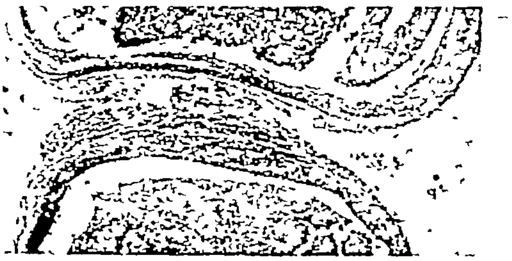
Fig. 5—Circle of Willis: black marks indicate sites of infection (cases 1, 2, and 3); shaded area 3a indicates site of recanalised thrombus (case 3).

The explanation of embolism of cerebral arteries through a patent foramen ovale has to overcome the difficulty of explaining how the embolic particle passes from the low-pressured right atrium into the high-pressured left atrium. One might consider that some of the cases of so-called paradoxical embolism in the presence of a patent but not dehiscent foramen ovale are due to the same mechanism as the cases described here.

One might also consider the possibility that certain "congenital" aneurysms of cerebral arteries are of infective origin, an interpretation suggested by Cushing. In our series 1 case of aneurysm was observed, but unfortunately the aneurysm was not examined histologically. The aneurysm, as big as a pea, was situated at the branching of the ramus corporis callosi from the trunk of the anterior cerebral artery; the aneurysm was thrombosed, but there was no thrombosis of the artery itself, and multiple embolic foci were found in the cerebral cortex and in the genu corporis callosi, finally producing a communication of the lateral ventricle with the subarachnoidal space.

It is of interest that the fatal stroke took place only when the thrombosis of the trunk of the middle cerebral artery had occluded the rami perforantes. The right-

Immediately proximal to branching of artery into truncus mmunis and ramus horizontalis posterior, polymorphs, rtly degenerated, appeared in centre of thrombus. At el of fork of branching arteries much polymorph round-l infiltration was seen in fork and spreading along circum-ence of arteries (fig. 1). Round-cell infiltration had its eatest intensity in muscular layer, with extensive destruc-n of muscle bundles and formation of minute abscesses. timal layer of fork and of branching arteries showed loss f endothelial lining; internal elastic layer was stretched and rn; both arteries showed signs of impending rupture.



g. 1—Fork of right middle cerebral artery; polymorph round-cell infiltration of media and destruction of muscular coat (case 1).

Examination of brain at various levels showed no other idence of vascular disease.

Case 2.—A sweeper, aged 20, was found lying unconscious ı his billet and brought to hospital on April 2, 1945. The llowing history was given by his room-mate. Patient had omplained of abdominal pain after dinner, vomited twice, and assed three stools up to midnight. *At midnight, trying to* o to the lavatory, he had fallen from his cot. After that he ad been peculiar and unable to answer questions.

On admission 13 hours later patient showed a typical left emiplegia with involvement of face. There was no evidence f head injury. He could answer questions and asked for ater. Pupils equal and reacted to light, though sluggishly. Limbs of left side flaccid; blood-pressure 108/70.

Three hours later patient was improving and showed more nterest in his surroundings. He had no fever, and his pulse as good. Total white-cell count was 18,000 (polymorphs 5%, lymphocytes 18%, monocytes 7%). Blood films egative for malarial parasites.

April 3: Patient's condition was worse in the morning, nd he became unconscious; right pupil dilated and fixed, eft pupil of normal size and reacting to light. Right plantar eflex *extensor; right ankle clonus.*

Lumbar puncture: 8 c.cm. of fluid, clear and under slightly ncreased pressure, was removed. Cells and protein normal. lbumin in urine.

April 4: Patient's condition deteriorated. Temperature 101·8°F, pulse-rate 150, respirations 36 per min. Right plantar reflex absent; no clonus on right side. Blood-pressure 126/84. Left hemiplegia present as before. Coma deepened, and patient died on April 5, at 3 A.M.

Necropsy (six hours after death): The body was that of a young Indian male; turgor somewhat reduced; rigor mortis present.

Skull: Dura mater tense; middle-ear cavities normal; venous sinuses patent.

Brain and meninges: Hyperæmic congestion of meningeal veins of right hemisphere; gyri of right hemisphere flattened; moderate right-sided tentorial pressure cone. Extensive red thrombosis of trunks of right middle cerebral and right anterior cerebral arteries.

Frontal sections of brain showed œdematous swelling of he right hemisphere and early softening in white matter of the frontoparietal lobe and of temporal pole. Right half of circle of Willis and left posterior cerebral artery normal.

Microscopically, right middle cerebral artery greatly distended, with lumen obstructed by red thrombosis; no evidence of atherosclerosis, syphilis, or mycotic arteritis. Right anterior cerebral artery showed at level of origin from internal carotid artery, circumscript polymorph round-cell infiltration of muscular coat, with complete destruction of muscle bundles, intimal layer showed loss of endothelial cells; elastic membrane stretched and torn (fig. 2). The artery was greatly distended and lumen obstructed by predominantly red thrombus formation. Partly degenerated polymorphonuclear round cells seen in thrombus and prominent opposite infected area of wall of artery. Sections of the artery distal to this level showed severe dilatation and obstruction of lumen by red thrombosis. Sections of the brain taken at various levels showed no evidence of vascular disease.

Other organs: Left *tonsil* enlarged, with retention cysts (a smear from one of the cysts showed degenerating leucocytes and streptococci in short chains). *Lungs* showed scattered areas of atelectasis and localised adhesions over left upper lobe. *Heart* of normal size and consistence; no evidence of valvular disease. Foramen ovale and septum membranaceum closed. Aorta and coronary arteries normal.

No gross pathological changes were seen in abdominal cavity; spleen of normal size and consistence. Slight dystopia of the left kidney pelvis, with scanty ecchymosis in mucosa. No evidence of thrombosis of hæmorrhoidal veins.

Case 3.—A sepoy, aged 20, had had a fit at the railway station and been brought to hospital on June 11, 1945. He gave a history of suppuration of one ear for a year. He had also had occasional "fits" for a year. Patient became unconscious soon after admission.

Blood films were negative for malarial parasites. First mepacrine was given *intramuscularly and quinine intravenously.* Patient remained unconscious and had frequent convulsive attacks.

White count was 18,000 cells per c.mm. Lumbar puncture was done and 8 cells were found in cerebrospinal fluid. Routine examination of urine gave negative results. Patient then received 'Soluseptasine.'

June 13: Temperature 104°F (previously 107°F), pulse-rate 145, respirations 36 per min. Left tympanic membrane was perforated, and fluid was visible in middle-ear cavity. Dullness with diminished breath sounds at left base. Left pupil pin-point, right $^1/_4$ in., pupils fixed. Reflexes and tone in left arm normal. Right arm could not be examined owing to intravenous drip. Abdominal reflexes absent. Tone of right leg increased. Knee-jerks absent, ankle-jerks present. Plantar reflexes extensor. Patient died during a second lumbar puncture.

Necropsy: Inflammatory œdema and consolidation of left lung; trachea filled with froth; heart flabby but no evidence of valvular disease; foramen ovale closed; aorta and coronary arteries normal. Meninges congested; no evidence of thrombosis of venous sinuses.

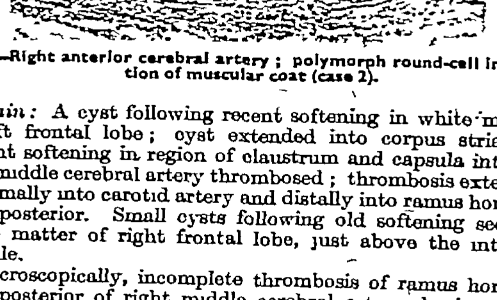


Fig. 2—Right anterior cerebral artery; polymorph round-cell infiltration of muscular coat (case 2).

Brain: A cyst following recent softening in white matter of left frontal lobe; cyst extended into corpus striatum. Recent softening in region of claustrum and capsula interna. Left middle cerebral artery thrombosed; thrombosis extended proximally into carotid artery and distally into ramus horizontalis posterior. Small cysts following old softening seen in white matter of right frontal lobe, just above the internal capsule.

Macroscopically, incomplete thrombosis of ramus horizontalis posterior of right middle cerebral artery, beginning at bifurcation of trunks of right middle cerebral artery.

Microscopically, sections of left frontal lobe showed multiple small foci of cortical and deep softening; softening incomplete, with large gitter cells between better-preserved structures. Numerous calcified nerve-cells in areas near to cortical softening and in places of actual softening. Occipital cortex showed no evidence of vascular disease or thrombosis.

Left middle cerebral artery showed red thrombosis of trunk. Severe mycotic arteritis immediately proximal to bifurcation into truncus communis and ramus horizontalis posterior

SCHEME OF DOSAGE WITH SULPHONAMIDES

—	No. of 0·5 g. tablets				
	1st day	2nd day	3rd day	4th day	5th day
Adults	6, 4, 4, 2	3, 3, 3	2, 2, 2	2, 2, 2	2, 2, 2
Severe cases ..	6, 6, 4, 2	4, 4, 4	3, 3, 3	2, 2, 2	2, 2, 2
Children :					
10–12 yr. ..	4, 2, 2, 1	2, 2, 2	2, 2	2, 2	2, 2
6– 8 yr. ..	3, 2, 1, 1	2, 2	1, 1, 1	1, 1, 1	1, 1
3– 4 yr. ..	2, 1, 1, ½	1, 1, 1	1, 1	1, ½, ½	..
1½–2 yr. ..	1, 1, ½, ½	1, ½, ½	½, ½, ½	½, ½, ½	..
1 yr. ..	1, ½, ¼, ¼	½, ¼, ¼	¼, ¼, ¼	¼, ¼, ¼	..
3 months ..	¼, ¼, ¼, ¼	¼, ¼, ¼	¼, ¼	¼, ¼	..

No known ill effects were experienced from this intensive initial therapy, except that 2 babies died about seven days afterwards from complete digestive failure, passing undigested stools. There were 4 other known cases of this digestive derangement, which may be due to sulphanilamide poisoning. These infants were invariably under a year old, and the history in each case was of passing undigested milk stools for about a week after treatment ceased, until death supervened. Loss of weight, in the cases noted, was rapid.

Only sulphanilamide (sometimes as 'Streptocide') and sulphapyridine were used in this series. Of these, sulphanilamide is definitely the drug of choice and was used in over 75% of the cases treated. This drug gives a better response, is better tolerated, and has the highest cure-rate. Sulphapyridine sometimes left the patient rather weak and mentally depressed for a few days.

No cases of suppression or of hæmaturia were seen in the 600 hospital cases, or reported from the treatment camps. (There was 1 possible case of suppression of urine in the previous epidemic of 850 cases.)

Sulphanilamide as a rule restored the temperature to normal within 24 hours. With sulphapyridine this was not usually accomplished before 24–30 hours.

Sulphathiazole was used only in 1 severe case in which the infection did not respond to sulphanilamide or sulphapyridine. In all, 54 g. of these three sulphonamide compounds was given *in six days. Sulphathiazole rapidly reduced the pyrexia,* and after a long convalescence the only sequelæ were a mild ptosis of one eyelid and a small corneal opacity following a corneal ulcer which developed during the acute stage.

SOME COMPLICATING FACTORS

The bulk of cases were in the age-group 1–25. Two patients aged about 60 both died. Those who developed a squint or ptosis usually did not die.

Paralysis of the soft palate and fauces was fairly common and usually of very early onset. In such cases the drug was given by intramuscular injection (sulphapyridine soluble, 1–2 g., repeated as necessary, or sulphanilamide, or sulphapyridine suspension, 3 g. in 10 c.cm. of sterile distilled water, repeated in three hours if necessary). Usually patients were sufficiently recovered within twelve hours to be able to swallow.

Herpes labialis was noted in about 5% of cases. A few cases were seen in which the herpes extended over the whole face.

In very severe cases an acidosis often developed within thirty-six hours of the onset; this was treated with mist. sod. bicarb. and glucose.

Of the 600 hospital patients 6 were admitted with the full signs and symptoms of meningitis but without fever. The following is a striking example:

Case 1.—A schoolboy, aged 15, was writing, and when he tried to look down from the blackboard to his paper he found that his neck was slightly stiff and painful. He had a headache. When seen 15 min. later his neck was as stiff as a board. His temperature was normal. Treatment was begun at once and within two hours his temperature rose to 99·8°F—not to 103–104°F as with the normal *febrile* admission. The neck rigidity lessened but was present for four days.

In many cases there was a residual stiff neck following five days' treatment, but this was not an adverse sign *if the temperature was normal,* for the neck rigidity cleared within a few days without further treatment.

Patients with a concomitant disease—e.g., trypanosomiasis, advanced yaws, and tuberculosis—did not resist the disease well. Abortion was fairly common in pregnant women, and the mortality among them was high.

In the few cases in which lumbar puncture was done soon after the start of treatment the cerebrospinal fluid (C.S.F.) contained numerous polymorphs but no organisms. The shortest period between the start of treatment and lumbar puncture was three hours.

SEQUELÆ

The following sequelæ were seen

600 Hospital cases

Bilateral effusion in knee-joints	1	
Unilateral effusion in knee-joints	4	
,, ,, elbow-joints	1	
Spastic paraplegia	1	
Mild dementia a month later (recovered)	1	
Infant deaths from intestinal disorder (a week later)	2	
Reinfection	3	
Total	13	(1·17%)

Isolation camps

Bilateral effusion in knee-joints	2
Paralysis of left arm	1
Paralysis of right leg	1
Deafness and dumbness (one subsequently died) ..	2
Hydrocephalus, 18 months child (3 months after discharge)	1
Infant deaths from intestinal disorder (a week later)	4
Reinfection	1
Relapse	1

(Incomplete)

B. B. Waddy, who has since trekked in part of the area *involved, believes that the incidence of residual* intracranial lesions, from persistent headache to severe paraplegia, is in the region of 1%.

SECOND ATTACKS

Of the 6 cases described below no. 2 is regarded as a relapse, while it is thought that the other 5 suffered from cerebrospinal fever. Pneumococcal meningitis is a possibility; but in view of the intensity of infection by the meningococcus in the area, and the subsequent fairly good response to treatment, it seems probable that the meningococcus was responsible on both occasions.

Case 2.—A girl, aged 3 years, developed meningitis and was treated in a bush camp for four days and discharged cured. She was readmitted six days later but died after the second dose of medicine.

Case 3.—A boy inpatient, aged 16, had almost recovered from a chronic osteomyelitis of tibia. He developed a meningitis of gradual onset, the neck rigidity developing suddenly on the third day. Treatment was commenced on the third day and continued for five days. He was perfectly well and up and about as soon as treatment was finished. Nine days after the completion of treatment he suddenly developed a second attack of meningitis. On this occasion he was severely ill and had to be treated with intramuscular preparations. He subsequently made a normal recovery.

Case 4.—A soldier, aged 10, was admitted with a meningitis of sudden onset. He was treated for six days. Pending the *grant of sick-leave* he remained in hospital and was perfectly well. Ten days after treatment ended he again developed a meningitis of sudden onset. He underwent lumbar puncture three hours after the administration of 3 g. of sulphanilamide, but the C.S.F., although packed with polymorphs, contained no organisms. He was dangerously ill for four days, though his temperature returned to normal on the third morning. He subsequently recovered.

Case 5.—A schoolboy, aged 6, was admitted with a meningitis of sudden onset. The temperature of 104°F returned to normal in less than twenty-four hours. He was treated for five days and returned to school. Twenty-three *days after* the completion of treatment he was readmitted ided occlusion of the ramus horizontalis posterior of the middle cerebral artery produced only minor foci of oftening. Comparison of our material with the cases f the Neurological Centre (British Troops), India Command, shows that out of 12 cases observed there were only 3 in the age-group below thirty-five years, and only 1 below thirty years. None of these were fatal. Non-fatal cases of cerebral occlusion in young Indian adults in the absence of syphilis are said to be common, but subacute bacterial endocarditis is rare in Indians. Only further examination of non-Indian cases will show if the mechanism of cerebral occlusion, described here as not uncommon in Indian troops, is of the same importance in other populations.

SUMMARY

Of 7 fatal cases of cerebral thrombosis in young Indian adults 3 were due to thrombosis of infected cerebral arteries.

Infective endocarditis, suppurative lung lesions, and a patent foramen ovale were absent from all 3 cases.

For this reason these cases were interpreted as instances of transpulmonary embolism of minute particles from foci in the systemic circulation.

It is thought that, contrary to the common belief, this mechanism is responsible for a considerable percentage of cases of cerebral occlusion in young Indian adults.

Its importance for populations other than Indian should be assessed by examination of further material.

I am indebted to the Director of Medical Services, India Command, for permission to publish; Brigadiers D. Denny-Brown, J. F. Fulton, H. K. Goadby, and D. McAlpine, Colonel J. E. Hall, and Lieut.-Colonels H. M. Garland, J. A. Manifold, and W. Aldren Turner for their interest in the work; Prof. Abdul Rahman for permission to use the photomicrographic equipment of the Osmania University, Hyderabad; and Sergeants Gould and Foster for the technical work in histology.

CEREBROSPINAL MENINGITIS IN THE GOLD COAST

A REVIEW OF 9864 CASES

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During the latter part of the last century there were major epidemics of cerebrospinal meningitis (C.S.M.) in the western province of the Northern Territories of the Gold Coast. These decimated the Lobi population year after year, until the disease died out about 1908. Any patient who survived was, as a result, often deaf, dumb, or permanently demented.

Epidemics of C.S.M. are likely to occur during the dry season, especially when the very dry dust-filled breeze of the *harmattan* blows southward from the Sahara about December and January. This dry atmosphere can cause chapping of the lips; respiratory infections are common. The nights are cold, and this causes the people to sleep indoors, and close together, in their ill-ventilated flat-roofed mud houses. Such conditions are ideal for an increase in the carrier-rate, and a subsequent epidemic.

Small epidemics restarted in this area in 1941, when there were 45 cases. The number rose to 140 in 1943 (with a case-mortality just over 30%) and 850 in 1944. In 1945 there were 9864 cases, with 1057 deaths: this gives a case-mortality of 10·7%, but 286 patients died untreated and in the treated cases it was 8·05%. The mortality figures suggest that in 1945 the virulence of the infection was mild; but this was not so.

In the 1944 epidemic of 850 cases the disease was of medium virulence, cases lasting, earlier on, for twelve hours untreated and, later on, for three or four days. The total case-mortality was 19·3%, against a mortality of 13·4% in the treated cases. Then the disease was new to the present generation. Treatment was usually continued for seven days, adults receiving sulphanilamide 3 g. daily.

In the 1945 epidemic the disease was of far greater virulence, most of the untreated patients dying two to six hours from the onset. A few patients survived up to forty-eight hours, but the mortality among these, although they were treated, was high. Included in our treated mortality figures are almost hopeless cases which received only one treatment, the patients dying within the next two hours.

Sporadic cases are normally expected about January or February, following the *harmattan*, and these may give rise to an epidemic about March, when the dry season, which lasts from September to May, is at its height. In the 1945 epidemic, following the 850 cases of the previous dry season, sporadic cases started as early as the middle of October, 1944; and these gave rise to the present epidemic, which started in earnest on Jan. 1, 1945.

It is well known locally that, with the onset of the rains in mid-April onwards, an epidemic of C.S.M. will slacken and die out. This happened in the 1945 epidemic, although sporadic cases extended further into the wet season than is usually expected. Sporadic cases restarted as early as September, instead of January or February.

The 1945 epidemic extended over approximately 10,000 sq. miles (cf. Wales 7470 sq. miles), and involved a scattered population of about 200,000. Communications and accessibility in the bush are difficult, especially when dealing with a rather primitive population, although Army jeeps greatly overcame these difficulties. As a result exact and scientific data are limited, since the primary concern of all staff involved, both civil and military, was to prevent the epidemic from spreading, and to treat such cases as occurred. Preventive and treatment staff directly concerned numbered 5 Europeans and just over 100 Africans. In view of the vast area to be covered, the number of cases, and the number of staff capable of scientific investigations, it must be appreciated that this article cannot contribute much to bacteriology but is mainly concerned with general observations.

TREATMENT AND ITS RESULTS

In view of the rapidity with which patients died, it was found necessary to increase massively the initial treatment, sulphanilamide or sulphapyridine 8–9 g. being administered during the first nine hours, as against 6 g. in twenty-four hours in the 1944 epidemic, as follows:

	Normal case	*Severe case*
Initial dosage	3 g.	3 g.
3 hours later	2 g.	3 g.
6 " "	2 g.	2 g.
9 " "	1 g.	1 g.
Total	8 g.	9 g.

When a patient was admitted to hospital or isolation camp during the day, this treatment was given with no further administrations until 6 A.M. next day. Subsequent treatment is indicated in the accompanying table. When a patient was admitted during the night, this nine hours' treatment was given, followed directly by the doses recorded in the table. There appears to be no difference in mortality with these two modifications of dosage.

If a severe adult case was sufficiently improved by the second day, it reverted to the normal course of treatment.

together by suture, owing to their friability, especially of the proximal torn fragment.

In these cases it has been the custom to introduce a catheter through the penis to the perineum, and another, via a suprapubic cystotomy, through the prostatic urethra to the perineum. One then cuts down on the perineum and secures the ends of these catheters; and so, by the "railroad" technique, draws the penile catheter up into the bladder, thus bridging the tissue intervening between the torn ends of the urethra, and relying on granulation and fibrous tissue to re-establish a passage between the two ends (fig. 2). It is clearly better, however, to approximate the separated ends of the urethra; and I have successfully accomplished this in three cases.

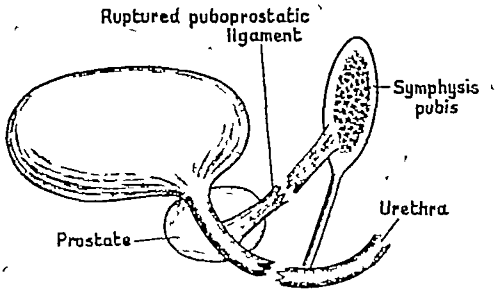

Fig. 1—Rupture of urethra close to prostate, with tearing of puboprostatic ligament and consequent backward displacement of bladder and prostate.

METHOD

A suprapubic cystotomy is performed, through which the bladder wall is inspected and its integrity verified, and a gum-elastic catheter is passed along the urethra from the bladder as far as it will go. With the catheter held in position by an assistant, the patient's legs are held up, and a Foley's catheter is passed down the penile urethra until it meets obstruction. Next, the perineum is opened by a midline incision on to the ends of the two catheters, and these are joined together with a stout silk or thread suture. The gum-elastic catheter is then withdrawn, drawing into the bladder behind it the Foley's catheter. No suture of the perineal wound is necessary, since the parts fall together naturally, and dependent drainage is allowed.

The bag of the Foley's catheter is now inflated with 20 c.cm. of water, and the suprapubic incision is sutured round a suprapubic tube inserted obliquely through the abdominal parietes, as recommended by Riches,[1] to encourage early closing of the suprapubic fistula after the tube is withdrawn, and to avoid osteomyelitis of the pubis, which is liable to develop (as in case 1) when the tube is in contact with that bone. The perivesical tissues are suitably drained if extravasation has taken place.

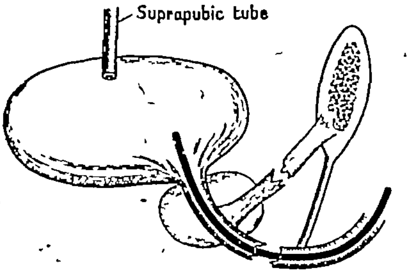

Fig. 2—Usual method of dealing with rupture of urethra, as in fig. 1, by inserting a catheter and relying on granulation tissue and fibrous tissue to bridge the gap.

The divided ends of the urethra are next brought together by applying a continuous traction of 2 lb. to the end of the Foley's catheter via a cord over a pulley at the end of the bed (fig. 3). After a fortnight the Foley's catheter is deflated and withdrawn, and a sound is immediately and very gently passed. This is an anxious moment, but in the cases in which I have done it it has proved perfectly simple.

Two or three days later, when the patient starts passing urine, the suprapubic tube is withdrawn, and the fistula is allowed to heal. Sounds are passed wee and then at longer intervals.

CASE-RECORDS

Case 1.—A man, aged 24, was admitted to hospital witl extraperitoneal rupture of the bladder and a dislocat backwards of the bladder and the prostate, with extravasat of urine. Suture of the bladder, *traction of the bladder,* drainage of the perivesical tissues were performed, and penile catheter was removed after fourteen days. Pass of urine per urethram started after two days, and the sup pubic tube was removed. The suprapubic fistula was hea after a further week, but a sinus down to bone persis owing to an osteomyelitis of the pubis, which required rat prolonged treatment. Six months later there was no evide of stricture.

Case 2.—A boy, aged 11, was admitted to hospital witl dislocation of the bladder and prostate backwards, with extravasation. Traction of the bladder was performed, a high suprapubic drainage established. After fourteen de the Foley's catheter was removed, and passage of uri through normal channels started three days later, when t suprapubic tube was removed. After five days the sup pubic wound was dry. Eight months later there was evidence of stricture.

Case 3.—A man, aged 39, as a result of an accident, sustain a fracture of the sacrum, a fracture of the anatomical neck the femur, and a fracture of the acetabulum, all witho displacement. He also suffered a rupture of the urethra at th level of the apex of the prostate with backward dislocation o the bladder. There was no extravasation. Traction of th bladder and high suprapubic drainage was established. Th normal flow of urine occurred in twelve days and he was di in sixteen days. Four months after the accident there was n sign of stricture formation. This case is of interest in that the was no displacement of the bony pelvis, and it would appe that rupture occurred by the shearing force of a violen *sudden acceleration injury,* through being run into from behir by a motor vehicle, having a full bladder at the time.

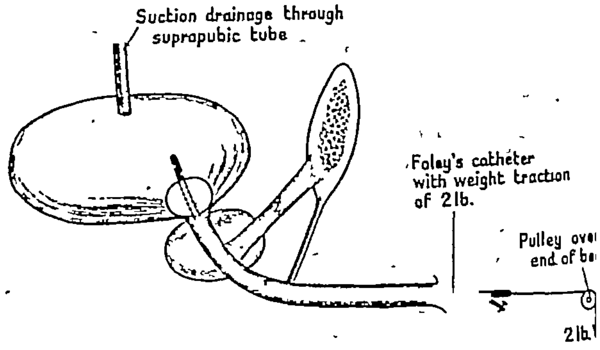
Suction drainage through suprapubic tube
Foley's catheter with weight traction of 2lb.
Pulley ove end of be
2lb.

Fig. 3—Traction on bladder, through catheter, to approximate the tor ends of the urethra.

SUMMARY

The torn ends of a ruptured urethra can be approx mated by applying traction to the bladder throug a Foley's catheter.

Three cases are reported in which this was done succes fully.

There was no sign of stricture 6, 8, and 4 months afte operation.

" . . . The diseases responsible for most sickness and deatl today are *no longer* the infectious diseases such as typhoi fever, tuberculosis, and the acute exanthemas. They ar diseases obscure in origin and chronic in their course, such a the several forms of heart and arterial diseases, diabete cancer, rheumatoid and other forms of arthritis. None of th conventional methods of *preventive* medicine will ward of any of these disorders. The public health officer is learnin that in order to control their ravages—for in the presen state of medical knowledge their *prevention* is still beyond th range of medical science—the most potent weapon is immediat and ready accessibility to medical care, both for diagnosis an treatment."—Dr. ERNEST P. BOAS, *J. Pediat.* 1947, **30**, 478.

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[1] Riches, E. W. *Brit. J. Surg.* 1943, 31, 135.

with meningitis. He was slightly more ill on this occasion than before, but made a normal recovery.

Case 6.—A youth, aged 20, developed meningitis and was treated for five days in a bush camp and discharged cured. Nine days later he was readmitted with meningitis, treated for another five days, and recovered.

Case 7.—A girl, aged 3 years, developed meningitis and was treated for four days in a bush camp. She was readmitted eighteen days after the completion of treatment but died on the eighth day of the second attack.

Thus, after a full course of treatment, patients have had a second attack of meningitis after intervals of 6, 9, 9, 10, 18, and 23 days. The second attack has in each case been more severe than the first, although, except fatal cases 2 and 7, they have responded normally to sulphanilamide or to sulphapyridine. The greater severity of the second attack is no doubt due to lowered physical condition. The failure to develop immunity may perhaps be attributed to treatment with sulphonamides. Councilman,[1] in America, reported 5 patients who were reputed to have had C.S.M. twice.

PREVENTION

It is difficult to control the movements of an African community, especially when the area in which they move is large. However, efforts were made in this epidemic to control movements by banning funeral ceremonies, at which as many as 300 natives may attend for two or three ays; closing markets entirely, or after 2 P.M.; and ontrolling foot and lorry travellers, and traders.

Overcrowding and bad housing played their parts in the pread of this epidemic. The people were advised to sleep on the top of their flat-roofed mud houses, but they seldom took this advice. A few villages which were harder hit than others built temporary grass houses.

INITIAL TREATMENT BY NON-MEDICAL PERSONNEL

Owing to the very large area affected, the great number of villages involved, and the fact that deaths took place in 2–6 hours, it was impossible for medical staff to be always on the spot: one member might be looking after 100 sq. miles. It was found that the best plan was to visit the villages surrounding an infected place, and to talk to the chief, explain the sickness to him, and warn him to be on the lookout. Confidence was further gained by giving him a few tablets of a sulphonamide. Literates were supplied with a simple paper on diagnosis, and a chart of dosage. Illiterates were given tablets and told to give one tablet for every "double hand-span" (18 in.) of the patient's height, before sending the patient to the nearest treatment camp. This dose was to be given twice (dose repeated in three hours) if they were far away from the nearest camp.

It is thought that the low mortality of this epidemic is due to (1) the confidence of the people in European medicine acquired in the smaller epidemic of the previous year; (2) increasing this confidence by giving their chiefs a miraculous drug, with the result that cases were early reported to an authority, who not only managed to treat but also forwarded information immediately; and (3) control of movements, funeral ceremonies, markets, and travelling.

CARRIER-RATE

The epidemic slackened considerably towards the middle of April (8000 cases) with the start of the rains. Under 2000 cases occurred in the next two months. Despite war-time commitments the Army managed to lend facilities for bacteriological investigations, which were carried out towards the end of the epidemic. In Wa town (6000 inhabitants) there had been approximately a 2% infection of clinical cases of meningitis between January and April. In July, in 200 persons examined at random, there was a positive carrier-rate of about 6%. The meningococcus was identified as type I.

SUMMARY

In 1945 a Gold Coast district covering some 10,000 sq. miles, with a population of about 200,000, had 9864 cases of cerebrospinal meningitis.

The number of deaths was 1057, giving a case-mortality of 10·7%. In treated cases (including the moribund) the mortality was 8·05%.

As the disease often ran a rapid course, intensive initial treatment with sulphonamides was instituted, 8 or 9 g. being given in the first nine hours.

Sulphanilamide, which was used in over three-quarters of the cases, was better tolerated and gave better results than sulphapyridine.

In 6 cases there was a second attack of cerebrospinal meningitis.

Initial sulphonamide treatment was given successfully in the villages by the native chiefs. This and other measures helped to control the epidemic.

ADDENDUM

A fresh epidemic of meningitis during the dry season of 1945–46 was feared and anticipated by all concerned. A preventive scheme, involving universal sleeping-out and prohibition of overnight travel (both through-traffic and local visits), was therefore designed and put into force from the very beginning of the dry season. It was considered that by the time cases in any number occurred, to indicate the presence of an epidemic, the carrier-rate would be so high that preventive measures would be comparatively ineffective.

In the event, cases of meningitis during the 1945–46 dry season totalled 58, of which 52 were of meningococcal or doubtful origin. It is not possible to estimate to what extent this virtual elimination of the disease was due to (1) preventive measures, (2) possible mass-immunity after the presumably high carrier-rate of the previous year, and (3) climatic factors, chiefly a rather humid period during January, 1946.

In the same district in the recent dry season of 1946–47 there have been 65 cases of meningitis, of which we have no details.

We are indebted to Dr. J. G. S. Turner, acting D.M.S., Gold Coast Medical Service, and Brigadier H. B. F. Dixon, M.C., D.D.M.S., West Africa Command, for permission to publish this paper.

TREATMENT OF RUPTURED URETHRA BY BLADDER TRACTION

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THE problem of traumatic rupture of the urethra has been largely solved by applying one of the first principles of surgical treatment—namely, rest. The flow of urine is diverted through a suprapubic fistula until the torn urethra is united.

If rest to the part is established, and gross sepsis avoided, the urethra will reform and become lined anew with epithelium, provided its torn ends can be approximated. Where such approximation is impossible, healing can only be by granulation tissue, and a fibrous stricture is bound to ensue, with its attendant dangers and tedium, entailing, throughout the rest of the patient's life, periodic dilatation with bougies. Where, for example, fracture of the pelvis has caused rupture at the apex of the prostate, with tearing of the puboprostatic ligaments (fig. 1) and backward dislocation of the bladder and prostate, the ends of the urethra may be found to be more than $1^{1}/_{2}$ in. apart and separated by a mass of hæmorrhagic and lacerated tissue; and, even if they are identified, it is impossible to draw them premenstrual eruptions of acne. The acne was very pronounced when the following period was more excessive than the previous one. All symptoms subsided with lutocyclin, and this is now a very good preventive in gradually diminishing dosage.

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[1] Cited by Rosenau, M J Preventive Medicine and Hygiene, New York and London, 1935, p 126.

Case 4.—Female, aged 36. Periods began at 14. Married when 17. There were six pregnancies during the first nine years of married life, the last being ten years ago. Migraine, lasting seven years, started about three years after this pregnancy. The attacks were severe and frequent, without any definite relation to the menstrual periods, which were normal. Treatment for a retroverted uterus and right-sided salpingitis, and for indigestion, did not affect the migraine; nor did vitamin B_1 given in large doses for pain in the calf muscles (at times very severe), and burning of the soles, of three years' duration. Wassermann reaction and Kahn tests were negative.

She became pregnant again sixteen months ago, and migraine ceased after the fourth month of pregnancy but recurred six months after parturition. The symptoms referred to the legs and stomach also ceased during pregnancy, and reappeared with migraine after parturition. All symptoms have responded to lutocyclin.

RELATION OF SYMPTOMS TO VARIATIONS IN EXCRETION OF ŒSTROGENS AND PROGESTERONE

In these cases a definite relation exists between the attacks of migraine and the time at which the excretion of free œstrogen in the urine would be expected. Thus mid- and pre-menstrual attacks of migraine correspond to the periods when free œstrogen is excreted in the urine. Its disappearance with the progress of pregnancy corresponds to the increased ratio of œstriol to œstrone in the urine, the absence of œstradiol in the blood, and the increased excretion of progesterone in the urine.

Clinically, progesterone both cured and prevented migrainous attacks, whereas stilbœstrol precipitated an attack identical with the naturally occurring one. The excretion of A.P.L. also rises during pregnancy, and A.P.L., by stimulating the development of corpora lutea, is largely responsible for the increased production of progesterone. Individual susceptibility or intolerance to œstradiol was probably an important factor in the causation of migraine in these cases.

Experimentally, headache which may simulate a migrainous attack, severe nausea and vomiting, aches and pains all over the body, especially in the calf muscles, and intense pallor occur singly or in combination in a few persons who are susceptible to stilbœstrol therapy. Milder symptoms are lassitude and languor, loss of appetite, lack of concentration, and vague headaches. Such mild symptoms were complained of by nearly all our migraine patients. Response to treatment with progesterone was complete.

An interesting feature in case 4 was the disappearance of indigestion and pains in the legs, along with migraine, after the fourth month of pregnancy and for six months after parturition. In an almost identical case, where by test-meal examinations it was found that indigestion resulted from hyperchlorhydria and hypersecretion, a fall in the gastric acidity, accompanied by spontaneous disappearance of gastric symptoms and migraine as pregnancy progressed, was noticed. A similar but smaller fall was noticed with progesterone therapy, which relieved the migraine. This and scanty evidence available from a few other cases suggest that progesterone depresses the gastric secretion, probably via the pituitary-hypothalamic mechanism, though retention of sodium in the body caused by progesterone may have an adjuvant effect. Way (1945) has produced evidence that the gastric acidity and the urinary excretion of A.P.L. in pregnancy in women seem to be inversely proportional. It appears from experiments on dogs by Culmer et al. (1939) that A.P.L. diminishes the secretion of free and total acid, and progesterone does not have this effect. These findings suggest the following explanation of our observation in this case: pregnancy→increased A.P.L. (an therefore hypochlorhydria)→increased progesterone relief of migraine.

The menstrual disturbances present in some case suggested hyperactivity of the œstrogens and als responded to progesterone therapy. In one case patch progressive pigmentation of the skin had developed afte three years of migraine; this also has been checked wit progesterone therapy, and is gradually subsiding.

MODE OF ACTION OF ŒSTROGENS

Headache or migraine may be caused by œstrogens in one or more of the following ways:

(1) *By causing temporary enlargement of the pituitary.*—Œstrogens injected into rats of both sexes cause pituitary enlargement (McEuen et al. 1936, Zondek 1936). In the migraine subjects, however, such gross changes are not evident in X-ray films. It is reasonable to assume that even congestion of the pituitary produced by œstrogens would precipitate headache or migraine in them.

(2) *By their effect on blood-vessels.*—The specific effect of ergotamine tartrate on the headache, by virtue of its vasoconstrictor action, is well known. Dilatation of the blood-vessels in the distribution of the common carotid artery, as shown by flushing of the face, conjunctiva, and nasal mucosa of the affected side, leads to vigorous pulsation of the arteries and increased stimulation of the sensory nerve-endings in their coats, and this is probably the cause of headache in migraine. Early cortical symptoms have been attributed to arterial spasm preceding vasodilatation. According to this hypothesis migraine is caused by arterial spasm followed by arterial dilatation within the distribution of the common carotid artery.

Nothing seems to be known about the effect of œstradiol on cerebral blood-vessels, except that intense congestion and hæmorrhages may occur in the pituitary. The results of Markee's (1940) experiments are, however, interesting.

Using a macaque monkey he transplanted a uterine graft to its eye. In the first half of the menstrual period, under œstrogenic stimulation, this graft showed alternate vasodilatation and vasoconstriction of certain areas. At the time of ovulation the vasodilatation was well marked. Just before menstruation vasoconstriction occurred for a day or so and the graft was blanched. This was followed by vasodilatation and rupture of small arteries. It is not known whether the vascular changes in the graft were local and confined to it, or secondary to similar changes in the blood-vessels of the eye. But, if comparison may be made, the primary vasoconstriction followed by vasodilatation in this case is identical with the conception that migraine is due to arterial spasm followed by arterial dilatation within the distribution of the common carotid artery.

(3) *By retention of sodium and chlorides in the body.*—Thorn et al. (1940) have shown that œstradiol injected into normal dogs causes retention of sodium and chlorides. Retention of sodium and chlorides in the brain tissues would predispose to cerebral œdema of the affected areas, and cerebral œdema would certainly lead to headache. However, this would not explain the beneficial effect of progesterone, since progesterone is also known to caus retention of sodium and chlorides. It is reasonabl to assume, however, that in therapeutic doses, pr gesterone would convert œstradiol into the comparativel impotent œstrone and œstriol, and so be utilised instea of circulating in the blood as free progesterone. Ver large doses of progesterone also cause headache, and i this connexion it may be mentioned that Hamble (1939) reported a case of menstrual headache associate with excretion of abnormally large amounts of sodiun pregnandiol glycuronide, and relieved it with intensiv œstrogenic therapy.

SUMMARY

Of 30 women with migraine which had responded poorly to the usual methods of treatment, 23 showed

PROGESTERONE IN THE TREATMENT OF MIGRAINE

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The ætiology of migraine is complex and varied. ndividual susceptibility, often inherited as a mendelian dominant, seems to play an important part, and in any given person more than one factor may precipitate an attack, though there is usually a particular predisposing factor.

In some cases endocrine abnormality may be responsible. It appears that thyrotoxicosis predisposes to migraine, patients with exophthalmic goitre being specially liable; but this may be due to the effect of increased pulse-pressure in thyrotoxicosis in a migrainous subject. The onset of migraine at or shortly after puberty and its disappearance with old age suggest that imbalance of sex hormones may be an ætiological factor. In this connexion it is interesting to note its association with the menstrual cycle (menstrual migraine) and its disappearance with the menopause. Therapeutically, 'Emmenin' (Blakie and Hossack 1932) and anterior pituitary-like hormone (A.P.L.) (Moffat 1937) are said to have given beneficial results.

We record here our results in 23 cases of migraine in women, in whom, clinically and therapeutically, œstrogens were established as causal factors in precipitating attacks of migraine. The patients were all successfully treated with progesterone, which not only terminated but also prevented attacks. Facilities for biochemical examinations were not available.

SYMPTOMS

The patients were women between the ages of 21 and 40, and in all of them migraine was the predominant symptom. Its duration varied from about three years in the younger patients to about fifteen years in the oldest. The relation of migraine to menstruation was as follows:

About mid-cycle	12
Premenstrual	4
About mid-cycle and premenstrual	7

The incidence of associated symptoms was as follows:

Excessive and/or prolonged menstruation	16
Intermenstrual bleeding	5
Loss of appetite, lassitude, poor concentration, improper sleep, and vague headaches	21
Indigestion, unclassified	1
Hyperchlorhydria	1
Falling of hair	2
Pain in calf muscles and burning sensation in soles	1
Patchy pigmentation of thighs	1
Tendency to obesity	1
Pallor	3

They were otherwise all healthy, except for the following physical signs in a few cases:

Anæmia	7
Salpingitis	2
Retroverted uterus	4

These 23 cases in which there was clinical evidence of œstrogen hyperactivity form part of a group of 30 cases of migraine in females, which had responded inadequately to the usual methods of treatment. In 27 other cases such treatment had given satisfactory results.

Œstrogen hyperactivity commonly manifested itself in disturbances of menstruation, such as excessive and/or prolonged periods. When these were not present, sensitiveness to œstrogens was shown by inducing a migrainous attack with œstradiol. In all 23 cases migraine could be induced or increased by oral or parenteral administration of 2–10 mg. of œstradiol ('Clinœstrol'), and was relieved by the administration of 5–15 mg. of progesterone ('Lutocyclin'). Usually the amount of progesterone required to alleviate an induced attack of migraine was inversely proportional to the amount of œstradiol used to induce it. To prevent spontaneous attacks the amount of progesterone required was generally *directly proportional* to the severity of the symptoms of œstrogen hyperactivity.

In no case did we inform the patient of the nature and action of the drugs used, and the relief from migraine was associated with disappearance of symptoms of œstrogen hyperactivity. Accordingly, it is unlikely that the success of treatment was due to suggestion. The effects of the drugs were uniform, œstradiol aggravating the symptoms and progesterone relieving them. Early in our trials we treated 7 control cases by injections of distilled water without any effect on the migraine.

ILLUSTRATIVE CASE-RECORDS

Case 1.—Female, aged 40. Periods began at 13. Married when 19. Last and only pregnancy seventeen years ago. Migraine started two years after this pregnancy. Onset at any day between the 10th and the 16th days of the cycle, usually between the 11th and the 13th, rarely premenstrual between the 24th and the 28th days. Periods somewhat excessive and prolonged. Premonitory symptoms of migraine included irritability and a tendency to weep, mutism, and seclusion in bed, loss of memory for time and place, and inability to continue conversation, followed by dimness of vision, blindness, visual hallucinations of snakes and tigers, tingling sensation in, and paresis of, the left upper limb, swelling of the hand and tongue (which continued during the attack), and vomiting. Analgesics, bromides, phenobarbitone, and ergotamine tartrate had an unsatisfactory effect. Complete relief was obtained with two doses of lutocyclin, 2 mg. on alternate days. Period of freedom after treatment with this dosage lasted eight weeks. Relapse occurred about mid-cycle and was controlled with 5 mg. of lutocyclin. Attacks are now mild and less frequent, always occur about mid-cycle, and are easily controlled and prevented by lutocyclin.

Case 2.—Female, aged 29. Periods began at 12. Married when 21. Last and only pregnancy seven years ago. Migraine *started two years after this pregnancy. Onset* any day between the 4th and the 28th days of the cycle. Periods scanty, lasting 2–3 days. Comparative freedom from migraine during this time, though sometimes the most severe attacks developed two days before to three days after the period.

Three months after the onset of migraine scanty intermenstrual bleeding became very frequent, sometimes lasting several days. Continuous ordinary headache or migraine attacks were often associated with intermenstrual bleeding, and their severity was to some extent proportional to the amount of bleeding.

Premonitory symptoms were severe, with giddiness, cold sweating, cloudiness of vision, and diplopia. Analgesics, bromides, phenobarbitone, and ergotamine had little effect except that the last was useful during the actual attack. Complete relief was obtained with four doses of lutocyclin 2 mg. on alternate days. Intermenstrual bleeding stopped. The following period was scanty and lasted two days. The migraine recurred on the 6th day *of menstrual cycle*, but complete relief was obtained with 5 mg. of lutocyclin. Period of freedom then lasted six weeks. Attacks are now mild and less frequent, usually occurring about mid-cycle; they are easily controlled or prevented by lutocyclin in smaller dosage.

Case 3.—Female, aged 29. Periods began at 13. Married when 18. Migraine started at 13 with onset of menstruation. The attacks were severe and associated with excessive menstruation. They were usually mid- and pre-menstrual but at times bore no relation to the period. There was progressive falling of hair.

She aborted three times in early pregnancy during the first six years of married life. The fourth pregnancy, five years ago, appears to have been maintained by administration of crude whole-placenta extracts by mouth. Three months after the onset of this pregnancy migraine disappeared, to return six months after parturition. Now, however, the attacks were mild and irregular; the periods were less excessive, and the loss of hair within normal limits. In the fifth pregnancy, twenty months ago, migraine ceased after three months and did not recur till five months after parturition. The attacks were mild and irregular, often premenstrual, and associated with excessive periods and

All these 10 related persons died suddenly. The following are alive or did not die suddenly:

Two brothers of 1, aged 24 and 36, are alive and well.

One half-sister of 2, aged 43, is healthy and has healthy children.

One sister of 2, aged 34, is alive and has four healthy children.

Three sisters of 5 died from diseases other than apoplexy.

One brother of 5 went to America with seven children; no details known.

The mother of 5, 6, and 7 died in old age from apoplexy, and three of her sisters (aged 60–80 years) died from the same condition; one of these sisters had a "stroke" when aged 20, was ill for a year, but recovered and died aged 59.

Two children of 7, aged about 40, are alive and healthy.

COMMENT

Cerebral angioma is not uncommon, but many of the cases do not come to autopsy or give rise to symptoms. Some of them are cerebellar and some in the region of the third ventricle. Few are in the cerebral white matter, but we record such a condition occurring in more than one member of an Icelandic family.

These cases and the family history suggest the probability of a familial tendency in the formation of some angiomata. Such angiomata may be multiple and give rise to symptoms over a period of years.

Our special thanks are due to Dr. Arni Pjetursson, and one of us (J. N. C.) is indebted to the National Hospital Research Fund for an expenses grant.

PENICILLIN IN POSTOPERATIVE PROGRESSIVE BACTERIAL SYNERGISTIC GANGRENE

REPORT OF A CASE

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PROGRESSIVE bacterial synergistic gangrene is a rare complication of an operation wound, and its prompt recognition is important, because efficient treatment can prevent much loss of skin and a fatal issue.

Cullen (1924) and Christopher (1924) first drew attention to this condition, though Luckett (1909) described a large phagedænic ulcer of the abdominal wall which was almost certainly this same condition. Earlier cases were probably included under the term of hospital gangrene.

Recently cases treated with penicillin have been reported, and this further case may be of interest.

CASE-RECORD

A printer, aged 49, was admitted to the surgical unit, St. Bartholomew's Hospital, on March 14, 1946, with a perforated duodenal ulcer. He was a lean but healthy looking man. He had 10 years' history of intermittent dyspepsia and hunger pains but had never had any medical treatment.

Exploratory laparotomy was performed, six hours after perforation, through an upper right transverse incision, and a small perforation on the anterior surface of the first part of the duodenum was sutured. A drain was inserted into the pelvis through a suprapubic incision, and the laparotomy incision was closed in layers without drainage or antiseptics.

Postoperatively, the patient had some fever from the first day; but, after the drainage of an incisional abscess on the 7th day, the temperature remained normal, apart from a slight rise on three independent days. The incision continued to discharge thick pus, and some sloughs separated.

On the 13th day two extremely tender, raised, red, and indurated areas appeared above and below the inner end of the incision. At first about 1 in. in diameter, in the next forty-eight hours they enlarged to about $1^1/_2$ in. in diameter, and the centres became yellow like a carbuncle.

On the 17th day two patches of gangrene appeared in the centre of the lesion on either side of the incision. These were surrounded by a raised red edge and beyond this by a zone of brilliant red hyperæmia, which spread into healthy skin. The gangrene slowly spread away from the incision, being preceded by a raised red edge and zone of hyperæmia, till there were two patches of gangrene 1–$1^1/_2$ in. in diameter.

A course of 1,000,000 units of sodium penicillin (20,000 units I.M. 3-hourly) was started on the 18th evening. Locally, penicillin cream and dry dressings were applied alternately.

From a swab taken on the 19th day Dr. A. E. Francis reported: "Gram film showed gram-positive cocci, mainly small ones in short chains and a few larger ones in pairs. Culture showed almost pure growth of a micro-aerophilic streptococcus, with a few colonies of staphylococcus."

On the 21st day the condition had stopped spreading, and on the 24th day the sloughs had separated, leaving a clean granulating surface which healed rapidly.

The patient was discharged from hospital on the 35th day, and was seen as an outpatient three weeks later, when the incision was soundly healed.

ÆTIOLOGY

This gangrene may develop in the abdominal skin after the drainage of foul intraperitoneal abscesses, often appendical in origin; gangrenous appendicitis; perforated duodenal ulcers; or other conditions in which the incision has been contaminated with intestinal organisms. It may also develop after the drainage of lung abscesses or fœtid empyemata in the skin of the chest wall. Most of the reported cases have arisen in the region of tight sutures, which are undoubtedly a predisposing cause. In one case, in which the process started some distance away from the incision, a towel clip was thought to be the cause (Lichtenstein 1941).

The condition is a slow but relentlessly spreading gangrene of the skin due to a micro-aerophilic non-hæmolytic streptococcus from the intestinal or the respiratory tract. According to Brewer and Meleney (1926), symbiosis with a non-specific hæmolytic staphylococcus, from either the skin or the air, is necessary for gangrene to develop. Meleney (1931) found, from experiments on dogs, that injections of a suspension of either organism alone, or of both organisms separately in close proximity to each other, did not produce gangrene; whereas, if a 50%-mixture was used, gangrene followed which was similar to that seen in man. Willard (1936), using guineapigs, confirmed these observations. Meleney (1931) points out that the staphylococci are often in small numbers and are easily overgrown on culture by other contaminants, such as *B. proteus*. In some reported cases (Grimshaw and Stent 1945, Mester 1940) a staphylococcus could not be found and therefore some doubt exists about the necessity of a symbiosis. All authors, however, are agreed that a micro-aerophilic non-hæmolytic streptococcus is the essential causal organism of the gangrene.

PATHOLOGY

The micro-aerophilic streptococcus can be grown in pure culture from the subcutaneous fat deep to the spreading edge of hyperæmia or even healthy skin beyond this. Whereas both organisms or other contaminants can be grown from the necrobiotic edge of the gangrene (Meleney 1931), the micro-aerophilic streptococcus only grows anaerobically, except when the swab is taken from the gangrenous area or after subculture, when it may grow aerobically. The staphylococcus concerned is aerobic.

Meleney (1931) could not find any evidence of vascular thrombosis, and considered that the gangrene was due to the specific action of a toxin elaborated by the symbiosis.

CLINICAL FEATURES

The gangrene starts in the 2nd or 3rd postoperative week, but cases have been reported as late as the 4th week (Vier 1940, Dodd et al. 1941), and in one case (Grimshaw and Stent 1945) as late as the 7th week, through drainage of a residual abscess had been performed twenty days before the onset.

The gangrene starts on one or both sides of the incision, often near a tension suture, as an extremely tender red "carbuncle-like" area. The centre of this soon becomes signs of excessive œstrogen activity. In all of these it was shown that œstrogens would precipitate an attack. In all 23 cases progesterone was effective in relieving or preventing attacks of migraine. Various associated symptoms also disappeared with its use.

The name "œstrogenic migraine" might be appropriate for this condition. These symptoms also responded to progesterone. This clinical variety of migraine may be termed œstrogenic migraine.

In a case with a tendency to obesity progesterone had no effect on the obesity, though the migraine was successfully treated.

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CEREBRAL ANGIOMATA IN AN ICELANDIC FAMILY

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Elkington[1] in 1935 described some cases with symptoms suggesting that an angiomatous condition in the brain was their pathological basis, and this was confirmed in one case by autopsy and histological findings.

We have clinical, autopsy, and histological records of a patient from Iceland who showed such an angioma in the cerebral white matter, and clinical and autopsy records in a cousin, together with a remarkable family history in which sudden death in young persons is a prominent feature.

The clinical details of the two patients seen by one of us (H. A. K.) are as follows:

Case 1.—A man, aged 22, was admitted to hospital on April 13, 1938, in coma. There had been one previous attack of unconsciousness eight months previously. On admission there was twitching of the face, arm, and leg on the right side, with spasticity of the limbs, more pronounced on the left side. The pupils were equal and reacted to light. No other significant clinical findings were present, and the blood-pressure was normal. Lumbar puncture yielded a bloodstained fluid under an initial pressure of 125 mm. The cerebrospinal fluid (C.S.F.) showed 43 lymphocytes per c.mm., 0·5 g. of protein per 100 c.cm., a positive Pandy, and a negative Wassermann.

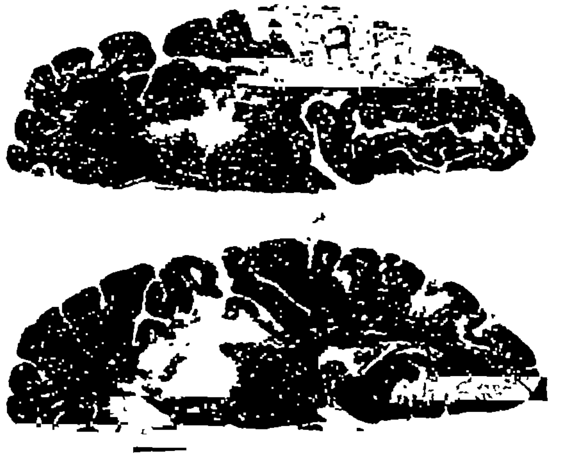

Fig. 1—Left cerebrum showing hæmorrhage in angioma (case 2).

Two days later the patient was confused and aphasic, but able to move the limbs, and had extensor plantar responses.

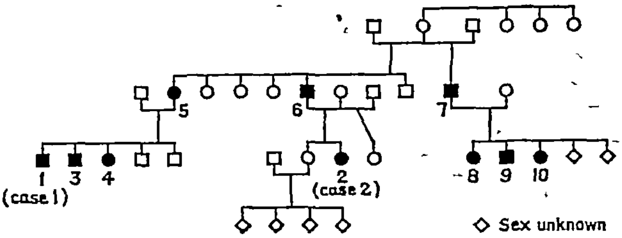

Fig. 2—Pedigree showing relations of cases 1 and 2: solid symbols indicate cerebrovascular accidents in youth; open symbols indicate absence of cerebrovascular accidents in youth.

There was papillœdema of the right disk. The C.S.F. was still bloodstained, with an initial pressure of 165 mm. After six days the left pupil was dilated and the right contracted, but other signs were similar to those seen previously. Stupor increased, and he died twelve days after admission to hospital.

Autopsy.—There was a cyst containing yellow fluid in the left temporal lobe and a large recent hæmorrhage in the right temporoparietal lobe. No aneurysm or vascular disorder was seen. The hæmorrhage was so extensive that it was impossible to demonstrate any angioma.

Case 2.—A woman, aged 33, cousin of case 1, was first admitted to hospital on Jan. 15, 1940, with a history of numbness on the left side for three weeks. There was slight loss of power of the left arm and leg, with exaggerated reflexes on that side, and flexor plantar responses. A slight nystagmus to the left was present. No other abnormal physical signs were found, and blood-pressure, blood-count, and C.S.F. were normal. There had been a similar but milder attack eighteen months previously.

She was discharged with a provisional diagnosis of intracerebral hæmorrhage, and was to return for ventriculography if symptoms persisted. She was readmitted on Nov. 5, 1942, with a week's history of aphasia and weakness of the extremities. A left hemiparesis and some degree of aphasia were present. Coma ensued, and she died four days later, but further clinical notes are not available.

Autopsy.—Abnormal features were limited to the head; the cardiovascular system was normal. The brain was fixed whole and on section showed a hæmorrhage in the white matter of the left hemisphere. This was situated to the lateral aspect of the lateral ventricle, externally and posteriorly to the basal ganglia, extending almost to the posterior tip of the posterior horn, and almost to the cortical grey matter (fig. 1).

Sections cut in celloidin showed a large hæmorrhage with very dilated vascular channels, some of which showed well-marked elastica. The surrounding brain tissue showed much iron pigment, some cuffing of the vessels by lymphocytes, and a few small vessels plugged by thrombus. Some of the many peripheral capillaries were irregular in shape and arrangement, and the appearances were those of an angiomatous condition in which hæmorrhage had taken place.

FAMILY HISTORY

Dr. Arni Pjetursson, of Reykjavik, has kindly supplied the following remarkable details of the family history (fig. 2):

1. Pjetur (case 1) ..	died aged	22.
2. Inga (case 2) ..	" "	35.
3. Jakob	" "	23, brother of 1.
4. Gudrun	" "	23, sister of 1.
5. Kristjana ..	" "	36, mother of 1.
6. Ingimar	" "	30, father of 2, brother of 5, drowned in a swimming-pool although a good swimmer.
7. Hans	" "	42, half-brother of 5 and 6.
8. Elinborg	" "	25, daughter of 7.
9. —	" "	27, brother of 8.
10. —	" "	29, sister of 8.

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[1] 1. Elkington, J. St. C. *Lancet*, 1935, i, 6.

PROGNOSIS

Many of the cases reported in the literature have been diagnosed late, and these have often proved fatal. With early effective radical surgery most patients have recovered, often with considerable loss of skin and scarring. Dodd et al. (1941), reviewing the literature, place the mortality at 20%. It is hoped that with early diagnosis and effective treatment, especially with penicillin, the mortality and the resultant scarring may be very considerably reduced.

SUMMARY

A case of postoperative progressive bacterial synergistic gangrene of the abdominal wall is described.

It promptly responded to intramuscular and local penicillin without the need for radical surgery.

The ætiology, clinical appearances, diagnosis, and treatment are briefly discussed.

I am indebted to Prof. J. Paterson Ross for permission to publish this case and for the help and encouragement he has given me. I also wish to thank Mr. A. M. Boyd, assistant director of the surgical unit, and Dr. A. E. Francis, of the bacteriological department, St. Bartholomew's Hospital, for the bacteriological report.

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ESTIMATION OF VITAMIN C IN LEUCOCYTES BY THE HYDRAZINE METHOD

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THE current colorimetric methods of estimating the vitamin-C content of leucocytes are so laborious that only research laboratories can use them.

The commonly employed indophenol method [1] depends on the simple decolorisation of a dye by ascorbic acid; but the lability of both the ascorbic acid and the dye, and the interference of —SH groups such as glutathione, have necessitated the introduction of various safety measures that complicate the technique.

Roe and Kuether [2] developed a new colorimetric method that depends on an entirely different principle—i.e., the production of colour by oxidised ascorbic acid instead of subtraction of colour by reduced ascorbic acid. This method, while extremely sensitive and specific, since the sulphhydryl groups do not interfere, has the advantage that the reagents and the colour produced are stable. There is therefore no need to recalibrate the colorimeter or to restandardise the dye every time; nor has the reading to be taken within 30 sec., as in the indophenol method.

It was therefore thought that the adaptation of Roe and Kuether's method to the estimation of vitamin C in leucocytes might provide an easier procedure, suitable for routine use. Moreover it seemed interesting to compare the values obtained by this method with the values given by the dye methods, as the true vitamin-C content of leucocytes has not yet been definitely established.

METHOD

Reagents.—The following modifications of the original method of Roe and Kuether were adopted:

(1) A 1% solution of 2-4 dinitrophenylhydrazine was used instead of the 2% solution recommended by Roe and Kuether. This was done to increase the difference between the extinction coefficients of the blank and the unknown, and so increase the sensitivity of the method. (There seems to be no stoicheiometric contra-indication to the use of an even more dilute hydrazine reagent—e.g., 0·25%.)

(2) A 2·5% solution of alcoholic thiourea was used instead of a 10% solution.

(3) Ordinary animal charcoal (B.D.H.) was used instead of the unobtainable 'Norit.' It was found active enough, without even having been reactivated, to oxidise more than 99·9% of pure 0·05% ascorbic-acid solutions in 5 min.

The stock of animal charcoal used did not contain any chromogenic substances, and therefore acid washing was omitted.

Carbo activatus (B.D.H.), on the other hand, was unsuitable, as it caused a precipitation after the addition of 85% H_2SO_4, and therefore it appears necessary to check each batch of charcoal on these points before use.

Absorptiometry.—The readings were taken in a Hilger spectrophotometer at 5200 Å, as the red colour obtained under our conditions absorbed at this wave-length more than at 5400 Å, as stated by Roe and Kuether.

The colour has extraordinary stability. No change in the extinction coefficient was noted in four hours with the tubes exposed to daylight, air, and room temperature. Only a slight fall of about 0·01 was noted after four days in the dark.

The blank remained remarkably constant during a whole month of daily estimations.

A calibration curve prepared by plotting concentrations of serial dilutions of a pure ascorbic-acid solution against their extinction coefficients gave a perfectly straight line of direct proportionality in both the spectrophotometer and the photo-electric absorptiometer.

A recalibration of the apparatus with the same reagents after three weeks gave an identical curve. It can therefore be assumed that the reagents last at least that long.

Collection of Sample.—The technique for obtaining the leucocyte-platelet layer was in principle that described by Butler and Cushman,[1] with the following slight differences:

(1) 15 ml. of venous blood is mixed with 0·15 ml. of 20% potassium oxalate, as recommended in an unpublished paper by Lloyd, of Oxford, *instead of the mixture of dry potassium* and ammonium oxalate (Heller and Paul) used by Butler a Cushman. Heparin was unsatisfactory. Icteric blood sampl gave very bad separation with any anticoagulant.

(2) The white and red hæmatocrits are estimated by spi ning Wintrobe tubes for 40 min. at 2700 r.p.m. in duplicate According to the average red hæmatocrit value, 9–11 ml. blood is spun in the special centrifuge tube with a constricte segment near the middle, as described by Butler and Cushma for 60 min. at 3200 r.p.m.

(3) After the plasma has been removed, 15–25 mg. of whi layer is transferred with a glass capillary attached to a syrin into a weighed 15 ml. conical centrifuge tube, which reweighed to obtain the wet-weight of the white mass.

The rest of the procedure is essentially an adaptatio of Roe and Kuether's method to the estimation o vitamin C in the white layer:

After weighing the tube containing the white mass, ad 1 ml. of 6% trichloracetic acid and grind the leucocytes i the acid with the rounded end of a closely fitting glass rod fo 5 min.

Rinse the rod with 1 ml. of 6% trichloracetic acid. Stand it for 5 min. and occasionally tap the tube. Spin the tube for 1 min. at low speed to pack the precipitate at the bottom. Add a pinch of charcoal (about 0·05 g.) to the supernatant fluid. Stand the tube for 5 min. and tap it occasionally.

Filter through Whatmann no. 42 or 44 (5·5 cm.) paper into a clean test-tube. Transfer 1 ml. of the filtrate into purple and then gangrenous. The lesion now consists of three zones: a centre of brownish-black gangrene, like suede leather, surrounded by a raised purple or red edge, and beyond this a zone of brilliant red hyperæmia fading off into healthy skin. The hyperæmia slowly spreads in all directions away from the incision and is succeeded by the raised edge and then by gangrene; hence the lesion slowly creeps over a large surface of the body during the course of nine months to a year (Stewart-Wallace 1935). The gangrene is superficial; and, as the condition spreads, the oldest part nearest the incision may liquefy, leaving a red granulating area. This may epithelise in patches from surviving epithelium in the deeper parts of sweat glands and sebaceous glands. At the spreading edge of the ulcer, however, there are always three zones of hyperæmia, raised edge, and gangrene.

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* British Council Scholar in Medicine.

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There is usually little if any general reaction; but extreme depression, leading sometimes to serious mental change, is common as a result of the severe pain, especially on dressing the wound, and the relentless progress of the disease.

DIAGNOSIS

Diagnosis is made on the clinical appearance of the three zones, the history of an operation, and the finding of the specific organism. For bacteriology a small biopsy specimen of the growing edge of the ulcer may be required.

Meleney (1933) classifies gangrene of the skin into acute and chronic. Three main types of acute gangrene have to be differentiated: gas gangrene, hæmolytic streptococcal gangrene, and erysipelas.

Gas gangrene mainly involves muscles, and general toxæmia is pronounced; but, near the wound, limited redness and œdema may, after becoming dusky, progress to a very limited gangrene of the skin.

Hæmolytic streptococcal gangrene is a spreading necrosis of the subcutaneous fat, with thrombosis of the vessels supplying the skin, leading to a secondary gangrene of the skin. Phagedæna and Fournier's gangrene are probably examples of it. It follows a superficial wound. Swelling and redness spread quicker than in erysipelas, and the edge is not raised. On the third, fourth, or fifth day a dusky purplish patch with an irregular margin appears in the centre but not necessarily in association with the wound. Blisters soon form, and other patches may appear, which may coalesce into a large gangrenous sheet unless longitudinal tension-relieving incisions are made through the area into healthy tissue on either side. Hæmolytic streptococci can be recovered from the centre of the lesion, but often not from the hyperæmic outer zone, as opposed to erysipelas, in which the organisms are mainly found in the spreading edge. Secondary infection may follow.

Erysipelas has a raised edge, and the rate of spread is slower. The centre is often pale, and gangrene is rare.

In the chronic group postoperative progressive bacterial synergistic gangrene, chronic undermining ulcer (Meleney 1935), gangrenous impetigo, fusospirochætal infection of the skin, and amœbiasis cutis have to be considered.

Chronic undermining ulcer is characterised by the absence of gangrene, much undermining of the skin, and the presence of only an anaerobic streptococcus on culture.

Gangrenous impetigo, also called ecthyma, pyoderma gangrenosum, and dermatitis gangrenosa, consists of multiple lesions which start as small vesicles surrounded by a red zone, the centre of which becomes gangrenous and depressed. This separates from healthy tissue, leaving a ring of ulceration with a gangrenous scab in the centre. When the scab separates a thin scar is left. The condition is contagious and occurs mostly in debilitated persons. It is considered to be a severe form of impetigo.

Fusospirochætal infection follows human bites or contamination of wounds with mouth organisms. Streptococci, fusiform bacilli, and spirochætes, either all three or two of them, are found; anaerobic culture is usually required. Cancrum oris and noma are often examples of this, and probably many cases of hospital gangrene were also. The w[illegible] foul discharge, and its edges become shaggy and grey-green and bleed easily. The infection rapidly spreads into bones and joints and often along the deeper tissues, to come to the surface at some distant site and so cause multiple sinuses.

Amœbiasis cutis may follow contamination of a wound after the drainage of amœbic liver abscesses or after operations on the colon. After some days or weeks the drainage tract becomes red and indurated, the edges become everted and raised, and the surrounding skin dark brown with hyperpigmentation. As the necrosis spreads, "raw-beef-like" granulations are left, in which no regenerating epithelium is found as in postoperative spreading gangrene, and the gangrene may involve muscles besides skin. Amœbæ may be found in the glairy pus expressed from the margin, and the response to intravenous emetine is usually rapid.

TREATMENT

Prophylactically, tight sutures should be avoided after the drainage of foul intraperitoneal abscesses or fœtid empyemata (Meleney 1931). Whether sulphonamide or penicillin powder locally would prevent this complication is not known. Mester (1940) thought sulphonamides had helped, but Meleney et al. (1945) found that sulphadiazine given by mouth did not prevent gangrene in their cases. They also found that penicillin injected locally for the established condition did not improve it.

Before the introduction of penicillin the only treatment was a radical excision of the affected area well beyond the spreading zone of hyperæmia, or, if that were not possible, an encircling incision. The wound was then smeared with "active" zinc-peroxide paste. Neary and Rankine (1943) describe a method of testing "activity." Later, in 10–14 days, the raw area is skin-grafted. Many of the reported cases which recovered were treated without peroxide, which is probably unnecessary provided the excision is radical enough and through healthy skin well beyond the hyperæmia. Meleney (1933) prefers the scalpel, because it produces less sloughing than the cautery. In no circumstances should the wound edges be drawn together with strapping (Vier 1940) or sutures (Nightingale and Bowden 1934), as this favours recurrence.

Antiseptics, hypertonic dressings, radiant heat and various lights, zinc peroxide and oxidising agents alone, and X rays have all been tried on several occasions; but, apart from an isolated case in which recovery may have been spontaneous, they have been completely ineffective (Dodd et al. 1941).

There are few reports of treatment with penicillin. Grimshaw and Stent (1945) report a case, following a perforated duodenal ulcer, treated with 500,000 units I.M. over five days, which responded within forty-eight hours, the patient recovering without radical surgery. Meleney et al. (1945) also report three cases, two of which, a lung abscess complicated by empyema, and a strangulated internal hernia requiring resection and ileostomy, were cured with penicillin, the total dose not being stated. Their third case of unusual multiple gangrenous ulcers resembled but was not proved to be this condition; it responded partially to penicillin but required excision before the condition was finally controlled. In the authors' opinion the unusual factors were due to the presence of penicillin-resistant gram-negative organisms. The patient died of a pulmonary embolus.

In the present case the response to penicillin was dramatic, and radical surgery was not required. The lesion healed so rapidly that even skin-grafting was not necessary.

Further trial of penicillin is needed before its curative effect can be completely accepted, but so far the results have been good. Grimshaw and Stent (1945) state that the organisms in the pus from their case were sensitive to one drop of penicillin solution of a strength of 1 unit per c.cm., but I have been unable to discover whether it is effective against both members of the symbiosis.

advances in the theory and application of knowledge of blood coagulation are well represented. Adequate sections on the Rh factor—Fisher's nomenclature is fully described—and folic acid are included. Treatment with radioactive phosphorus applied to leukæmia and polycythæmia is described in detail, as is the use of nitrogen mustards in leukæmia and Hodgkin's disease. Corrected ideas on the site of the gastric lesion in pernicious anæmia are given. New plates show malarial parasites. We are glad to see that Professor Wintrobe continually condemns the use of "shot-gun therapy" in anæmia and emphasises its expense. He gives a timely warning that photoelectric colorimeters require just as careful standardisation and use as other types: commercial patterns may be up to 20% inaccurate when received.

Diseases of the Retina

HERMAN ELWYN, M.D., senior assistant surgeon, New York Eye and Ear Infirmary. London: J. & A. Churchill. 1947. Pp. 587. 45*s*.

WITHIN the limits he has set himself, Dr. Elwyn has written a useful book, well produced and handy in size. Inspection is the only method open to the doctor who examines the retina, and a book on retinal disease ought to illustrate the ophthalmoscopic appearance of all the more usual fundus disorders; it is a pity, therefore, that the good coloured illustrations are not more numerous. The description of each fundus condition opens with a brief historical review, goes on to the clinical manifestations and course of the disease, and ends with pathology and treatment. Dr. Elwyn's own experience does not come much into the picture, and the descriptions are mainly a review of current thought. While this is helpful, most readers value more exact case-histories quoted by an author from his own recorded observations, and followed to their conclusion. The book being mainly medical, details of the operative surgery of retinal detachment seem out of place in it; but it contains much useful information given clearly and with moderation, and the coloured plates more nearly resemble the diseases they depict than is generally the case in textbooks.

Diseases of the Heart and Circulation

ALBERT A. FITZGERALD PEEL, D.M. Oxfd, F.R.F.P.S., professor of medicine, Anderson College of Medicine, Glasgow. London: Oxford University Press. 1947. Pp. 398. 35*s*.

STUDENTS will find Professor Peel's book a reliable, if at times dull, introduction to cardiology. Based on lecture notes, the book is more academic than practical in approach, dealing first with symptoms and physical signs, then with anatomical lesions, and finally with ætiology. Some will feel that the section on anatomical lesions should have been incorporated in the section on ætiology; for modern cardiology stresses the importance of cause—whether rheumatic, syphilitic, or arteriosclerotic—and the functional state of the myocardium. The student may get the impression, too, that "mitral stenosis" or "aortic incompetence" is itself a diagnosis. Thus a full description is provided of the signs of a fully developed mitral stenosis, but little attention is paid to the development of this lesion and its significance as a guide to the state of the underlying rheumatic pancarditis. A welcome feature of the book is that more attention than usual has been given to treatment.

Retinal Structure and Colour Vision

E. N. WILLMER, SC.D., lecturer in histology in the University of Cambridge. London: Cambridge University Press. 1946. Pp. 231. 21*s*.

COLOUR-VISION is a subject which has always attracted theorists, no doubt because none of the explanations so far produced, not even the famous Young-Helmholtz theory, has been obviously and finally satisfactory. Dr. Willmer's hypothesis (he specifically refuses to call it a theory) is definitely one to be taken seriously but not to be swallowed whole. While accepting the necessity for three retinal mechanisms to cover the facts of human colour-vision, he rejects the classical view that colour-vision is confined to the cones and seeks to explain the phenomena in terms of the known reactions of both rods and cones. In doing so he is forced to postulate two different types of rod, both containing visual purp but one capable of dark-adaptation and the other (the "day rod"). There seems to be little more eviden in favour of the "day rod" than there is in favour the three different types of cone required by the Yo Helmholtz theory, though it is only fair to remember that Granit, in a purely experimental approach to retinal physiology, has found it necessary to assume that some rods are incapable of dark-adaptation. Unfortunately Dr. Willmer accepts rather uncritically some of the evidence in favour of his hypothesis, while evidence tending in the other direction is often either ignored or rejected on insufficient grounds; in the main, however, this applies only to minor points. He also has a disconcerting way of making startling and unusual statements without giving adequate references for them. The book is certain to arouse opposition, especially among those who have accepted the classical explanations of colour-vision and who do not want to have their ideas upset. The best possible antidote to this attitude is provided by W. D. Wright's foreword, which should be read and taken to heart by anyone who wishes to tackle an interesting and provocative book.

Practical Malariology

PAUL F. RUSSELL, M.D., M.P.H., colonel, M.C., A.U.S., parasitology division, Army Medical School; LUTHER S. WEST, PH.D., head of biology dept., Northern Michigan College of Education; REGINALD D. MANWELL, SC.D., professor of zoology, Syracuse University, New York. London: W. B. Saunders. 1946. Pp. 684. 40*s*.

WRITTEN by authors whose practical experience and acknowledged reputations are hallmarks of their competence, this manual gives a comprehensive account of malaria and its control. Though written in the closing months of the war, and embodying much military experience of malaria, it discusses control primarily from the standpoint of civilian needs.

In the chapters on life-cycle, morphology, and physiology, all technical methods for demonstrating and studying the parasites are set out. The mosquito is exhaustively described in terms of morphology, taxonomy, life-cycle, bionomics, and distribution; and the authors describe ably the technical procedures for collection of specimens, for their identification and study, for making mosquito surveys, for testing anti-mosquito agents, and for experimental work in the entomological laboratory. An important section on the community problems of malaria discusses epidemiology, climatology, and the science of malaria surveys. A large appendix gives keys to world anophelines. Beautifully illustrated with drawings, photographs, and coloured plates, the book is a polished piece of work.

Erkennung und Behandlung der organischen Lösungsmittelvergiftungen (Berne: Hüber. 1947. Pp. 168. Sw. fr. 13·80).—The toxicology of the volatile industrial solvents is yearly becoming more commonplace, but published work on the subject is widely scattered, largely uncritical, and tedious to study and evaluate. This slim comprehensive monograph by Dr. Franz Borbely sets out under general and special sections the sources, commercial and domestic forms, and clinical symptomatology of these poisons. The analytical and special laboratory aspects of the subject are not so extensively dealt with, for this is essentially a handbook for the industrial medical officer. It is well documented with references to published cases.

Anatomical Terms: Their Origin and Derivation (Cambridge: Heffer. 1947. Pp. 165. 7*s*. 6*d*.).—Compiled for the increasingly large proportion of medical students who have not had a classical education and therefore do not know and cannot guess the meanings of words derived from Greek or Latin and met for the first time, this book, by Dr. E. J. Field and Dr. R. J. Harrison, can easily be carried in the pocket for rapid consultation. A knowledge of the derivation of a word helps one both to remember its meaning and to spell it properly. Besides derivations this dictionary includes short biographical accounts under eponyms (even to the dipping of Achilles). Now we want a companion volume for medical terms, such as "poikylocytosis," "poliomyelitis," "anaphylaxis," and "dysdiadochokinesia."

nother test-tube. Add a small drop of 2·5% alcoholic thiourea olution and 0·25 ml. of 1% hydrazine reagent. Stand it or three hours in a water-bath at 37°C; then dip it into a eaker containing ice-water. Add 1·25 ml. of 85% H_2SO_4, drop by drop, cautiously from a pipette. Mix by shaking under he ice-water. Remove it to a rack and let it stand for 30 min.

A blank is performed on 2 ml. 6% trichloracetic acid n exactly the same way—i.e., add a pinch of charcoal, c. It need only be run during the first estimations, until ne is satisfied with its constancy. It is advisable to run blank once in two weeks to check the reagents.

The extinction coefficient E_X of the unknown solution nd E_{BL} of the blank are read on a spectrophotometer r a photo-electric absorptiometer.

Calculation.—A calibration curve for the instrument s prepared from vitamin-C solutions in 6% trichloracetic cid ranging from 2 γ/ml. to 20 γ/ml. and a blank. A pinch of charcoal is added to 2 ml. of each solution, and he procedure described above is carried out. The xtinction coefficient of each solution is determined, nd E_X–E_{BL} is plotted against the vitamin-C concentration n γ/ml.

The concentration of vitamin C of the test solution in γ/ml. is read off from the calibration curve, and the result expressed as mg. of vitamin C per 100 g. of leucocyte-platelet layer by the formula $\frac{200\ C}{W}$, where C=concentration of vitamin C in γ/ml., and W=weight of the white-layer sample in mg.

Time.—The "active time" of the method is 50 min., even with several simultaneous estimations. But, as the inactive time (centrifugations, incubation, &c.) comprises five hours, it is advisable to start in the forenoon.

EFFECT OF SPINNING CONDITIONS

The weight of every white-layer sample, however intensively spun, is never identical with the true weight of the leucocytes and platelets. It always includes the weight of some plasma and red cells. Various degrees of white-layer density and purity give therefore different vitamin-C values for the same apparent weight. This was demonstrated by estimating the vitamin-C values in the white layer of two healthy persons at three different centrifuge speeds. The results were as follows:

Ascorbic acid (mg. per 100 g. white layer)

	15 min. at 2400 r.p.m.	*40 min. at 2700 r.p.m.*	*60 min. at 3200 r.p.m.*
Case 1 ..	15·5	29	36·9
Case 2 ..	17	25	38·7

It is obvious that, in any survey, the vitamin-C values will vary with the spinning conditions, and it was found in practice that centrifuging at 3200 r.p.m. for 60 min. gave maximal values. With this speed and time the white layer is densely packed and its average histological purity greater than 95%.

In every case smears stained with Leishman confirmed that the "white layer" displays a typical heterogeneous structure. The top of the column is always occupied by a pure mass of thrombocytes and small lymphocytes. The middle and lower parts contain the large lymphocytes and the granulocytes, with a variable infiltration of red cells at the bottom.

RESULTS

An examination of seven healthy persons aged 20–36 gave values ranging from 20 to 39 mg. per 100 g., with a plasma range of 0·4–1·4 mg. per 100 c.cm.; the average white-layer level was 29 mg. per 100 g. Duplicates performed on plasma showed a maximal difference of ±1%. Duplicates performed on white layer showed a maximal difference of ±12%. The greater discrepancy in the case of the white layer is probably due to the heterogeneous cytological composition. (The normal white-layer range found by Butler and Cushman[1] was 25–38 mg. per 100 g., their average normal value being 34 mg. per 100 g.)

In a case of acute clinical scurvy, on admission, ascorbic acid was absent from the plasma, but the white-layer level was 9 mg. per 100 g.

DISCUSSION

The ascorbic-acid content of leucocytes estimated by the hydrazine method agrees with the values given by the indophenol method. It therefore seems probable that the values which Butler and Cushman[1] obtained by the indophenol method and called "apparent" values do represent the true values, though the ultimate test would consist in simultaneous examinations of each specimen by the two different methods.

Our lower average value cannot be considered conclusive, as it is not yet statistically supported. It may, however, reflect the difference in nutritional level between the post-war British and the pre-war American populations.

SUMMARY

The hydrazine method of Roe and Kuether has been modified and adapted to a micro procedure for the estimation of vitamin C in leucocytes and platelets.

Estimations were made by this method in seven healthy persons and in one case of acute clinical scurvy. The values found in the healthy persons were 20–39 mg. per 100 g. and thus agree with the range obtained by the indophenol method.

Different spinning conditions and anticoagulants affect the histological composition of the white layer and interfere with the correct estimation of its vitamin-C content.

My thanks are due to Dr. A. Lyall for permitting and encouraging this investigation in his department.

Reviews of Books

A Synopsis of Orthopædic Surgery

DAVID LE VAY, M.S. Lond., F.R.C.S., orthopædic surgeon, Woolwich Memorial Hospital. *London*: H. K. Lewis. 1947. Pp. 242. *15s.*

Mr. Le Vay acknowledges his free use of Brailsford's, Girdlestone's, and Jones and Lovett's larger and well-authorised orthopædic works, and this may partly account for the success of this little book; but he is to be congratulated on the way he has pruned those larger works, and still written a textbook which will stand on its own feet. The text is lucid and never becomes a mere catalogue of names; written for undergraduates, it is factual, but though controversial matters are not discussed the facts are there in abundance, and the book would be useful—perhaps even more useful—to postgraduate students. References would be welcome in a second edition.

Clinical Hematology

(2nd ed.) M. M. WINTROBE, professor of medicine, University of Utah, Salt Lake City, U.S.A. London: H. Kimpton. 1946. Pp. 862. *55s.*

THE advances of the four years that have elapsed since the first edition of this book are fully covered, and revision of detail has been thorough. A welcome new chapter brings together much information on the "metabolism" of erythrocytes; this deals with the biochemical aspects of the production and destruction of red blood-cells, hæmoglobin metabolism, the place of the porphyrins, new evidence on iron metabolism derived from studies with radioactive tracers, the importance of the various vitamin-B-complex members, pigments, and an informative section on the fate of worn-out red cells. Much of this information is not yet really digested, and it is not the author's fault if parts of the chapter are a somewhat confusing catalogue of apparently unrelated detail—for example, "xanthopterin is a yellow pigment isolated from butterfly wings which has been shown to have hemopoietic activity in Chinook salmon." Recent

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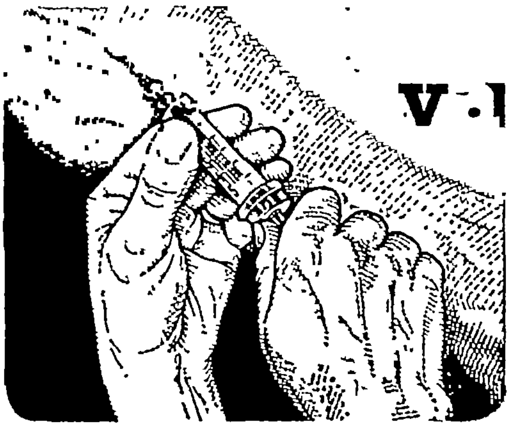

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The survey provided some useful information about the amount of medical attention received. In these adult samples 56% of the people were insured, and 95% of the insured relied on a panel doctor for their medical care. The private patients saw their doctor appreciably more often than the panel patients, the average number of consultations in the winter period being 1·76 for private and 1·31 for panel. In the whole sample the average number of consultations per head worked out at about half of one per month. About 30% of the ill saw their doctor at his surgery and 13% were visited at home: it would be interesting to know whether home visits were more plentiful among insured or among private patients, but this division is not made in the report. Nearly 3% of the ill attended a hospital outpatient department and no less than 8% sought advice from their chemist; 3·5% consulted a dentist, 2% an optician, and 3% a nurse or others.

The publication of a periodical statistical analysis of morbidity in the Registrar-General's quarterly returns will provide a record of the changes in the nation's health resulting from seasonal fluctuations, epidemics, and the effects of variations in policy, habits, and conditions. The surveys will also reveal more stable relationships between health and sex, age, income, and environment. Special inquiries can be made by adding supplementary questions to the schedules or by making a special survey among a selected sample of the population—in January of this year, for example, the incidence of deafness was inquired into for the Medical Research Council. Other plans under consideration are to study the relation between the health of old people and their occupations; and to obtain information about the health of people living under special housing conditions. It is proposed to extend the survey to cover all ages, and to record the health experience of a sample of complete families over a year. With such an organisation in full swing it should be possible to gauge fairly accurately the type and extent of our disorders for which the National Health Service must provide.

Iodine and Goitre

IT is useful from time to time to overhaul our beliefs and make sure that they still hold water. Nevertheless anyone who sets out to "debunk" some established method of preventing disease assumes a certain responsibility, particularly nowadays when the lay press is ever on the lookout for a startling break with tradition. Lately Dr. ISIDOR GREENWALD,[1] of New York, has denied that lack of iodine in food or water is the chief cause of endemic goitre, and his views, which the *Journal of the American Medical Association*[2] calls "extraordinary folly, unsubstantiated by anything resembling scientific evidence," have been widely quoted in the American press. Having almost certainly convinced many readers, both medical and lay, these views might therefore form a basis for serious opposition to the preventive measures now being pressed forward. It will be recalled that the Ministry of Health has recently decided to add iodine to the vitamin preparations distributed to expectant mothers, while the Goitre Subcommittee of the Medical Research Council[3] is urging the gen adoption of iodised salt, and the United States Congress is being asked to make the iodisation of table salt compulsory.[2]

It was CHATIN[4] in France, in 1852, who first established that the iodine content of water, food, and soil was low in regions of endemic goitre, but his work was discredited and then forgotten until BAUMANN[5] in 1896 discovered that iodine was a normal constituent of the thyroid. MARINE was one of the pioneers in demonstrating the relationship of iodine to thyroid structure and in showing that the iodine store varies inversely with the degree of active hyperplasia. In 1935 he said that, as CHATIN's observations had been generally confirmed by all workers, the view that goitre was caused by some specific virus or toxin must be abandoned.[6] It is now accepted that endemic goitre is a compensatory hypertrophy whose essential cause is a relative or absolute insufficiency of iodine, and on this basis large-scale attempts to prevent goitre by adding iodine to table-salt (usually 5–10 mg. of potassium iodide per kg. of salt) have been undertaken in Switzerland, Canada, America, Germany, Poland, Australia, and New Zealand, all with favourable results

GREENWALD argues that if endemic goitre really does arise from lack of iodine: (1) goitrous people should have low basal metabolic rates; (2) goitrous thyroids should contain less iodine than normal glands, not only per gramme of tissue but per entire gland; and (3) one should be able to produce goitre in animals by placing them on iodine-poor diets, and to prevent it by adding to these diets such small quantities of iodine as are found in ordinary foods The first of these assumptions is surely a non-sequitur and does not deserve consideration. Turning to the second, we do not see why, with progressive enlargement, the total iodine content of a goitre should not equal that of a normal-sized gland, though the concentration would be considerably less. As regards the third, goitres have in fact been produced by iodine-poor diets; but it is true that these experimental goitres cannot always be prevented or cured without giving the animal more iodine than a normal diet contains, and it is quite possible that some undiscovered factor is concerned. GREENWALD quotes the work of THOMPSON,[7] who showed that the addition of large amounts of iodine prevented goitre, whereas small amounts did not, and suggests that iodine may check a goitrogenic factor in some diets. Even this, however, does not argue against iodine-lack as a factor in the disease. GREENWALD makes much, too, of what he regards as uncontrolled analyses of natural waters, though actually few workers have attached much importance to the iodine content of water except as an indicator of the available iodine in the soil. (SHORE and ANDREW[8] in New Zealand found that generally speaking the incidence of goitre varied inversely with the iodine content of the soil, though there were unexplained anomalies.) He is also perturbed at the lack of controls in assessing the iodine content of vegetables, pointing out that the iodine

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THE LANCET

LONDON: SATURDAY, MAY 31, 1947

Prevalence of Sickness

UNTIL the last few years there was no reliable measure of the amount of non-fatal illness among our population; for only certain infectious diseases are notifiable, while the records of hospitals and national health insurance do not give an overall picture. This gap in our knowledge was particularly embarrassing during the war, and the Report of the Ministry of Health for 1946, just published,[1] describes some of the efforts made to close it. A fundamental step was the preparation of a coded classification of diseases and injuries [2] by a committee of the Medical Research Council in 1943; this is now used in Great Britain, but it is hoped that by next year all countries will have accepted the new international classification, covering causes of death as well as diseases and injuries, which is being drafted for the World Health Organisation. Further information was obtained from the records of admissions to E.M.S. hospitals, and from the sickness records of a number of firms collected by the Industrial Health Research Board. Finally, great success has been achieved by the monthly analyses of the health of random samples of the population instituted in 1944 by Social Survey, with the support of the Ministry of Health. Some of the survey's results have already been published, in the *Monthly Bulletin of the Ministry of Health*, by Dr. PERCY STOCKS, medical statistician to the Registrar-General, who has been principally responsible for devising and guiding the investigations, and future findings are to appear in the Registrar-General's quarterly returns. The first full report [3] traces the course of these studies from their inception up to the end of 1945.

The first survey for what has become known as the "health index" was made in January, 1944, to collect information about the previous three months. Further surveys, each covering the previous three months, were made during six months of 1944; and since February, 1945, a survey has been made every month. The number of schedules collected at each survey ranges from 2000 to 2500; and strict precautions are taken to make these truly random samples of the population between the ages of 16 and 64. From the start the public have given their willing support, fewer than 1% having refused to answer questions; this is perhaps partly because the interviewers are mostly women experienced in social work, though it is human nature to welcome a ready listener to the tale of one's misfortunes. The selection and training of the 300 interviewers employed is the task of six regional organisers, who hold a monthly conference with the research officer responsible for the health index, when flaws in the schedule are sought and corrected Despite all care the results cannot be taken at their face-value. Experience has proved that memory of minor illnesses, good for the immediately preceding month, is not so good for the month before that, and is worse still for the first of the three months under survey. Some people mention complaints which others would think too trivial; some statements are patently wrong (e.g., on the state of the teeth); and some information is intentionally withheld (e.g., about venereal diseases). Reliance on the patient's own diagnosis is probably not a source of serious error, for when in a similar survey in the United States the diagnoses were referred to the patients' doctors for confirmation there was agreement in 90%. One difficulty is the tiresome irregularity of the calendar: January figures cannot be compared with those for February without allowance for the three days' difference. Moreover, minor changes in procedure may produce apparent alterations in the incidence of disease, and variation in the quality of the samples (for instance, through demobilisation) may give a false impression of general improvement or deterioration.

The simplest count is of the number of people in each sample who have reported any kind of illness or injury during the preceding three months. The figures for corresponding months in 1944 and 1945 were very similar, the anticipated ebb and flow between summer and winter occurring in each year. For 1945 the percentage ill was highest in March (82%) and lowest in September and October (both 69%). The general increase of illness in the winter is attributed almost entirely to colds and influenza. Other main types of illness arise fairly steadily throughout the year, except "rheumatism" and nervous complaints, which appear to be more common in the summer, possibly because when people have no winter ailment they are more prone to complain of vague aches and pains or their nerves. In one winter period 79% of the sample reported some illness and 3·8% an injury, but only 70% of the injured also had an illness and only 3·3% of the ill also had an injury, which suggests that illness and injury do not go together, though regions with high illness-rates tend also to have high injury-rates. The proportion of the sample reporting illness rose steadily from the age of 16 to 64, but the amount of new illness decreased with advancing age; liability to injury was appreciably greater under than over 30 years of age. The incidences of both illness and accident were appreciably higher in urban than in rural areas, and there were pronounced differences between regions, not ascribable solely to varying degrees of urbanisation. The incidences in different occupations also vary widely; some occupations, such as agriculture and fishing, have low rates of both injury and illness, but on the whole occupations where injuries are common have low rates of illness, and vice versa. Health is related to wealth—liability to illness increases as income falls—but liability to injury is unaffected by income-level. Surprisingly perhaps, no relationship was established between total illnesses and number of persons per room in the household, but people living more than one to a room were particularly liable to some diseases, notably those of the mouth and teeth, and relatively free from others, such as cardiovascular disorders. Women, it was found, reported about 25% more minor ailments than men, but for more serious illness there was little difference between the sexes.

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[1] Report of the Ministry of Health for the Year Ended 31st March, 1946: including the Report of the Chief Medical Officer on the State of the Public Health for the Year Ended 31st December, 1946. H.M. Stationery Office. Pp. 194. 3s. 6d.

[2] *Spec. Rep. Ser. med. Res. Coun., Lond.* 1944, no. 248.

[3] The Social Survey: Survey of Sickness, October, 1943, to December, 1945, by Patrick Slater.

in many of the children classified as P.-I. or W.P.-I. reactors, there was a well-marked rise in titre three weeks afterwards, whereas in the N.-S. group all except 1 had no agglutination titre at the time of the test, and none retested three weeks afterwards showed any rise.

Felton and Flosdorf [20] used the agglutination test in investigating an epidemic of pertussis in a children's home. Of 74 children (including 9 cases of pertussis) skin-tested at the start of the outbreak, 34 were classified as N.-S., 21 as W.P.-I., and 19 as P.-I. The reactions in the 9 children suffering from whooping-cough at the time of the test were equivocal. Eight secondary cases occurred, 6 from the N.-S. group and 2 from the W.P.-I. group (the latter had no demonstrable agglutination titres at the time of the test). The skin-testing once more led to a definite rise in agglutination titres estimated a month later. The elevation might have been ascribed to the presence of pertussis in the home, but in another group of children living under similar conditions except that there was no evidence of pertussis a similar rise was found after skin-testing. In an outbreak investigated at another home, the 5 secondary cases occurred in the N.-S group. Smolens and Mudd [21] extracted agglutinogen by chemical methods instead of sonic disruption of the bacterial bodies, and Felton et al.[15] compared the reactions from the two types of agglutinogen, concluding that 5 units of the acid-extracted substance (designated E.-I) was equal to 10 units of the sonic extract (A.-I). In an institutional epidemic in a children's home, where pertussis was almost a yearly occurrence, the children were tested with both types of agglutinogen in 1943. When an epidemic occurred after skin-testing was completed all 10 cases were in the N.-S. group. Subsequently all entrants have been skin-tested and the susceptible immunised. No further outbreaks have been recorded.

Thus agglutinogen is apparently a stable fraction of the pertussis bacillus, which, when freed from toxic components of the disrupted organisms, gives consistent results in the detection of immunity or susceptibility. It has also a pronounced stimulating effect on the production of agglutinins, and if these early findings are confirmed, it may have an important rôle either as an immunising agent in itself or as a means of increasing the protective antibodies of children already immunised with whole bacterial vaccines.

Proper Care of the Old

Protests about the neglect of old people are common and shocking enough. Yet, bad as things are, some hospitals, some counties, some voluntary bodies, and some individuals are already making a good job of looking after the old. Believing that it may be useful to describe a few of the best examples, we open in this issue a series of articles on Modern Care of Old People, beginning with an account of capable treatment in hospital. Other articles will discuss homes and housing for those who are well, special methods of treatment for the ailing, and ways of overcoming staffing difficulties. None of these homes or hospitals can claim to have achieved perfect care of the old; but in all of them those in charge have grasped that their task is active not passive; they have shaken off inertia, and, whatever the frustrations and handicaps, are set on steady advance. We hope they will infect others with their discontent.

Annotations

BOVINE TUBERCULOSIS IN THE LUNGS

The part played by the bovine tubercle bacillus in the causation of non-pulmonary tuberculosis has been studied by several workers in Great Britain, Scandinavia, Germany, and the United States, and is now fairly well defined. It is known, for example, that in England and Wales about 30% of *all cases of non-pulmonary* tuberculosis are due to infection with the bovine type; and much the same proportion holds true for Denmark. The findings of the Royal Commission, and later of Stanley Griffith, that only about 1% of cases of *pulmonary* infection were due to the bovine type led to the conclusion that, for all practical purposes, this organism could be ignored as a cause of human phthisis. This belief was generally held for many years, and was not seriously challenged till W. T. Munro in Scotland and B. Lange in Germany reported a considerably higher proportion of bovine strains. Further observations showed that bovine pulmonary infections were much commoner in Scotland than in the south of England, where most of Griffith's early studies had been made, and that they were commonest of all in the north-eastern region of Scotland. Work by K. A. Jensen and his colleagues in Denmark added weight to these conclusions, since, in a study of 3708 strains of tubercle bacilli from cases of pulmonary tuberculosis, the bovine type was found to comprise 5·3%. The question then arose: how does the bovine tubercle bacillus reach the lungs? Griffith and Munro leaned towards the view that in these cases pulmonary tuberculosis was a late manifestation of a previous glandular infection contracted via the alimentary tract. Lange, on the other hand, finding a high proportion of his cases among farm-workers, was inclined to attribute infection to direct inhalation of contaminated dust.

Fresh light is thrown on this problem by the studies in Denmark of Sigurdsson.[1] As he concentrated exclusively on pulmonary tuberculosis his patients were nearly all adults. In his first study he collected information on 566 strains of tubercle bacilli that had been sent for examination between 1932 and 1940 to the State Serum Institute at Copenhagen; of these, 91 (16·1%) proved to belong to the bovine type. Studying the origin of these strains, he found that 67 (40·6%) were derived from the 165 patients who had been living during the two previous years in country districts, 11 (28·2%) from the 39 patients who had spent part of their time in the town and part in the country, and only 13 (3·6%) from the 362 patients who had been living under urban conditions. Further analysis revealed that, among the 67 rural patients infected with the bovine type, 63 had been recently in contact with strongly tuberculous herds of cattle, 4 with herds containing healthy reactors, and none with only tuberculosis-free herds. These observations suggested very strongly that close contact with tuberculous cattle was the chief condition responsible for the development of bovine pulmonary tuberculosis in man.

Milk-borne infection, however, seemed to be largely ruled out, for three reasons: firstly, the clinical features were *those of primary lung disease*, not those of an alimentary infection; secondly, the younger children, who drank milk but who were not in close contact with infected cattle, did not develop pulmonary lesions; and thirdly, pulmonary tuberculosis in adult rural workers who were not living on infected farms but who were exposed to milk-borne infection from these farms was uniformly due to infection with the human type.

Following up this work, Sigurdsson surveyed the population of a rural parish (Grimstrup) in the county of

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20. Felton, H. M., Flosdorf, E. W. *J. Pediat.* 1946, **29**, 677.
21. Smolens, J., Mudd, S. *J. Immunol.* 1943, **47**, 155.

[1] Studies on the Risk of Infection with Bovine Tuberculosis to the Rural Population, with Special Reference to Pulmonary Tuberculosis. By Jón Sigurdsson. London: Oxford University Press. 1945. Pp. 250. 15s.

content of the same vegetables growing in the same soil varies considerably, and that the differences between them are at least as great as between vegetables in different regions. Nor is he satisfied with the work done on the recovery of iodine from urine and fæces. Finally, he remarks that prophylactic iodine, while reducing the incidence and severity of goitres, does not entirely prevent them; and he says that in some districts the reduction has coincided with a spontaneous decrease.

Simple iodine-lack is no doubt not the whole story. Thus a high content of calcium in the drinking-water reduces the metabolic effects of thyroxine; a high-protein diet can produce goitre experimentally; and many food constituents affect the thyroid. When investigating a goitrogenic factor in rape-seed, Kennedy[9] in New Zealand discovered that allyl-thiourea produced thyroid enlargement in rats; and it was this that eventually led Astwood,[10] of Harvard, to try thiourea as a remedy for thyrotoxicosis. Campbell et al.[11] in Aberdeen then showed that thiourea has a peculiar chemical affinity for iodine: by binding with iodine, it may interfere with the synthesis of thyroxine. Some goitrogenic principles evidently act through the pituitary, for their action is inhibited by hypophysectomy; and perhaps the individual response to them depends on the degree of pituitary activity. The subject is thus complex, and it cannot be said that the pathogenesis of endemic goitre is yet fully understood. But those who connect the condition with iodine deficiency need lose no sleep over this fresh analysis.

Skin-tests in Pertussis

Whooping-cough now occupies first place as a cause of death among the specific infectious diseases of childhood. Some 60–70% of children suffer from it before they reach school-leaving age, and nearly half the cases occur in the pre-school period. Evidence of the development of immunity after natural infection or artificial immunisation has so far been dependent on the demonstration of antibodies in the blood by the estimation of agglutination titres, or by the complement-fixation or opsonocytophagic tests, but such methods—necessitating blood samples from young children—are not practicable outside the experimental field. A reliable skin-test would greatly simplify the study of the epidemiology of pertussis and the assessment of the potency of antigens. So far four substances have been investigated as possible reagents: (1) killed suspensions of *H. pertussis* in phase I; (2) crude extracts of bacterial bodies; (3) agglutinogen; and (4) purified toxin. The first three give an allergic type of reaction similar to the Francis skin-test in pneumonia—i.e., a positive result is taken as an indication of immunity.

Thomson,[12] who investigated the reliability of killed suspensions of *H. pertussis* in varying concentrations, found that these gave non-specific reactions and were of no value in determining immunity or susceptibility, a conclusion which confirmed the experience of earlier workers. By means of an "endotoxin"—a saline extract from ground bacterial bodies—he obtained positive reactions in 85% of children with a history of pertussis, but 30% of control children with no history of infection were also positive. He suggested that the latter results might be due to immunity derived from subclinical infections or from undiagnosed attacks. Strean[13] found that purified toxin extracted from *H. pertussis* by physical methods gave an erythematous reaction comparable to the Schick test in diphtheria—a positive result indicated susceptibility and a negative result immunity. Margaret Kunstler[14] supported his findings on the basis that 65% of children between six and eight months old gave a positive (susceptible) reaction, but Felton et al.[15] found the toxin was of no value in distinguishing susceptible from vaccinated children, and Silverthorne et al.[16] concluded from their investigations that the test in its present form was not a reliable index of susceptibility or immunity.

Agglutinogen was described by Flosdorf and Kimball[17] as a highly purified fraction separated from toxic components by chemical means after sonic disruption of *H. pertussis* in phase I. When inoculated into rabbits it produced high serum-agglutination titres, and intradermal injection into rabbits immunised with *H. pertussis* in phase I resulted in an indurated reaction at the site of inoculation. This reaction did not develop in rabbits immunised with *H. pertussis* in phases III and IV, with *H. parapertussis*, or with unrelated organisms. After standardisation in arbitrarily chosen units based on assay by absorption of agglutinins from immune serum, Felton and Flosdorf[18] used 10 units of agglutinogen in 0·1 ml. of 0·85% sodium chloride as the intradermal dose for children. Three types of reaction were observed at the site of injection:

(1) *Positive-immune* (P.-I.).—A well-indurated reaction (with or without erythema) 20 mm. or more in diameter at either ½ hour or 24 hours or both.

(2) *Weakly Positive-immune* (W.P.-I.).—An indurated reaction (with or without erythema) not exceeding 20 mm. in diameter at either ½ hour *or* 24 hours, but at least 10 mm. in diameter at either time or both.

(3) *Negative-susceptible* (N.-S.).—No indurated reaction at either ½ hour or 24 hours beyond an area 10 mm. in diameter.

Induration, not erythema, was taken as the determining factor in classifying the reactions. There were no untoward local or systemic effects after injection; the reaction faded quickly and usually disappeared within 36 hours. In this first investigation 94 babies aged six to fourteen months were used as controls. All gave the N.-S. reaction. Of 305 vaccinated children, 23 were N.-S. (subsequently they were found to have been immunised with a vaccine of questionable potency), 112 were classified as W.P.-I., and 170 as P.-I. Of children with a history of pertussis (not necessarily accurate) 21 were N.-S., 38 were W.P.-I., and 52 were P.-I. In a further series Flosdorf et al.[19] obtained similar results. Of 122 "control" children aged six to fourteen months, only 1 gave a positive reaction; 89% of children with a history of pertussis and 92% of vaccinated children were classified as P.-I. or W.P.-I. Although agglutination titres done at the same time as the test were negative or nearly so to 49 years and decreases rapidly until 70. Accordingly the mortality in women is 143% of the estimated mortality, and in men 288%, or more than double the normal. Bechgaard postulates a sex difference which causes the circulatory system to be more resistant to raised blood-pressure in women. The prognosis becomes worse with increasing age owing to associated myocardial degeneration, and it is bad in malignant hypertension.

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[9] Kennedy, T. H. *Nature, Lond.* 1942, 150, 233.
[10] Astwood, E. B. *J. Amer. med. Ass.* 1943, 122, 78.
[11] Campbell, D., Landgrebe, F. W., Morgan, T. N. *Lancet*, 1944, i, 630.
[12] Thomson, A. R. *J. Hyg., Camb.* 1938, 38, 104.
[13] Strean, L. P. *Canad. med. Ass. J.* 1940, 42, 525.
[14] Kunstler, M. *Ibid*, 1945, 52, 62.
[15] Felton, H. M., Smolens, J., Mudd, S. *J. Pediat.* 1946, 29, 657.
[16] Silverthorne, N., Fraser, D. T., Brown, A. *Canad. med. Ass. J.* 1944, 50, 129.
[17] Flosdorf, E. W., Kimball, A. C. *J. Immunol.* 1940, 39, 475.
[18] Felton, H. M., Flosdorf, E. W. *J. Pediat.* 1943, 22, 259.
[19] Flosdorf, E. W., Felton, H. M., Bondi, A. jun., McGuinness, A. C. *Amer. J. med. Sci.* 1943, 206, 421.

Although Bechgaard's material consists of patients who had a blood-pressure of 160/100 mm. Hg, or a systolic blood-pressure of 180 mm. Hg at the first examination, he defines the upper limits of normal blood-pressure as 140/90 mm. "in agreement with most of the recent investigations." Accordingly, he regards people who have a blood-pressure of more than 140/90 mm. as hypertonics, even if they are over 40 years of age. He adds, correctly, that "with this limit a very large number of older people (in case of the oldest more than 50%) are regarded as hypertonics." This would not be accepted by British and American observers, who regard as abnormal in people over 50 a blood-pressure of 170/105 mm. Hg taken under proper precautions on at least three occasions.[8]

DETERMINING THE TIME OF OVULATION

IN the investigation of cases of infertility it is often important to ascertain the time of ovulation. The methods used for this purpose include examination of the vaginal smear and the cervical mucous plug, biopsy of the endometrium, and, more recently, charting of the temperature, which theoretically should show a slight fall at the time of ovulation.[9] Unfortunately this last method, which has the attraction of simplicity, does not seem to be proving as accurate as was hoped.

Farris,[10] of Philadelphia, proposes another way of establishing the time of ovulation. He finds that if the patient's urine is injected into an immature white rat, the rat's ovaries become hyperæmic if ovulation is taking place, but not otherwise. The first morning specimen of urine is used, and 2 ml. is injected subcutaneously into each of two animals. The animals are coal-gassed after two hours and the abdomens opened. The degree of redness of the ovaries is compared with a standard colour chart. Farris attributes the hyperæmia to the action of pituitary gonadotrophin, which shows a peak rise at the time of ovulation.

This new test is certainly of scientific interest, and should prove valuable in laboratories equipped to perform it. The reading of the reaction, however, is by no means easy, and Farris admits that abnormal reactions are fairly common. We still await the simple, cheap, reliable, easily interpreted test for ovulation which gynæcologists would find so useful.

FUTURE OF PREVENTIVE INOCULATIONS

THE list of diseases for which satisfactory preventive inoculations have been discovered is ever lengthening. Dr. H. J. Parish, in his presidential address to the epidemiological section of the Royal Society of Medicine on May 23, reviewed current immunological procedures for each disease in turn. In the prophylaxis of diphtheria and tetanus, typhoid and typhus, smallpox and rabies, yellow fever and cholera, the use of an appropriate vaccine or toxoid is universally practised. Evidence of the value of pertussis vaccine is still somewhat contradictory, and the short-lived immunity obtained from influenza vaccine at present limits its application. Promising preliminary reports are appearing on the use of an attenuated mumps virus, and an effective attenuated measles virus may in time be produced. Dr. Paris believes that advances depend on close coöperation between the immunologist, the bacteriologist, and the chemist. Many unsolved problems remain to be tackled. Knowledge of the basis of racial and species immunity (inherent non-susceptibility) is entirely lacking. There is no explanation of the immunity of man to avian tuberculosis or of dogs and goats to tetanus. Again, we know that immunisation of the pregnant mother with diphtheria prophylactic raises the circulating antibody titre of the child, but although passive immunity can be conferred on the mother by injection of diphtheria antitoxin in horse serum, these immune bodies do not pass the placental barrier. Most exotoxins can be measured quantitatively and qualitatively, and they are relatively stable substances; but endotoxins are in a different category and our present understanding of their action is much less complete. Dr. Parish suggested that in the near future much effort will be expended on elucidating the antigenic structure of organisms and preparing pure stable antigens capable of exact measurement and less likely to produce allergic manifestations. Other paths of research are the use of new mineral salts to combine with antigens—such as the aluminium-phosphate diphtheria toxoid of Holt—and careful assessment of the antigenic potency of strains used in the preparation of vaccines and toxoids. The work of Barr and Glenny,[1] showing that higher antibody titres can be obtained with two doses of A.P.T. at a three-monthly interval (instead of the usual one month) reminds one that we do not yet know the optimum spacing or dosage of diphtheria toxoid.

There is little hope, in Dr. Parish's view, that artificial immunity will be obtained without recourse to parenteral injections, and the ideal of all antigens being administered in one single inoculation is far in the future. The growing practice, however, of combining certain antigens (e.g., diphtheria and tetanus toxoids with pertussis vaccine) should, he thought, become more common, for it reduces the number of injections without apparently reducing the immunising value of each antigen.

OUT OF POCKET

ENGLISH local government has a fine record of unpaid service. Those taking part have given generously of their leisure and energy, and in the past they have not grudged the expenses that went with their duties, for they were usually in a position to afford them. Today, however, with altered social and economic conditions many of those best fitted to serve on local councils can only do so at a sacrifice which we are beginning to feel it is unfair to ask them to undertake. The interdepartmental committee which have just reported[2] to the Ministry of Health and the Scottish Home Department on the expenses of members of local authorities confirm these uneasy fears. From the evidence they received they gained the impression that some members were suffering undue hardship, and that suitable candidates were being deterred from standing for election by fear of expense and loss of time. They have therefore recommended that local authorities should have power to pay allowances to councillors who lose remunerative time in attending meetings and carrying out their public duties, and that councillors should be entitled to be paid travelling expenses and subsistence allowances. The principle involved is of importance to the new health service, which will depend so much on the wisdom and generosity of those who sit on its committees and boards. If we are to have practical members chosen from among working people—whatever their work may be—it is important that no-one should be hindered from accepting office from fear of out-of-pocket expenses.

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[8] Evans, W. Lecture to the Association of Industrial Medical Officers in London on June 19, 1946.

[9] Barton, M., Wiesner, B. P. *Lancet*, 1945, ii, 663; Halbrecht, I. *Ibid*, p. 668; Nieburgs, H. E. *Ibid*, 1946, i, 627.

[10] Farris, E. J. *Amer. J. Obstet. Gynec.* 1947, **52**, 14.

[1] Barr, M., Glenny, A. T. *J. Hyg. Camb.* 1946, 44, 135.

[2] Cmd. 7126. H.M. Stationery Office.

ibe, to determine the incidence of tuberculous infection. o fewer than 680 out of the 745 persons in the parish ubmitted to examination, which included a tuberculin est, radiography of the chest, and bacteriological nvestigation wherever pulmonary tuberculosis was uspected. For purposes of analysis the subjects were ivided into three groups, according to whether they ad been in contact with strongly-tuberculous herds, pparently healthy reactors, or only tuberculin-negative erds. In the first group 4·8%, in the second group ·8%, and in the third group none, showed evidence f pulmonary tuberculosis (not necessarily active). A econd survey was carried out on 100 families living on arms where there was a large amount of tuberculosis n the cattle and on 100 families living on farms where ll the cattle were tuberculin-negative. In the former roup 3·0% of persons showed evidence of pulnonary tuberculosis, and in the latter group only ·3%.

The general conclusion reached from these results is hat in Denmark pulmonary tuberculosis of bovine rigin is mainly due to close contact with tuberculous attle, and that infection is contracted by inhalation ather than ingestion.

STANDARDS OF MEDICAL EDUCATION IN U.S.A.

ONE of the subjects discussed at the meeting of the New York Academy of Medicine in April was how to improve medical education.[1] Dr. Carl Eggers pointed out that it was in 1904 that the first real steps were taken to coördinate the various educational systems under the committee of medical education created by the American Medical Association. This was followed by the gradual elimination of inferior schools, and in 1910 the first classification of medical schools was published. The United States now has 69 schools which offer the complete course, and 8 which offer only the first two years of medical training.

Much attention has been given in the last few years to the status and education of the general practitioner, who is justly called the "forgotten man" of medicine. A good working knowledge of the body as a whole, early manifestations of diseases such as cancer and tuberculosis, acute medical and surgical emergencies, and obstetrics calls for considerable postgraduate experience. But in the light of English custom it is surprising to learn that in America before the war 18 months or 2 years of house-jobs was considered normal, and the 12 or 9 months during the war was thought to be a very short time.

Concerning the teaching which residents receive, it is more and more being realised that recently qualified doctors are not in residence only to benefit a particular hospital, but to learn as well. Dr. David Seegal criticised the present system, pointing out that 87 out of the 111 hospitals in greater New York have no university affiliations. Two major attempts had been made to alter this state of affairs, one in New York and the other in the State of Michigan. The chief difficulty in both cases seems to have been that the available staff did not have enough time to devote to teaching, and in New York two hospitals were chosen for study, each one nominating a medical and surgical teacher (usually doctors who had just finished their residencies) who spent a third or half of their time in teaching and study. After a year's trial this scheme seems to have worked well, and is generally popular. The Michigan plan has been an altogether larger design; much seems to have been done to improve the education of the doctors in this State. The central authority is the university, to which any hospital can ask to be affiliated. The hospital must then agree to provide a minimum teaching programme for the benefit of its residents, which includes daily ward rounds, X-ray and pathological conferences, and so forth. In return the university provides lectures in the various specialties. The great advantage of this scheme is that it not only caters for the man who wishes to specialise but improves the teaching capacity of the smaller hospital. The urgent problem is now to make general practice more attractive by limiting the process of infiltration which has gradually been removing pieces from the practitioner's frontier; such innovations as the health centre should help.

PROGNOSIS OF RAISED BLOOD-PRESSURE

As early as 1913 Janeway[1] called for caution in giving a bad prognosis in cases of raised blood-pressure. He demonstrated that many patients with essential hypertension lived for years in good health and were completely fit for work. Benni,[2] who reported that 112 (77%) out of 146 patients with hypertension died after 4 to 14 years, admitted that his figures were not quite significant since many of his patients were aged seventy years and upwards. Blackford et al.[3] followed up 222 patients out of 401 from 5 to 11 years after a systolic blood-pressure of more than 175 mm. Hg had been found. Of these, more than half (70% of the men and 39% of the women) died between the first and second examinations. The average duration of life after discovery of the hypertension was 32 months. The death-rates for moderate and severe hypertension were the same. Russek[4] noted that if the diastolic pressure was normal expectation of life was not adversely affected by a raised systolic pressure. Rosling,[5] who followed up 450 patients with raised blood-pressure (the limit being 160 mm. Hg and over), found that of 102 of them who had essential hypertension without complications only 30% were dead 8 years later. Wagener and Keith[6] grouped hypertensives according to the changes of the vessels in the fundi. In the four groups described by them they examined 209 patients, and in the follow-up 5–9 years later 40%, 65%, 92%, and 99% were dead.

In his recent monograph Poul Bechgaard[7] has reported on a follow-up of over 1000 hypertonics. His material consists of 325 men and 713 women who at the first examination had a blood-pressure of 160/100 mm. Hg or over, and 97% of them were examined very carefully 4–11 years later. The patients were mainly working men and women between 40 and 69 years of age, the age-group 50–59 being the largest. Bechgaard emphasises as one of the main characteristics of arterial hypertension the well-marked lability of the blood-pressure and its increased amplitude. Electrocardiographic examinations showed signs of myocardial disease in 30%. Cerebral hæmorrhage was found in 8·3% and hypertensive encephalopathy in 3·5%. Malignant nephrosclerosis was found in only 13 patients at the second examination, 11 of whom had already had symptoms at the first. In Bechgaard's view malignant nephrosclerosis may be due to a number of different conditions, such as psychological strain, infection, arteriosclerosis, syphilis, or lead poisoning. From his figures, the prognosis of essential hypertension, judged from the death-rate, appears to be very good indeed. It is remarkable that 41% of the men and only 22·4% of the women died during the period of observation. If the normal mortality for the (Danish) population is taken as 100%, Bechgaard calculates the excess mortality in his series as +188% for men and +43% for women of all ages. The excess mortality is high up

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[1] Medical Information Bureau; New York Academy of Medicine, April 10, 1947.

[1] Janeway, T. C. *Arch. intern. Med.* 1913, 12, 755.
[2] Benni, B. *Acta med. scand.* 1926, suppl. 64, p. 512.
[3] Blackford, J. M., Bowers, J. M., Baker, J. W. *J. Amer. med. Ass.* 1930, 94, 328.
[4] Russek, H. I. *Amer. Heart J.* 1943, 26, 11, 289.
[5] Rosling, E. *Acta med. scand* 1934, suppl. 83; *Ugeskr. Læg.* 1934, 96, 341.
[6] Wagener, H. P., Keith, N. M. *Medicine, Baltimore,* 1939, 18, 317.
[7] Bechgaard, P. *Acta med. scand.* 1946, suppl. 172.

Modern Care of Old People

I

A NEW OUTLOOK IN THE WARDS

The West Middlesex Hospital

NEGLECT of the old in institutions is rather the rule than the exception. Several things have contributed to this dismal situation: want of staff, want of buildings, want of equipment, even want of paint. But the outstanding trouble is want of imagination in the doctors and nurses who look after them. Some infirmaries are still scrap-heaps to which the medical staff of acute wards send any case which seems "not worth treating"; and when doctors discard patients in this bored and defeated spirit, nurses can hardly be blamed for feeling they are scarcely worth nursing.

In the West Middlesex County Hospital a new spirit has been developed in the reablement of elderly people with long-term ailments. Patients are classified according to their condition, and are actively treated in a hopeful atmosphere. The geriatric wards, under Dr. Marjory Warren, are treatment wards equipped to meet the special requirements of the aged.

Probably no condition is so hopeless or so chronic that it cannot be eased, perhaps ameliorated, by the resources of a good doctor; and it is precisely in the care of such patients that the nurse achieves her highest skills.

A NEW CHANCE

The West Middlesex is a large general hospital, of over 1200 beds, which in the old days shared its site with a poor-law infirmary. A medical officer, whose chief work lay in the hospital, attended daily to initial medicine-cards, and to see any of the old people whom the sister thought not so well. The wards were painted in the chocolate and dark green shades beloved of guardians; the pendant electric lights were ill placed, shining in the eyes of sick patients and giving poor light to those wanting to read. Every ward had its mixture of healthy elderly patients who could get up; sick patients needing treatment or dressings or both; senile, incontinent, and demented patients, some of whom were restless and disturbing to others; old people, young people, and even children.

In July, 1935, the infirmary was taken over by the hospital, under the Public Health Act of 1929; and this was recognised as an opportunity. It was not easy, however, to know where to begin; the wards were in the Victorian tradition, equipped with low black iron beds and lockers which had to be shared between two patients, and fitted with ordinary domestic doors, partitions which prevented the easy transfer of beds from one section to another, and many other awkwardnesses. Indeed these wards had never been built or equipped to take sick patients, but to house the elderly in dormitory fashion. Extravagant outlay was not possible: it was a question of making the best use of what lay to hand. A careful survey was made of each of the hundreds of inmates, and scores of their relatives and friends were interviewed before reforms were planned. Early in 1936 the first steps were taken in building up the present geriatric unit.

Patients were classified afresh; the younger ones—that is, the under-60's—were separated from the old, who range (especially in the women's wards) up to 96 and 97. An early change was in the colouring of the wards. Walls were painted cream, and comfortable high nursing beds painted in pale colours were bought for the sick; low beds suitable for use of ambulatory patients, and equally easy to work, replaced the old black iron ones. The frames carrying doors were removed from the central partitions, leaving a not ungraceful archway through which beds could readily be pushed. Lockers of a good type, one for each patient, rep the old clumsy kind.

By 1938 it had become possible to replace the doors of the ward by swing doors which nurses with hands could push open without fumbling for a door and through which a bed could pass without being dismantled. At this time, too, the pendant lights were exchanged for opaque bowls set above the beds, from which a bright but gentle light was thrown upwards.

Scarlet top-blankets and light-coloured bedspreads and screen-curtains also helped to change the look of the place, and relatives were encouraged to visit, and to bring flowers to, the patients. This different atmosphere interpreted a difference in the care of the patients, which has been steadily growing through the years.

The old-age groups, in the course of time, were classified still further. Those with acute illnesses were sent to wards where their conditions were investigated and treated. Restless patients, or those liable to lean to one side and fall out of bed, were nursed in wards with cot-beds. Ambulatory patients, including those fit for discharge and waiting for a vacancy in a residential home or hostel, and also those who need to stay a little longer in hospital, and yet who do not need to stay in an acute sick ward, are grouped together in a ward for up-patients. Finally, there are wards for the incontinent.

The decision to put all the incontinent women together in one ward was made in an experimental spirit, for it was thought the nursing staff might find it objectionable. The medical director and matron, however, agreed to give it a trial; and the sister of the ward found in it an opportunity for some remarkable work. Since March, 1936, the ward has had only three sisters in all, and the present sister has been in charge for over four years. Some 45 incontinent women fill the beds, yet there is no unpleasant smell and no atmosphere of depression; and though most of the patients are senile the atmosphere of this ward is as cheerful as that of the rest.

Nursed according to a routine worked out by an interested and experienced sister, every patient is made comfortable, and none fears she may annoy her neighbour, or worse still her neighbour's visitors, as may happen when a solitary incontinent patient is nursed in a ward with others. The patients are thus spared the feelings of guilt and unhappiness which the incontinent patient nursed in a busy general ward so often develops. The ward is equipped with 900 draw-sheets and adequate quantities of other linen, which greatly eases the nurses' problem. Under these favourable conditions the sister finds she is able to train some patients back into continence. A sister undertaking this difficult and important work is at one of the growing-points of her profession; and in this hospital she has the prestige her work deserves.

In the cot-bed ward for restless patients, too, the sister is keenly interested in their progress.

OUTLOOK

Perhaps the greatest change has been in the prognosis of the patients. It is assumed from the start that they want to get well enough to go back either to their own homes, or to the residential homes from which they came; and 30% of them do. Patients admitted after a stroke, for example, are not left lying in bed until their limbs become fixed in permanent contractures; they are encouraged to take an interest in their condition, to exercise the affected limbs from the day of admission or as soon as they are able to do it. After a few weeks they get up and practise pulling themselves upright from a chair placed at the foot of the bed, by holding on to the bed-rail; later they learn to walk a few steps with help, and finally they go down to the gymnasium, where they practise with the walking-machine, learn to go up and down steps again, meet and talk with others showing like disabilities and progress, and develop a healthy spirit

Special Articles

HEALTH IN 1945-46

The Ministry's Annual Report

THE transitional period between war and peace, though cking the historic appeal of the war years, has proved ne of peculiar difficulty for our health services. The eturn of vast numbers of soldiers and prisoners-of-war, any of them convalescent from or carriers of a variety f infectious and tropical diseases, set an unprecedented ublic-health problem, and Sir Wilson Jameson, the hief medical officer of the Ministry of Health, whose eport for 1945 is for the first time incorporated with he Ministry's annual report,[1] is justly proud of the uccess of his officers in preventing the spread of such angerous invaders as typhus, smallpox, and malaria.

VITAL STATISTICS

The birth-rate, which had reached 17·7 per thousand ving in 1944—the highest since 1926—declined to 5 9; but this was obviously the result of the departure f large forces overseas. The death-rate was 11·4, and he civilian death-rate, which included violent deaths f civilians due to war operations, was 12·6 per 1000 —slightly better than the average of 12·7 for the three receding years. The rising proportion of old people n our population was reflected in increases in deaths ue to diseases to which they are most liable. Thanks o the small amount of traffic, road accidents accounted or only 4572 deaths, the lowest number for many years, hile fatal war casualties amounted to 5239, almost all f these occurring in the first third of the year.

INFECTIOUS DISEASES

Here the striking features were the continued fall in the mortality from measles and scarlet fever in children, a repetition of the fortunate experience of the war years as regards influenza and the enteric fevers, and fewer deaths from pneumonia, but more dysentery.

Influenza.—The fear of a reappearance of the pandemic of 1918 was not fulfilled, and there was no need to embark on the large-scale plan of immunisation which had been prepared. Only 2686 deaths were recorded from this cause, the lowest total for thirty years.

Diphtheria.—Both notifications and deaths reached new low records, with totals of 18,596 and 722, compared with 23,199 and 834 in 1944. Since mass immunisation was introduced in 1940 the deaths in children aged 2–15 years have steadily fallen, the rate in 1945 being 6·7 per 100,000, against 28 in 1941. At ages under 2 and over 15 years there has been a slight rise.

Measles.—Notifications reached the highest figure since 1940, when notification began, yet out of 446,796 cases there were only 729 deaths, a fatality-rate of 0 16%, about a seventh of that of whooping-cough.

Cerebrospinal fever.—The 555 deaths (out of 2063 notifications) were fewer than in any year since 1928 except 1939.

Poliomyelitis.—Notifications (784) were higher than the previous year (464) but little more than half the figure for 1938, the epidemic year.

Intestinal diseases.—The remarkable freedom from typhoid fever continued, but notifications of dysentery again rose, to 16,278; how far this was because of better recognition is unknown; in some 87% the causative organism was *Shigella sonnei* and in the remainder mostly *Sh. flexneri.* Of the food-poisoning outbreaks investigated nine-tenths were apparently due to salmonella infections; the danger of insufficiently cooked duck's eggs was again demonstrated.

Jaundice.—Only small outbreaks of epidemic hepatitis were reported in the year, and there were no cases of jaundice following prophylactic or therapeutic inoculation; but the last battles of the war left an aftermath of post-transfusion jaundice, the incidence in one series being 82 per 1000 persons transfused. Weil's disease was the certified cause of 29 deaths, and the case-mortality seems to be about 10%.

Tuberculosis.—The downward trend of the mortality among the population as a whole, interrupted in the war, was resumed, but there was an increasing shortage of beds for treatment, mainly because of shortage of nurses and domestics.

Venereal diseases.—By importing infection from abroad and increasing the young adult population, demobilisation raised the incidence of both syphilis and gonorrhœa, but the large number of people who attended the clinics for examination and were found to be free from infection showed a satisfactory awareness of the value of early treatment.

MATERNITY AND CHILD-WELFARE

The infant-mortality rate (46 per 1000 live births) was slightly higher than in 1944, while the stillbirth-rate (28 per 1000 total births) remained the same. Maternal mortality reached the lowest level ever recorded (1·80 per 1000 total births), and if deaths following abortions are excluded the rate was 1·47 per 1000. Considering the shortage of staff and the resulting pressure on the maternity services generally this was a highly creditabl record.

LABORATORIES

The year saw the beginning of the conversion of th Emergency Public Health Laboratory Service into permanent structure. Staffing presented considerabl difficulties, because few trainees had been permitted during the war, and not many Service pathologists ha the necessary training and experience for these civilia posts. An important step initiated was the establishmen of a central public health laboratory in the premises o the Government Lymph Establishment at Colindale. The Medical Research Council, which had previously administered the emergency public health laboratories in the provinces, took over control of those in the London sectors from the Ministry of Health, but it was thought advisable to leave the supervision and coördination of central London laboratories in the hands of the London County Council.

THE AGED AND CHRONIC SICK

The ten hospital surveys, summarised in the report by Dr. T. S. McIntosh, revealed a serious deficiency in beds (estimated at at least 40%), the obsolescence of many of the existing buildings, a shortage and maldistribution of specialists, and the need for more special centres. The plight of the chronic sick was emphasised in every report, and one refers to the "masses of undiagnosed and untreated cases of chronic type which litter our public assistance institutions."

Sir Wilson Jameson points out that the medical student has in the past received too much of his clinical instruction on patients who are acutely sick. This has tended to make doctors unduly pessimistic as to what can be done for the chronically sick and aged. Steiglitz in America has remarked that the aged sick, simply because they are old, are too often denied modern treatment, though in fact old people tolerate surgery, for example, quite well, and with adequate medical and nursing attention often make surprising recoveries from serious injuries and illnesses. Dr. E. L. Sturdee calls for research into suitable accommodation for the aged and also into the early diagnosis and special treatment of those diseases which are not fatal but may lead to years of incapacity unless they

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[1] Report of the Ministry of Health for the year ended 31st March, 1946, including the Report of the Chief Medical Officer on the State of the Public Health for the year ended 31st December, 1945. H.M. Stationery Office. Pp. 194. 3s. 6d.

Reconstruction

POSTGRADUATE EDUCATION IN THE SERVICES

P. K. FRASER
M.D. Glasg.
SURGEON COMMANDER ROYAL NAVY

A NEW era of medicine is opening, and the time seems ripe for a complete fusion of the civil and Service aspects of the profession.

It may be asked what was wrong with pre-war medicine that necessitates a new era. Similarly we might ask what was wrong with the horse-drawn omnibus at the turn of the century. The answer is Nothing. As the horse gave way to the motor, so medicine is adapting itself to changing times and newer horizons. The situation is neatly summed up by R. L. Wilbur, of Stanford University, U.S.A., when he says:

> "Specialization is inevitable and group practice desirable. The future of medicine will be played out around medical centres now existing and to be established, where all the institutions and workers in medicine come together and make a pool of medical knowledge." [1]

Some will object to this emphasis on specialisation, but the following remark by K. T. Compton puts it in perspective:

> "In the early days all the sciences were combined together frequently in the same individual. Later the various specialties had a tendency to run their separate courses. Now we find them coming together again for mutual support." [2]

If we are to produce men of the calibre of the older school of general practitioners and consultants, with their breadth of outlook in all the sciences and their understanding of medicine as related to human suffering, compartmentation must be broken down and integration fostered. Carried to extremes, specialisation merely provides a series of doors at which the patient knocks in the hope of finding the right one. The specialties must be based on a broad general understanding: after all the tallest New York skyscrapers have a pretty wide foundation. In a growingly complex field, we must, as Compton says, come together for mutual benefit and support.

HOUSE-APPOINTMENTS

In Service as in civil medicine we have the problem of the gap between the general practitioner (general-duty officer) and the hospital. In civil life some practitioners demand the right to treat their own cases in hospital and some even specify special G.P. hospitals. There is something to be said for this; for, as Osler said, "the general practitioner does the work and the consultant does the writing and collects the fees (or the kudos)." However, having practised in and out of hospitals in civil and Service medicine, I can say emphatically that to carry out such schemes would produce an administrative bedlam. What these men want is access to the *material* in hospital, and this can be achieved by regarding all hospitals as postgraduate centres with ward rounds, demonstrations, and clinical meetings.

To organise teaching—or, to put it in another way, presentation of material—would require changes in staffing; and as Naval hospitals are the only Service hospitals with which I am familiar I shall take them as an example.

In the large base hospitals the senior establishment is simple and compact. The senior officer has his two heads of the divisions of medicine and surgery, and after them come the specialists in charge of wards. No business expert could quarrel with this. Below this level, however, there is dissatisfaction. There are no definite house-physician or house-surgeon posts and there is considerable insecurity of tenure. The absence of appointments as resident medical (or surgical) officer is another outstanding lack. House-posts should be definite, and men should be appointed house-physician or house-surgeon for a stated period—e.g., six months. Posts at the R.M.O. level would give the holder access to all the work of the division, and all records would pass through his hands for final approval. He would help and direct the house-officers and would arrange the teaching programme throughout his division.

At this point we can raise the burning question of adequate clerical assistance. During the war the typist-stenographer played a valuable part in conserving man-power, and this type of economy is at least as necessary now as it was then. Adequate office equipment is essential in any modern organisation, and particularly in hospitals where the records form the patient's main safeguard in future illnesses or in questions of compensation. Further, these records are invaluable in any research project. The specialist should be left free for the duties of his office and not saddled by work which belongs rightly to a junior clerk.

SERVICE AND CIVILIAN

Integration with the civil side can best be arranged at the specialist level. Most Service hospitals are within reach of their civil counterpart, and the Service specialist should be appointed as associate to his civilian "opposite number," who will assume responsibility for his continued training. The medical services of the Forces have always been part of the medical services of the nation, and no opposition to this plan need be expected: indeed it has been tested unofficially over many years, and merely requires official sanction and wider scope. With the coöperation of the local consultants a teaching programme embracing all medical facilities in the district could be arranged.

The outstanding gap in these proposals concerns the man seeking highly specialised and personal tuition not available locally. Usually he is a candidate for a higher degree or diploma, and his case could best be dealt with through a central office as at present. Here the Postgraduate Medical Federation is the natural body to approach, though unfortunately its activities are confined to the London area. The ideal for most people is appointment as personal assistant to one man who undertakes the teaching and direction of his pupil.

Eventually, perhaps, we could have overseas postgraduate study at the more senior levels. During the war many pleasant and valuable contacts were made with the best brains of our Allies, and it seems sad that this great broadening influence should come to an end. As Levine, of Boston, has put it, "we little realise the constant acquisition in knowledge that we experience from the casual and more spirited conversations with our intimate colleagues and medical friends. This is one of the most characteristic and laudable aspects of our great profession." The United States Navy has already drawn up an ambitious programme of postgraduate teaching which merits close study.

I am indebted to the Medical Director-General of the Navy for permission to publish this article.

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[1] *J. Amer. med. Ass.* 1946, 130, 1055.
[2] *Ibid*, 1946, 131, 77.

AN exhibition of labour-saving devices for use in hospitals, organised on behalf of the Ministry of Health by the British Electrical Development Association with the coöperation of the British Gas Council, is being held at the Empire Tea Centre, 22, Regent Street, London, S.W.1, from July 15 to August 2. The morning sessions are being reserved for hospital representatives, but the public will be admitted every weekday afternoon, from 1 to 6.

Exercises in the gymnasium.

The gymnasium is a very simple affair—merely an empty ward, well warmed with hot pipes, and with a bar made from broom-handles running round the walls, plenty of chairs, and some rib-stalls and a small flight of steps made by the hospital carpenter. No expensive equipment is needed: simple apparatus is the most successful. The only piece of bought equipment in constant use is the iron walking-machine which takes the patient's weight along the length of his forearms, and gently compels him to follow its progress step by step. The gymnasium can also be used by the physiotherapist or gymnast for classes taking breathing exercises, and for children needing physical training or re-education of muscles; while taking a class she can keep an eye on seven or eight old people practising standing or walking, ambling up and down the steps, or doing other exercises.

Occupation in a treatment ward.

ADMISSION AND PROGRESS

Special thought has been given to the placing of new admissions, and to the progress of a patient through different types of ward. There are two admission wards: one contains only cot-beds, and receives patients likely to endanger themselves by falling out of bed, at least in their early days; the other contains only open beds, into which old people not likely to need a cot-bed are received. Patients may graduate from cot-beds to open beds as they improve. If, after careful study, a patient proves to need more nursing than medical care—if she has an incurable carcinoma or an advanced progressive nervous condition, for example—she may go to a small ward with other similar types of case. Admitted to an open-bed ward, the patient normally never sees the cot-bed ward at all. If her condition can be improved, she is treated and ultimately sent home. If she has no home, as soon as she has made enough progress, she goes to the up-ward, to wait for a vacancy in a residential home. Thus her time in hospital is a steady progress, with the hope of discharge at the end of it. Even if she comes back again later, she has had so many more months of normal life with her family, and she returns to hospital in a hopeful spirit, willing to help to mend herself again.

The up-ward is a cheerful sort of club, where anyone who wishes helps to lay and clear the table, and to tidy the wards and dayroom. The big Victorian dayroom, with ample windows, is lined with easy chairs—some tubular, some windsor, some cane, but all easy. Headphones can be plugged into the wall; and books and papers and flowers can be enjoyed in the well-warmed air. If a patient wants to spend part of the day in the ward quietly beside her bed, writing letters, or lying down on top of it, nobody will stop her. Most of the patients are engaged in knitting, sewing, or some other kind of occupational therapy, and all look alert and purposeful; the deadly apathy of the institutional "inmate" is nowhere to be seen.

Two wards might be expected to show a less hopeful spirit: the cot-bed admission ward, and the ward for the incurable with cancer and other serious diseases. In fact, the admission ward looks as cheerful and comfortable as the rest, and the incurable ward is astonishingly free from fear and despair. Several of the patients make felt toys in gay colours, the materials and patterns being supplied by the occupational therapist. They are much interested in this little craft, and are ready to explain that they had never tried it before. In the men's ward, string-seated stools and knotted dog-leads take the place of sewing, and excite the same interest.

A ward in the new tradition.

THE NURSES

The most striking thing about these wards for the chronic sick is the attitude of the nursing staff. They are keen, lively, conscious that they are exercising themselves fully in their profession, and proud of the results. A bedsore is regarded as a disaster, and nursing students learn the real technique of prevention of bedsores, on helpless or paralysed, thin, old patients whose tissue-paper skin needs minute care. This state of mind in the nurses is not the creation of a moment: it has grown gradually as the inspiration to be found in this kind of work has been revealed to them. The West Middlesex Hospital is now well fitted to offer State-registered nurses a certificate in the care of the chronic sick. Such active nursing is the outcome of active doctoring.

The up-ward.

In England Now

A Running Commentary by Peripatetic Correspondents

I WISH I were one of the better sorts of invalid, the ntellectual type. Lancelot Hogben in bed for a month rote *Mathematics for the Million.* Robert Lynd while n last winter wrote many an essay full of charm and himsy for the Saturday Page of the *News Chronicle.* ur own professor retires on an average twice a year ith what he terms bronchitis; he remains in bed about week, and during this time performs that comprehensive eat known as "keeping-up-with-the-literature," reviews hree books, writes two witty articles for the lighter olumns of the learned periodicals, one stinging letter o the *Times,* and prepares three or four addresses, ectures, and surveys.

How do I pass the day? Eight to nine o'clock, bath, ace-fixing, schizophrenic indecision—blue or pink yjamas? Ten to eleven newspapers. Eleven to one 'clock gossip with kind colleagues who pop in to pass the ime of day. One to three o'clock detective story, sleep. nd so on throughout the unproductive day. The only emotely intellectual effort of the whole twenty-four ours is the designing of fantasy meals—grilled lamb utlets, camembert cheese, mushrooms on toast, crêpes uzette, complete in the blue flame of old brandy. Do antasy meals stimulate the gastric juice? I imagine so, udging by the lack of gastric peace which is my lot at resent. If this is true does the opposite work? Here erhaps is the idea which places me right in the front anks of intellectual invalids; here is a new treatment f peptic ulcer. Let the ulcer patient eat what he likes, hen he likes, and where he likes, but let him meditate very two hours on milk, mashed potatoes, and poached ggs. Here's an idea worthy of research, and by Saint Sippy! let me be the first subject of the experiment.

* * *

The Webbs, as much as any, are responsible for the design of the new society which we have been and are now building. None have contributed more to its theory and practice in social security and constructive public health, in nationalisation, in industrial relations—and in converting the public mind to the idea of the positive welfare State as opposed to the police and fire-brigade State of Victorian England.

What manner of folk were they? Despite the autobiography (least personal I have read) and the life of Beatrice I still find them very difficult to picture and rather intimidating. Neither do the first two "Webb Memorial" lecturers, R. H. Tawney and Margaret Cole, indulge our curiosity ("beware of dilletantism!", Tawney imagines Beatrice admonishing; "above all, no intimacies," echoes Sidney), and in true Webb fashion they keep their noses to the grindstone and confine themselves strictly to the *work* of their heroes.

Were there ever such workers? Tawney mentions 45 volumes, including the ten on local government, apart from the pamphlets (Sidney wrote 47 of these for the Fabians alone), articles, essays, and introductions to works by other writers. All this on top of an intensely active life in the Fabian Society, Labour Party, L.C.C., Parliament, and L.S.E. Luckily they had private means: Laski mentions somewhere that fifty years of solid and systematic writing brought them in less than £100 after their secretarial expenses had been paid.

Two threads ran through their lives. First, they studied social institutions with a view to transforming them. They were interested in knowledge only as a guide to and a precursor of action. Second, they were democrats bent on converting others to their way of thinking, and shirking no effort in education, propaganda, organisation, and agitation to achieve this. They were thus and above all practical people with an uncanny sense of what was practicable as well as desirable. I suppose one could say, therefore, that their approach was essentially English; and even in their latter-day conversion to Soviet Communism what attracted them most was the "marriage of dogma with a perpetual consideration of ways and means."

Was it their own near-perfection that led them, perhaps, to under-estimate the human element in all this planning? Mrs. Cole describes as their major weakness the insufficient attention they paid to the problem: Who would run and tend the machine of their welfare State? Today, as each new situation arises, whether it be that of caring for deprived children or managing regional hospital boards, we have no opportunity to forget how much we depend on those who administer the law.

* * *

When I tell him that I got a credit in arithmetic in the School Certificate of 1918 and that I often give my boys in form II and IIIa some useful tips with their maths homework Mr. Patrick Slater will no doubt be glad of my opinion on a point in his *Survey of Sickness.*

In a total sample of 6950, he says, "5518 of the subjects (79%) suffered an illness of some kind . . . and 263 (4%) suffered an injury; 185 (*only 70% of those injured*) suffered illness as well as injury. Hence illness and injury do not go together; healthy people are more likely to be injured than ill people are. When they are well, people are exposed to risks of injury on the roads and at their places of work to which they are not exposed when ill; therefore this finding is in accordance with reasonable expectations."

I'm with Mr. Slater in thinking that rest in bed is the finest preventive against being run over, but surely his calculation (my italics) doesn't show that. He should have told us that the 185 was only 3·3% of those ill. What the present one shows is that uninjured people are more likely to be ill than injured people are, which isn't quite so obvious; I suspect the small difference really shows that when you have lately had an accident you are not so keen to tell the interviewer all about your colds and rheumatics.

* * *

The political views of my sister-in-law are not those of the majority, but her remarks on social phenomena gain in vigour from this dissonance. In her last letter she has a few bitter comments on the effect of social legislation on the habits of Maoris in New Zealand. Apparently the Maori has received with gratified and gratifying enthusiasm the family allowance of ten shillings a week per child. This has enabled many a family man to retire and live a life as carefree as any debenture holder, and permits him to concentrate on the congenial and productive task of increasing his income. This is shocking enough to anyone with old-fashioned views on the distribution of wealth, but she complains further that it is now impossible to find a taxi. The Maori, with a pleasant, naïve, and absorbing passion for taxis, spends much of his newly acquired wealth in the easy transit from one social event to another. The sting comes in the tail of the letter. My sister-in-law, who lives near a large Maori *pah* (i.e., village) spends most of her day admitting engaging and smiling Maoris who want to use her telephone to call a taxi.

* * *

When we were going through the addresses and phone numbers of my colleagues my new secretary asked how she was to know which was a suitably equipped anæsthetist (they are all well qualified) to book in a hurry. We decided that the R.A.C. and A.A. method would be best, so now they are starred like the hotels. A **** stuffist must have a closed circuit, cyclo, and curare, be au fait with adrenaline drips, and be able to engage the onlookers in conversation on abstruse physiology when I am in a tight corner: naturally, like the hotels, he will be the most expensive. For *** a closed circuit and a knowledge of spinals will do, with of course an *eccentric* nozzle syringe for his thiopentone. The ** man must have a Boyle's and be able to use thiopentone too. A * anæsthetist has no machine of his own but is safe on the hospital one. We don't feel that I shall ever need a ***** man, but you never know. I'm just off after dinner to do a job with a "local."

* * *

Dear Old Lady: "As you know, Doctor, I cannot afford to have you calling as often as I would like, but when the new Health Service comes into force I shall want you to visit me every morning at half past eleven."

Where necessary, the prostatic cavity can be packed round an indwelling catheter; and the free end of the gauze ribbon is firmly secured by two separate strong silk sutures to the expanded end of the de Pezzer catheter, which for this purpose is pulled into the bladder and out through the prostatectomy incision, and is then pulled back till it lies snugly against its drainage-hole in the bladder wall.

The closure of the lower opening in the bladder has to be done with some care to make it watertight. A continuous catgut side-to-side stitch is started at the upper end, just missing the mucosa, and when it reaches the lower end it is carried back upwards at a more superficial level; indeed it is probably better to continue it down again as a third layer at a still more superficial level to avoid the possibility of leakage. An ordinary continuous suture has not proved leak-proof, perhaps because it interferes with the arterial supply of the bladder wall, which runs vertically from the base. The usual drain to the space of Retzius is inserted and the incision closed.

The above procedure needs no special instruments or skill; if packing is used, it is pulled out on the fourth day by removing the de Pezzer catheter, but the latter should be replaced. The patient remains dry till the de Pezzer is removed on the tenth day. Leakage may occur for a time through its drainage track, but by this time the patient has got well over the worst part of his convalescence and leakage often ceases in two or three days.

Birmingham. J. W. RIDDOCH.

THE ESKIMO'S TEETH

SIR,—In your annotation of April 26 you referred to the findings of Dr. Pedersen in Greenland, that the natives who take to the carbohydrate diet of civilisation suffer from dental caries, while those who keep to their normal diet of meat and fish have healthy teeth. You quote him as saying: "In my opinion we are not entitled to draw far-reaching conclusions from these studies as to whether the tooth structure or the carbohydrate factor plays the greater part."

In his *English Social History* Prof. G. M. Trevelyan states that "foreign and native travellers in Tudor England marvelled at the number and size of the flocks [of sheep], unparalleled elsewhere in Europe." He speaks of the "prosperous and hospitable generation, whose carnivorous habits amazed foreign visitors accustomed to a more farinaceous diet." This rich meat diet could hardly have been confined to the really well-to-do, as he mentions that "Rugby abounded with butchers."

Is enough known, from records or the study of skeletons, about the state of teeth in England and on the Continent during the Tudor period, to say whether caries was more prevalent in the latter area? While not proving that a carbohydrate diet is responsible, evidence of pronounced difference between English and Continental teeth at that time would be suggestive.

Royal West Sussex Hospital, Chichester. C. J. HARWOOD LITTLE.

CLICKING PNEUMOTHORAX

SIR,—Dr. Thompson's article in the issue of May 10 prompts me to record my own experience.

Two months ago pulmonary tuberculosis was diagnosed (left hilar region). An artificial pneumothorax to a pressure of −3 cm. was induced, and three days later a refill was done. It was then that I first noticed this curious clicking sensation. Lying on my back, I could hear it distinctly and could feel it in the 4th intercostal space, just to the left of the sternum. When lying on my left side, I noticed that the clicking sensation shifted somewhat to the left, being still distinctly palpable and audible. Auscultation revealed a kind of bubbling sound, as if fluid were being disturbed in a confined space. A point of interest is that the clicking was quite unrelated to ventricular systole, thus differing from Dr. Thompson's cases. However, having had several further refills I have noticed that the noises are now synchronous with systole, and that they come and go in spasms.

I may add that radiologically there is evidence of adhesions, and it will be interesting to see whether these sounds disappear after division of the bands.

MEDICO.

BRONCHOSPASM AFTER CURARE

SIR,—The attack of bronchospasm after cur observed by Dr. Donovan (May 10) in a patient subject to bronchial asthma, may have been due to a release intracellular histamine, caused by the injection of curare. In animals (dogs) the injection of *d*-tubocurarine causes a release of histamine from striated muscle into the circulation, and a similar phenomenon may possibly occur in man. Asthmatic patients are said to be unusually sensitive to the bronchoconstrictor action of histamine. It would be interesting to know whether attacks of dyspnœa after curare in patients liable to bronchial asthma have been observed by others.

Such an attack might possibly be prevented or arrested by one of the new anti-histamine drugs. As you say in your leader of May 17, these drugs counteract experimental bronchoconstriction produced by histamine. Unfortunately they have been reported to produce a paradoxical bronchoconstriction of their own in a small proportion of allergic patients.

Liverpool. R. A. GREGORY
London. H. O. SCHILD.

LINING OF THE PULMONARY ALVEOLI

SIR,—The leading article in your issue of Jan. 11 was timely, and should stimulate further research on a fundamental lung problem which has baffled investigators for a century. To me the crux of the matter is the nature of the covering of the "bare areas"[1] which have been thought by some pneumonologists to be occupied by thin films of epithelial protoplasm called "squames" or "non-nucleated plates," though in sections of normal mammalian lungs no epithelial cells can be seen upon them. Miller[2] and Bloom[3] have pointed out that this surface covering has never been seen after desquamation. I recently thought I had stripped these hypothetical elements from the alveolar walls of mouse and other mammalian lungs, but a careful re-examination of the slides has convinced me that I was dealing with what are technically known as "smudges," though of unusual appearance. I did undoubtedly succeed in stripping off bits of the epithelial layer from the finer bronchioles and found in places extending from their edges curious, extremely thin flanges of substance which I thought to be underdeveloped squames forming part of the lining of the smaller alveoli which jut off from the walls of the respiratory bronchioles, for they corresponded in position to the larger fields circumscribed by dark lines in lungs which had been treated with dilute silver nitrate and afterwards exposed to sunlight or photographic developer, and their appearance was in keeping with my conception of what a respiratory squame would look like. However, I now regard them as smudged epithelial cells.

These exfoliations of epithelium were found in preparations made by what I have termed the "gash-irrigation" or "G.I." technique. In this, cuts into the fresh exsanguinated and collapsed lung are made with a safety-razor blade through a drop of physiological saline solution placed on the pleura, thus flushing the air-spaces. The preparation is then inverted and the emerging drop, carrying with it loose cells from the air-spaces, is received on a glass slide and is spread and stained with Wright's or Giemsa's mixture like a blood smear. In these preparations were also found many bodies of similar nature to those described as attached to the desquamated epithelial sheets, but differing in being usually of larger size, and in lying isolated in the field. Many were obviously modified cells with thinned nuclei from which thin processes projected to one side or all the way round. The edges were so thin as to be almost invisible. Some had no nucleus, but only a darker area in the central region to mark its place, while in others even this trace was wanting. It was easy to arrange from these objects a series, graduated according to the degree of nuclear attenuation, from small cells with a relatively intact nucleus through intermediate forms of increasing width but with a disappearing nucleus, down to wide, vignette-

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1. Macklin, C. C. *J. thorac. Surg.* 1938, 7, 536.
2. Miller, W. S. (In Cowdry's Special Cytology, New York, 1947, sect. v, p. 133).
3. Bloom, W. (In Maximow and Bloom's Text-book of Histology, Philadelphia and London, 1947).

hird showed areas of focal infiltration and necrosis near he *lateral ventricles*, *perivascular cuffs*, and infiltration in he ependyma; but similar changes were found in its mother nd a twin examined as controls, as well as in two other ontrols. No abnormalities were seen in the brains of three ats inoculated with filtrate of normal brain of a cat or n twelve normal controls. The results of bacteriological nvestigations were inconclusive.

It was suggested that cats are liable to be infected ith neurotropic viruses and may therefore act as a eservoir from which the infection could be transmitted o human beings.

The number of animal species known to be affected by arious virus diseases is increasing, and much has recently een learnt on the links between man and animal infecion. The cat appears to have been strangely overlooked n these studies. Dr. G. H. Jennings in his paper of pril 12 states that many homes from which his patients ere coming had cats. It may well be worth examining ome of these cats, and generally paying more attention o this animal.

Epsom. WILLIAM N. ROGERS.

CINEPLASTIC OPERATIONS

SIR,—In recent issues I have read with considerable nterest several articles and letters concerning the value f cineplastic operations for amputation of the upper xtremity.

As an exponent of this method in the United States for the past twenty years, I have always taken the view that there is no one device or procedure that can answer the needs of every arm amputee. My practice has been to employ cineplasty along with other devices such as the utility hook, the mechanical hand, or other special mechanical prosthetic appliances as a reservoir from which we can select the one which will best fit the needs of each specific case. In my opinion the device or method must be fitted not to the person's stump but to his whole personality, bearing in mind the psychological and vocational as well as the economic aspects.

Regarded in this way, we will find that cineplasty has its place as a special measure to meet the needs of special persons rather than as a solution to the problems of all amputees.

Newark, New Jersey. HENRY H. KESSLER.

HÆMOLYTIC DISEASE OF THE NEWBORN

SIR,—May I comment on your interesting annotation (April 5), and on Sir Leonard Parsons's letter (April 19)?

Nomenclature in hæmatology is notoriously vague; indeed it does not appear to be clear what each hæmatologist means by an erythroblast. May I suggest that instead of "hæmolytic disease of the newborn" there be a new classification under the heading "Rhesus diseases of the newborn," to include (i) erythroblastosis or congenital anæmia; (ii) icterus gravis neonatorum; and (iii) hydrops fœtalis. Such a classification does, I think, agree with present-day knowledge. In (i) the antibody has attacked mainly the hæmopoietic system of the child, and the disease is a hæmolytic congenital anæmia. In (ii) the liver cells and, either primarily or secondarily, the brain and extrapyramidal cells are attacked by the antibody or antibodies; this is essentially a toxic condition, unconnected with hæmolysis. In (iii), the gravest of the diseases, the antibody has attacked all the internal organs, with the well-known result of stillbirth or an œdematous, peeling, fœtus destined to live only a few hours. In these three conditions it may seem that the maternal antibody, whether single, compound, or incomplete (blocking), may be selective for certain tissues.

Regarding treatment, surely Sir Leonard Parsons would not suggest that the logical treatment of a severe case of icterus gravis, where, as often as not, there is no anæmia, is to transfuse with Rh-negative blood "to correct the anæmia." Exsanguination transfusion is no new treatment; many years ago it was practised by Sir John Fraser, in Edinburgh, for the treatment and prevention of shock due to burns.

Finally, in respect of mortality, Sir Leonard gives a figure of 27% for these babies at his clinic since he started to transfuse Rh-negative blood. In my own small series, since 1942, the mortality is nil, but in view of the unfortunate incidence of kernicterus I would have welcomed a mortality of more than 27%. To my mind it is the end-result that matters, not the immediate mortality; and further careful consideration of children two years after survival of the disease is needed.

Nelson, Lancs. HENRY THIRD.

CHILD GUIDANCE IN OLD AGE

SIR,—The meshes of the net spread by Professor Mackintosh in your issue of May 17 are a little too plainly visible. Chaff will not trap the wary old bird.

I appreciate the spirit of mischief that has crept into the latest of his pastoral letters; but will he tell us, who have changed our occupation at 65, how to recognise that even for the new task our powers have become inadequate and a proper opportunity for ridicule by our loved young ones?

Perhaps, after all, I am enmeshed in his snare!

PHOENIX.

ADVICE ON THUNDERSTORMS

SIR,—Your note on thunderstorms (May 17, p. 682) interested me. I would like to describe the precautions taken by a family I once knew. To permit fireballs to pass safely through the house without striking off their legs they used to open doors and windows and sit with their feet on the table. These precautions were invariably effective. In addition the mother encouraged her children by the assurance that every flash or bang meant that the storm was a hundred miles farther off. I believe they heard storms raging in New York or Siberia. This assurance was also effective and none broke down under the strain.

Colchester. G. C. PETHER.

TECHNIQUE OF PROSTATECTOMY

SIR,—The correspondence following the article by Mr. Terence Millin [1] introducing retropubic prostatic adenomectomy showed the interest in methods of curing prostatic obstruction. The bulk of prostatectomies are, no doubt, carried out by general surgeons, and the non-urologist has at times to steer his barque into a somewhat ammoniacal breeze and navigate the narrows of the bladder neck. Some of those who do not specialise in urology have not the opportunity or inclination to acquire the special skill called for outside the old-fashioned suprapubic enucleation, the disadvantages of which are the wet condition of the patient, the frequent changes of dressings after operation, the unsightly scar, and sometimes a subsequent ventral hernia. These disadvantages can be largely avoided by adopting the well-known surgical principle of draining through an incision separate from the main operative one—a method I have been using for about three years.

In the one-stage operation a median incision is made from the pubes to near the umbilicus, the prostate is enucleated through a vertical incision low in the bladder, and the bleeding is controlled by irrigation or packing. With the help of two fingers in the bladder, the peritoneum is stripped as high as possible so that the anterior part of the dome of the bladder as it recedes backwards is laid bare; a de Pezzer catheter is inserted through a stab-wound in this region, and the hole made watertight by a circular catgut suture; the catheter is then brought out by a track made through either rectus muscle and sheath and a skin stab, so that it passes obliquely upwards to one or other side, coming out just below the umbilicus.

In the two-stage operation, the first stage consists of an incision starting about one inch above the umbilicus over the right rectus muscle and passing downwards and medially to about two inches below it and towards the midline. Where the bladder is not large, the downward extension may have to be greater. The anterosuperior surface of the bladder is laid bare and the de Pezzer catheter inserted as above. This leaves the area immediately above the pubes free of adhesions, a virgin field for the actual prostatectomy. At the second stage an incision of the Pfannenstiehl type is preferred; this is a transverse incision about one inch above the pubes through the skin and rectus aponeuroses, with separation of the rectus muscles. The prostate is removed through a low bladder-incision. Alternately, a vertical incision, inclining to the left as it passes upwards, may be used.

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[1] *Lancet*, 1945, ii, 693.

Organisation is an inevitable concomitant of social evolution. Social life in a democratic society requires the harmonious integration of the activities of all sections of the community. The objection that such integration is incompatible with freedom or individuality has little substance. Scientists cannot but gain freedom and inspiration from becoming more socially conscious in outlook.

"My kingdom is not of this world" is an inappropriate credo for scientists in the atomic age.

London, N.W.3. Martin Roth.

HOSPITAL WARD PLANNING

Sir,—Dr. McIntosh and Mr. Coales (May 10) have produced a very timely and interesting ward plan. They are to be congratulated on combining as far as possible the best features of modern planning in one composite whole. In my view, the Medical Research Council's War Memorandum no. 11 on the control of cross-infection in hospital will have a profound effect on the ward planning of the future. Whilst it emphasises the need for isolation cubicles with access from corridors, it at the same time stresses the importance of good lighting and ventilation, especially in the control of droplet-borne infection.

The design submitted has another desirable possibility not mentioned by its authors. Often there is a great demand for beds on the male side while there are empty beds on the female side, or vice versa. This plan allows for elasticity in the allocation of beds between sexes even within the same ward unit. The provision of two separate sanitary units would help segregation.

I believe, however, that a ward of 30 beds is too big, at least for an acute general hospital. Complicated modern procedures demand that the ward sister should only have about 20 patients to look after. I agree with Dr. McIntosh and Mr. Coales that the 2-bedded unit has no merit either from the patient's or the hospital's point of view.

Llandough Hospital, Cardiff. David G. Morgan.

INFECTION BY INJECTION

Sir,—In your leading article of May 17 your rightly draw attention to the serious dangers attending the use of improperly sterilised syringes.

Discussing the limitations of autoclaving or adequate dry heat when sterilising glass-metal syringes you say that:

> "Boiling, however, is within the scope of all; and boiling is perfectly satisfactory provided the syringes and needles do not remain in water exposed to the air, and are assembled with forceps or sterile gloves."

I think this description of boiling as being "perfectly satisfactory" needs further qualification. The Medical Research Council's War Memorandum no. 15 (1945) refers to the technique of boiling in the following terms:

> "Boiling in water will destroy all pathogenic bacteria *except those that produce resistant spores*. . . . The word 'sterile,' therefore, applied to a syringe and needle, implies that the syringe and needle have been through the process of sterilisation in the autoclave or hot air oven. It is often loosely applied to a syringe that has been boiled. Since accidents due to spore bearing bacteria have proved rare, a boiled syringe may be accepted as reasonably safe where sterilisation in the autoclave or hot air oven is impracticable, but a boiled syringe is not necessarily sterile and its safety cannot be absolutely guaranteed."

It is clear from this that boiling is far from perfectly satisfactory, and that every effort should be made to sterilise syringes by autoclave or hot-air oven, especially when they are to be used for intrathecal injections.

Hertford County Hospital, Hertford. John C. H. Hanson Chief Pharmacist.

DIETARY DEFICIENCIES IN HONG-KONG

Sir,—May I correct one or two details in your annotation of April 26, which was based on my report on Medical and Health Conditions in Hong-Kong, 1942–45?

It is not true that British, Americans, and *Indians* were interned in Stanley Civilian Internment Camp. Several hundred Indian troops were interned in a P.O.W. camp on the Kowloon Peninsula and several were imprisoned in Stanley Prison; but none were inte in Stanley Camp. Dr. Fehily's article in the B *Medical Journal* (Feb. 8, p. 220), to which you re is not quite accurate in all particulars. For exam the infant-mortality rate in Hong-Kong for 1946 109 not 100.

Lastly and more important, neither I nor my coll would like it to be thought that we claimed to responsible for the remarkable health record for 1946. In this the first complete year since the liberation of the colony from the Japanese the general death-rate, the infant-mortality rate, and puerperal morbidity and mortality rates were the lowest recorded since the colony first came into being in 1841. This achievement, in the face of real difficulties, is the result of team-work in which medical, health, investigational, and social-welfare services share the credit with the able administrators responsible for maintaining food-supplies, the water and sanitary engineers, and the Navy, Army, and Air Force personnel. The relief workers mentioned, who undoubtedly helped to achieve the satisfactory results, included those attached to voluntary organisations, such as the Red Cross, Salvation Army, the Hong-Kong Social Welfare Council, and the Society for the Protection of Children, as well as members of the relief section of the Hong-Kong government medical department.

London, S.W.19. P. S. Selwyn-Clarke.

Parliament

ON THE FLOOR OF THE HOUSE

Despite protests at the amount of work the House is expected to complete, the work is being done. In the old days of the Irish party organised obstruction took a very big part in prolonging sittings past any reasonable hour. But these obstructionist tactics had only a limited aim—Home Rule for Ireland. Obstruction could succeed then as it cannot succeed now. For no one party dare hold up the work of the nation by making legislation impossible. Parliament in the old days was a largely political machine; now it is largely concerned with economic changes, and while many wish to amend very few would dare to oppose wholeheartedly. Economic changes on a big scale must be carried out, as the latest Conservative programme agrees. And so while disagreeing we progress. In the last week before the recess the House has passed the third reading of the Town and Country Planning Bill, the National Service Bill, the Statistics of Trade Bill, and the National Health Service (Scotland) Bill. For good measure there was added the second-reading debate on the Finance Bill, and a day of Adjournment motions.

Parliament will go on at this rate until the summer recess, which, rumour has it, is to be longer than of late and will last into October. It is to be hoped it will, for tempers are getting frayed even in the House of Lords. Under the Labour dispensation the Upper Chamber has become a more important organ of discussion and debate than for many a long year. Many new peers have been created who are able to take a leading part in public affairs, and this applies to all parties. Further, the power of initiating legislation which resides in the Lords is useful when the House of Commons programme is so crowded, and the power of revising the drafts of Bills sent to the House is useful when an extra time is needed for discussion.

The Addison-Cherwell mêlée on the feeding of the British people brought party politics very much to the fore in the usually august calm of the Lords. Mr. Churchill said some time ago that the people of this country are badly fed, and Lord Cherwell, who as Professor Lindemann was Mr. Churchill's adviser during the war, argued that our nutritional condition is very bad indeed, quoting the phrase "dying of starvation" from an article in a medical weekly. Lord Woolton intervened to say that this phrase was used in the strictly technical sense, but did not explain how death in a strictly technical sense differs from normal dying. Lord Addison vigorously rebutted Lord Cherwell's attack, and the old reputation of the House of Lords for quiet is shaken. But it is very unlikely that the Conservative Lords, who have a majority edged films of 35 μ or greater diameter, and with no nucleus. These were at first taken to be the long-sought respiratory squames in various stages of development, with the large anuclear ones representing the non-nucleated plates of Kölliker which had presumably been peeled off from the walls of the alveoli in the flushing process, just as had been the epithelial patches from the walls of the smaller bronchioles. However, critical study has convinced me that all of these formations are the result of "smudging" of cells. So close was the simulation of these artefacts to supposed reality that I reported them as detached squames to a scientific organisation,[4] and I wish to take this opportunity to set matters right, for I feel now that they are not respiratory squames. This "riddle of the lung" as you well term it in your editorial remains for me unsolved. We may thoughtfully parody the first line of John Keats' Sonnet on Fame and make it read: "Squame, like a wayward girl, will still be coy."

London, Canada. CHARLES C. MACKLIN.

W.H.O. AND GREECE

SIR,—Undoubtedly we all welcome the development of the World Health Organisation. There can be no dispute over the international importance of the many huge problems of disease prevention and raising of health standards, which it has set itself to tackle at the international level. In these undertakings we wish it godspeed.

But there is one aspect of its programme which should, I think, be seriously questioned—namely, that of two countries chosen for special missions on the spot, one of them should be Greece. I worked for sixteen months with the health division of the UNRRA Greece Mission, both in Athens and in the provinces, and it is hard to convey the extreme frustration experienced by all UNRRA field workers in their efforts to assist the reconstruction and improvement of services for the Greek people. The need was beyond measure; medical supplies and equipment arrived in abundance; great numbers of ordinary Greek citizens were ready to coöperate wholeheartedly and disinterestedly. Yet very little other than pure relief measures could be achieved, for the main reason that the Greek government put politics—its own particular brand of politics—before the interests of the people.

For instance, in the area of Corinth there is a very high incidence of trachoma, up to 70 % in some of the villages. A paper scheme existed to deal with this appalling situation. The only local ophthalmologist capable and willing to operate the scheme was not appointed to the post because his political opinions did not conform to those of the government. That doctor is now uselessly in exile, while the trachoma problem continues unchecked. For similar reasons many X-ray plants and laboratories installed by us go unused or only partially used. A number of girls put through emergency training courses for vital sanatorium nursing were subsequently refused appointment on the same grounds. Such examples could be quoted ad nauseam. But perhaps the most shattering incident of all occurred when the Greek government was fully prepared to wreck—and to some extent succeeded in wrecking—the huge lifesaving anti-malaria programme, in the course of conducting among its employees this same "purge" of "politically unreliable" elements.

I am told that in Poland unrelenting Nazis are reluctantly maintained in specialist posts where absolutely required by the acute shortage of experts. The Polish government can put the interests of reconstruction before the elimination of real enemies. Yet the Greek government will not employ even the humblest clerk if he helped to resist the German occupation.

Anyone who heard Dr. Marc Daniels speaking recently to the Tuberculosis Association about UNRRA tuberculosis work in Europe will appreciate how other countries —notably Poland and Yugoslavia—devastated by war beyond all comparison with Greece, suffering far more acute losses of trained personnel, and much less generously supplied by the United Nations, have yet made real, and in my opinion astonishing, advances towards restoring and developing their shattered health services. I would be the last to deny the Greek people that help which they certainly need and deserve. But I think that under present conditions in Greece the World Health Organisation will be as little able as was UNRRA to provide help from which the population will derive secure and lasting benefit. The taxpayers of the United Nations should have their money invested where returns in terms of real improvement of health conditions are certain. And if the World Health Organisation is to become the effective and respected body which we would like it to be, such considerations should be taken into account.

London, N.7. JUDITH WATERLOW.

EYE OPERATIONS ON THE DEAF

SIR,—May I make a plea for more imaginative dealing with the totally deaf (those who "hear" only through their eyes) while they are undergoing treatment in ophthalmic hospitals, especially after operations, when they have both eyes bandaged? To anyone lying in one position, fully conscious, deprived of sight as well as hearing, and not certain that sight will return, twenty-four hours can seem an eternity.

Through the sense of touch, used in ways arranged with the patient beforehand, something can be done to help. The time to the nearest hour can be tapped into the patient's hand; simple questions can be answered by a grip of the hand for "yes" and a shake of the hand for "no." (A slight movement of the patient's bed before the hand is touched will prevent shock.) It is also a help to know beforehand what nourishment will be given, and how; and to be told that you will not be left alone longer than an hour at a stretch (even though you don't ring) creates confidence.

While the patient can use his eyes, writing is the surest means of communication and should be used to tell anything important—that the time of the operation has been altered, for example. There will then be no waiting with nerves unrelaxed for preparations to begin, and no hustling of the patient which is not understood and causes worry. The operation itself, performed under a local anæsthetic only, is a great tax on nerves, and the avoidance of strain beforehand is an important matter.

London, W.2. GERTRUDE M. MANN.

ACADEMIC FREEDOM

SIR,—Professor Polanyi described the moral strength of the scientist as dependent on speaking "to the State as a liegeman of a higher master, demanding homage to this master." This is presumably the method he advocates for combating the ban already in operation on publications in certain fields of atomic physics, and which is likely to extend, if the present state of affairs continues, to an ever-widening field of scientific subjects, for there must be few discoveries of importance concerning which secrecy could not be demanded "in the national interest." While this approach carries a certain emotional appeal, it contributes little to the solution of the serious problems now confronting scientists, among them the threat to that free communication which is the very lifeblood of science. One is reminded of Canute sitting with his feet in the water forbidding the flood of the tide.

Professor Polanyi asks for the pure scientist an absolute freedom to dedicate himself "to the service of a transcendent reality"; he wants him to be free to follow his "personal creative passion." It is doubtful if the absence of restraint he would thus achieve could be characterised as freedom. No "metaphysical assumptions" will suffice to relieve the pure scientist of the burden of some moral responsibility for the consequences of his work. He cannot escape from them by retiring into a spurious isolation and making his utterances from academic solitude. The pure atomic physicist cannot retain purity and remain on his pedestal, wrapped in his transcendental vision while civilisation is exterminated with atomic bombs. Hiroshima and Nagasaki have made the problem of the perversion of science inescapable for scientists. They are henceforth morally obliged to study the social implications of scientific work and show their concern for truth and justice and all that is best in humanity by working for a rational social order in which scientific research, pure or applied, can result only in human betterment.

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[4] Macklin, C. C. *Anat. Rec.* 1947, 97, 38.

was well as long as everyone got an equal amount of food, and seemed to prefer parity to charity.

National Health Service (Scotland) Bill

Before rising for the Whitsuntide recess the House of Commons agreed to the Lords' amendments to the Bill and the measure was given a third reading and received the Royal Assent.

QUESTION TIME

Free Meals and Milk

Replying to a question, Mr. G. TOMLINSON stated that according to the return made for a normal school-day in October, 1946, the number of pupils receiving free school meals in maintained schools on grounds of financial hardship was 338,450. The number of pupils in maintained schools receiving ½ pint of milk, which was free of charge for all pupils, was, on the same day, 4,369,000.

Speech Therapists for Schools

Mr. TOMLINSON also stated that 90 local education authorities are now employing speech therapists; 56 authorities have no speech therapists on their staff. Local education authorities generally are fully alive to the importance of employing such officers, but unfortunately the supply of speech therapists falls short of the demand.

Vaccine Experiments on Children

Mr. PETER FREEMAN asked the Minister of Health whether his attention had been called to the experiments on 600 babies in London and Manchester by injecting them with different varieties of vaccine; what the exact contents of each of these vaccines were and how each was obtained; what evidence there was that any of them had any effect on maintaining the normal health of the baby; who authorised these experiments; and what compensation would be paid to the children or their parents in the event of undesirable consequences.—Mr. A. BEVAN replied: This is an investigation conducted under the ægis of the Medical Research Council, in association with my medical advisers, into the value of certain vaccines in preventing whooping-cough. Trials in the United States suggest that these vaccines give protection against the disease and thus help to maintain the normal health of infants. This valuable test is being carried out with the voluntary agreement of the parents, and under strictly controlled conditions. There is no reason to fear ill effects.

Public Health

Tuberculosis in the Boot and Shoe Trade

Dr. C. M. Smith's survey in Northamptonshire[1] shows that the boot and shoe trade has an unusually high incidence of active pulmonary tuberculosis as revealed by mass radiography. It will be recalled that in 1915 a committee on the incidence of phthisis in relation to occupation found that "phthisis is specially prevalent among workers in the boot and shoe industry, as compared with the general population." The Registrar-General's Decennial Supplement of 1931 makes the same point in listing the mortality-rate from respiratory tuberculosis of 86 occupational groups, among which that of boot and shoe operatives was only less than that of (1) costermongers and newspaper sellers, (2) barmen, (3) glaziers, polishers, buffers, and moppers, (4) potters, ware-makers, casters, and finishers, and (5) grinders.

In 38,632 Northamptonshire examinations the number of active tuberculosis cases discovered was 4·4 per 1000, but in the boot and shoe trade the figure was 5·7 compared with 3·25 in other occupations. Up to the end of 1945 about 797,000 civilians had been examined by mass radiography in England and Wales and 3·6 per 1000 of them were diagnosed as having active pulmonary tuberculosis. In the London County Council's survey of 46,671 people, 3·1 per 1000 were found to have the disease; in Birmingham (13,700 examinations) 3·6 per 1000; and in Glasgow (30,052 examinations) 5·0 per 1000. The Medical Research Council's examination of 10,103 office workers showed that 4·0 per 1000 had active pulmonary tuberculosis; in two factories employing 4720 and 5657 workers the rates were 3·0 and 4·0 per 1000. It will be seen that Northamptonshire's pulmonary tuberculosis rate is the second highest (after Glasgow) among the surveys made.

REASONS

After establishing that the incidence of active tuberculosis was higher in the boot and shoe trade than in other Northamptonshire occupations, Smith analysed the incidence in the various occupational categories within the trade. He found that there was an excess in the clicking, lasting, and finishing departments. (Clicking consists in cutting upper leather into components; lasting in attaching the bottoms of the boots to the uppers; and finishing in trimming and polishing heels and edges.) Among 1864 clickers the expected number of active tuberculosis cases was 4·14, but the number actually found was 12; among 3282 men in the lasting department, the expected number was 7·45 and the actual 20; while among 1872 workers in the finishing department the expected number was 4·41 and the actual was 15. In all the four main areas of the county there was an excess incidence of pulmonary tuberculosis in the boot and shoe trade.

In 1915 the high incidence of pulmonary tuberculosis in boot and shoe operatives was attributed to the sedentary nature of the work and possibly to the cramped attitudes of the worker. Factors thought to favour infection were defective lighting, infected dust, inadequate ventilation, and especially the presence of infected workmates. In Smith's opinion there is no doubt of this last factor, but further investigation would be needed to show that lighting and ventilation are worse than in other industries. Reports by H.M. inspectors of factories, quoted in last year's report of the Working Party on the boot and shoe industry, describe the conditions as of a "good medium standard," though the industry is not up to date in welfare matters. The work is not especially dirty, unpleasant, or heavy, and there is no overcrowding in the legal sense, but there is considerable congestion in many shops owing to the use of boot racks. The means for promoting good general ventilation (e.g., windows and doors) are generally adequate but seldom well used. A report by one of H.M. medical inspectors speaks of a tendency to crowd as many workers and machines as possible into small rooms which too often are ill ventilated. Rather than take advantage of open windows, the workers prefer "to immure themselves in a hot air bath. . . . Clickers with whom I have spoken abhor a draught as nature abhors a vacuum. Most of them think, in the colder season at least, that it is unnatural to work with open windows at their trade. In the smaller factories visited, I observed only two instances of the windows being open during work."

Smith thinks that, before expressing an opinion on work posture in relation to tuberculosis, comparisons are required with other sedentary occupations. Other possible factors are (*a*) selective recruitment, in that many branches of the work can be done by men who are not robust; (*b*) injurious dust particles, though there is so far no evidence of a dust factor; and (*c*) economic factors, such as wage levels. Some of the factory buildings are good; others are substantial but need much internal alteration to comply with the Factories Act; and others, again, should be demolished.

INFECTION AT WORK ?

Referring in a leading article to the Northamptonshire survey and to the Working Party report the *Times* of March 20 says: "This seems to be another example of the perpetuation of a specially serious threat to health because measures proposed to meet it have been largely ignored. The blame is perhaps widely shared, but the evidence suggests some degree of administrative breakdown, central and local." It is well to remember, however, that the factors in the spread of tuberculosis are economic and social and not necessarily occupational. Undernutrition, overstrain, and poor housing conditions are well known to contribute to its onset. It is remarkable how often, when cases of tuberculosis in factories are investigated, it is found that intimate contact has occurred in the home with open cases of tuberculosis. This is not to say that cross-infection cannot take place in a badly ventilated and overcrowded factory, but there have been few proved cases.

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[1] *Med. Offr*, March 22, p. 109.

their House, will challenge the Government on a major tter of legislation; for they do not want their powers be further limited.

A question to the Foreign Secretary revealed that en the most important reports of the United Nations e only generally available in this country after a long riod. F.A.O. reports published last autumn in ashington are not available generally even in May. far there are in this country only half a dozen copies the report on the formation of the international police rce, drawn up by the military staff committee of the nited Nations. Yet perhaps the fate of the world pends on making that international police force work d work efficiently.

MEDICUS, M.P.

FROM THE PRESS GALLERY

Our Calories

IN the House of Lords on May 22 Lord CHERWELL ointed out that it had been stated in the House of ommons by a Government spokesman that the domestic tion and the domestic entitlement of 8 points per week rovided 1600 calories a day. What food was available, e asked, to provide the extra 1300 calories a day required bring this figure up to the 2900 calories which Lord ddison said were obtainable by people who did not se restaurants and canteens. Lord Addison had complained that the figures given in Dr. Franklin Bicknell's rticle in the *Medical Press* were out by about 30% nd that the average person in Great Britain gets not 100 but 2900 calories a day. But if, as the Ministry f Food stated, only 1600 calories a day were to be erived from rationed and pointed foodstuffs, was r. Bicknell right in assessing the amount to be derived rom other sources, excluding canteen and restaurant eals, at 500 calories, or was Lord Addison right when e declared it to be 1300 calories a day from unrationed ources. According to the Ministry of Food's own ietary survey food eaten in the home was equivalent n December, 1945, to 2390 calories, and in December, 1946, to 2300 calories. That figure was nearer Dr. Bicknell's assessment of 2100 calories than Lord Addison's of 2900.

Lord Addison had also protested against the statement that unemployed before the war were better fed than most of the nation today. Lord Cherwell believed that to be broadly true. Some ten years ago Sir William Crawford and Sir John Boyd Orr had estimated the verage calorie intake of the lowest income groups at 2335 and 2317 a day respectively. Surely these igures supported Dr. Bicknell's statement.

Sir William Crawford's investigation further showed that the poorest 15% of the population got 65% more meat, 80% more bacon, 46% more fats, and 96% more sugar than the ration allowed today. A fervid vegetarian might say that the people were better fed today because they were getting less meat. But the fact that a small percentage of the population might be getting slightly more food did not outweigh the fact that the overwhelming majority were getting a great deal less. It was an abuse of language to say that the country as a whole was better fed than ever before. He was concerned with the normal man and woman, the small shopkeeper, the clerk, the adolescent, and especially the unhappy housewife, whose life of queuing and contriving left her no time for meals in restaurants and canteens. He asked the Government what were the rts and amounts of food which these people could y outside their rations and points to make up the ifference of 1300 calories.

Lord ROTHSCHILD felt that Lord Cherwell's question ast some doubt on the figure of 2900 calories per person er day as the average consumption of food in this ountry. The exact figure, he added, was 2880 calories. his figure applied to the whole population and Lord ddison, he believed, had nowhere said it applied o people who did not use restaurants. The combined nited Kingdom, United States, and Canadian Consumption Levels Enquiry Committee concluded in 942 that the method used by the Ministry of Food o obtain the figure of 2900 calories was the best method vailable and it was identical with the method used before the war to get similar data. The figure of 1600 calories obtainable from the ordinary adult ration took no account of unrationed foods, welfare food schemes, special rations for miners, extra cheese rations for some workers, the sweet ration, the consumption of food in restaurants and canteens, and the allocations of rationed foods to the manufacturers of composite foods which were unrationed to the consumer. In a letter to the *Times* Lord Cherwell had compared the calorific value of the adult rations with the pre-war average consumption of the same food by the poorest 15% of the population. The two figures were not comparable. The first was a minimum entitlement, while the second was an average total consumption. The only true comparison between now and before the war was given in the Consumption Level Enquiry Reports. The national diet had its defects and monotonies which he hoped would be rectified. But compared with pre-war levels of consumption assessed in the same way as now the deficiencies were nowhere near as great as some of the critics of the Government would have people believe. Grave as its difficulties might be this country was not dying of starvation, and the Government's figures were not lies used for political purposes.

Viscount ADDISON affirmed that the figure of 2900 calories was an overall and not an individual figure of consumption, and in the last debate when using this figure he had not mentioned people using restaurants or canteens. The comparable figure for the pre-war period was 3000 calories, a drop of 100 calories.

There was no doubt, Lord Addison admitted, that our food today was less varied, attractive, and palatable than our pre-war diet. The total consumption of meat today was about 9% less than pre-war. Fats were down by 29%, sugar by 26%, eggs by 14%. On the other hand, the consumption of dairy produce, especially milk, was up by 30%, fish by 28%, and flour (notwithstanding bread rationing) by 10%. While our diet was duller and less palatable than before the war, it approximated more and more closely to the nutritional foundation upon which it should be based—namely, dairy produce, vegetables, and high-extraction bread, rather a pedestrian diet, far removed from the æsthetic levels of an hotel grill-room.

The figure of 1600 calories was made up of the basic ration of 1400 plus the ordinary adult points ration of 200. In addition to the rationed foods there were also a number of additional sources of food, including the bonus issues of sugar and jam, meat pies, sausages, fried fish and chips, the sweet ration, vegetables, and fruit. Meals obtained in canteens and restaurants were not a minor contribution to the provision of food. There were at present 25,000 factory canteens; school canteens and canteens for young persons exceeded 29,000; there were 15,000 British Restaurants, about 3000 Service canteens, and about 92,000 commercial catering establishments. These places provided a total of nearly 180 million meals a week. Agricultural workers and others, who could not use canteens, benefited under special schemes by which they could obtain supplementary rations.

The Government naturally wished that the national diet might be more plentiful and more varied and attractive, and they looked forward to the time when changes to that end could be introduced. But the House could rest assured that the food requirements of the people as a whole were being adequately met and that there was no room for alarm and despondency. He still regarded the statement that England was dying of starvation as an absolute falsehood. Statements of that kind ought not to be made. They were sloppy, inaccurate, and mischievous.

Lord CHERWELL said the figures quoted for restaurant and canteen meals were equivalent to only 1¼ main-meals per head of the population each week. If the Government claimed that such an enormous amount of food was consumed, they should increase the ration. If the Government figures were right, they implied that some people were getting much more food than others. Lord Addison had not dealt with the fact that a normal person without access to canteen or restaurant meals obtained only 2300 calories. Lord Cherwell could not pretend he was satisfied with the Government reply. They said all diarrhœa and enteritis under two years, and 11 (3) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 270 (corresponding to a rate of 27 per thousand total births), including 41 in London.

Diary of the Week

JUNE 1 TO 7

Monday, 2nd

Royal College of Surgeons, Lincoln's Inn Fields, W.C.2
3.45 P.M. Mr. H. F. Lunn: Integument. (Arnott demonstration.)
5 P.M. Mr. J. W. Tudor Thomas: Corneal Transplantation.
Fellowship of Postgraduate Medicine
5 P.M. (St. Stephen's Hospital, Fulham Road, S.W.10.) Dr Mervyn Gordon, F.R.S.: Is Rheumatism a Virus Disease?
Westminster Hospital Horseferry Road, S.W.1
5 P.M. (Meyerstein theatre.) Clinico-pathological demonstration on Chronic Mastitis.

Tuesday, 3rd

Royal College of Surgeons
5 P.M. Mrs. A. Pirie: Experimental Aspects of Nutrition and Eye Disease.
Fellowship of Postgraduate Medicine
5 P.M. (St. Stephen's Hospital.) Prof. B. W. Windeyer: X-ray Therapy in the Chronic Rheumatic Diseases.
London School of Dermatology, 5, Lisle Street, W.C.2
5 P.M. Dr. A. D. Porter: Diseases of the Hair.

Wednesday, 4th

Royal College of Surgeons
3.45 P.M. Mr. H. F. Lunn: Alimentary Canal. (Arnott demonstration.)
Fellowship of Postgraduate Medicine
5 P.M. (St. Stephen's Hospital.) Dr. Francis Bach: Physical Medicine Department in the Treatment of the Rheumatic Sick.
Medico-Chirurgical Society of Edinburgh
8.30 P.M. (7, Drumsheugh Gardens.) Dr. J. L. Henderson: Reflections on American Medicine.

Thursday, 5th

Royal College of Surgeons
5 P.M. Mr. R. W. Nevin: Intestinal Amœbiasis. (Hunterian lecture.)
Fellowship of Postgraduate Medicine
5 P.M. (St. Stephen's Hospital.) Dr. W. S. C. Copeman: Non-articular Rheumatism.
London School of Dermatology
5 P.M. Dr. F. R. Bettley: Seborrhœic Dermatitis.
Edinburgh Post-Graduate Board for Medicine
4.30 P.M. (Royal Infirmary.) Dr. W. Lindsay Lamb: Chronic Diarrhœa. (Honyman Gillespie lecture.)

Friday, 6th

Royal College of Surgeons
3.45 P.M. Mr. H. F. Lunn: Pelvic Girdle. (Arnott demonstration.)
5 P.M. Mr. H. Ridley: Nutrition and Eye Disease.
Fellowship of Postgraduate Medicine
5 P.M. (St. Stephen's Hospital.) Dr. Grace Batten: X-ray Diagnosis in the Chronic Rheumatic Diseases.

Births, Marriages, and Deaths

BIRTHS

Bevan.—On May 20, at Hertford, the wife of Dr. J. E. C. Bevan—a daughter.

Hebbert.—On May 22, the wife of Dr John Hebbert—a son.

Hicks.—On May 16, in London, the wife of Dr. A. C. Hicks—a son.

Mackenzie.—On May 22, at Woking, the wife of Dr. M. D. Mackenzie—a daughter.

Mann.—On May 19, in London, the wife of Dr. W. N. Mann—a son.

Robertson.—On May 18, at Morpeth, the wife of Dr. R. P. Robertson—a son.

Smith.—On April 11, in Ipswich, Dr. Katherine Vajdora, wife of Dr. L. E. Smith—a son.

MARRIAGES

Craig—Dumaresq.—On May 17, in London, James Donaldson Craig, M.B., to Joan Lucia Dumaresq.

Kingdon—Appleby.—On May 2, at Fareham, John Renorden Kingdon, M.B., to Margaret Appleby.

Lucas—McGurk.—On May 17, at Brook Green, Peter Ferrers Lucas, captain R.A.M.C., to Fionnuala Doreen McGurk.

DEATHS

Cant.—On May 22, at Woodley, near Stockport, Frederick Cant, M.R.C.S., aged 85.

Churcher.—On May 21, in London, Thomas Gillard Churcher, M.B. Edin., aged 91.

Cooper.—On May 21, at Surbiton, Harry Cooper, D.M. Oxfd.

Elliott.—On May 22, at Oundle, Arthur Forbes Elliott, M.B. Camb., aged 70.

Evans.—On May 19, David John Evans, M.B. Birm., F.R.C.S.

Kinnear.—On May 15, at Dundee, William Lindsay Kinnear, M.B.E., M.D. St. And., F.R.C.P.E.

McCall.—On May 24, at Worthing, Henry Dundas McCall, M.R.C.S.

Macnab.—On May 20, at Winchester, Allan James Macnab, C.B., C.M.G., F.R.C.S., colonel, I.M.S. retd., aged 82.

Robinson.—On May 21, at Walton-on-Thames, Oliver Long Robinson, C.B., C.M.G., M.R.C.P., major-general late R.A.M.C.

Notes and News

TREATMENT OF THE ALCOHOLIC

Alcoholics seldom present themselves for treatment, and those who come up against the police are not usually referred for medical advice; so doctors have little opportunity to intervene in such cases. Dr. S. Izikowitz[1] would change this. He suggests that persons arrested for drunkenness should not be fined or otherwise punished but should be examined and if necessary treated, and he favours the establishment in Sweden of a special hospital for this purpose. Though "aversion treatment" is in his experience better than others, he denies that any one method is reliable, and he recommends ringing the changes by what he calls "summation therapy" From Sweden, too, comes the report that intractable alcoholism has yielded to frontal lobectomy, which has been undertaken in a few cases by Dr. Gösta Rylander. Experience so far has, however, been insufficient for the merit of this serious undertaking to be assessed.

INCREASED DISABILITY ALLOWANCES

Last year the Ministers of Pensions and of National Insurance set up an interdepartmental committee to consider the pensions payable for specified injuries. The committee's recommendations[2] have been accepted in principle by the Minister of National Insurance as a basis for regulations under the National Insurance (Industrial Injuries) Act. The Minister of Pensions has also accepted the report, with effect from April 1. For the loss of the left hand or arm the pension, hitherto 10 degrees less, is now the same as for the right arm at the corresponding site; the assessment for amputation through the shoulder is increased from 80% to 90%, and for loss of four fingers from 40% to 50%. The assessment for amputation through the hip-joint is increased from 80% to 90%; and there are other minor changes These increases will be automatically applied to the allowances of those disabled in the late war; but pensioners of the 1914–18 war must apply for a review of their awards. About 7000 pensioners will benefit by the new arrangements, which will cost slightly over £100,000 a year.

TRAINING OF LOW-GRADE DEFECTIVES

Those who work with low-grade defectives know they are not the useless clods they appear to the casual visitor. Dr. E. J. Fitzgerald,[3] formerly medical superintendent of Bridge Home, Witham, Essex, notes that such patients must be systematically taught things which the normal child picks up without training; but the point is that they *can* be taught, and that they enjoy learning.

The patients at Bridge Home are adult men, less than half of whom have a mental age above five years; yet in 1946, of 363 patients (including among them 80 with epilepsy, 52 crippled or partly crippled, and 12 blind) only 7 were completely unemployed, and none were bedridden. Cripples are trained to walk in various ways: a patient, placed at one end of a pair of parallel bars, is encouraged to leave his chair and pull himself along between the bars; as his powers improve he learns to walk, pushing his chair in front of him, or wheeling large toys, home-made in the form of a steam-roller or an engine. Later he will climb a wooden slope, cross a little bridge, descend some steps, and open a gate; and all these exercises are done wher possible in the open-air. Even helpless cripples lie out-of-doors on rugs, and exercise themselves by working to captur toys placed just out of reach. Many are able to take part in physical-exercise classes, using an outdoor gymnasium set consisting of a swing, climbing-rope, and trapeze. The rest of the equipment, since it needs to be exceedingly strong, is home-made and includes a rocking-horse made from an old gymnasium horse, and a fixed bicycle arranged on rollers so that the effort required to pedal it is equivalent to that used in a ride up a slight hill. Wheelbarrows filled with sand are pushed up and down inclined planks, low hurdles are crossed, and the men play at skittles and at a simple ball game, in which balls are thrown up into baskets which correspond in colour with sashes worn by the players Set exercises only last for 15 minutes in the hour, and for the rest of the

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[1] *Nord. Med.* 1946, 31, 2038.

[2] Report of the Inter-Departmental Committee on the Assessment of Disablement due to Specified Injuries. Cmd. 7076. H.M. Stationery Office Pp 19 4*d*

[3] Observations on the Training of Low Grade Defectives. Published by the National Association for Mental Health, 39, Queen Anne Street, London, W.1. Pp. 8. 6*d*.

Nevertheless Smith's findings constitute a challenge to the authorities, both central and local, to see what can be done to diminish the high incidence of tuberculosis in the boot and shoe trade. Further investigations will have to include comparisons not only of factory conditions but of the housing, nutrition, wages, and social habits of the workers in the various occupations.

Water and Health

The report of the Water Pollution Research Board,[1] ecently issued, covers the years from 1939 to 1945 and the first to deal with the experiences of the war. Preoccupation with war-time problems is obvious. nvestigations ranged from the provision of drinking-water for use in ships' lifeboats and in R.A.F. dinghies to the camouflaging of lakes and reservoirs or the evolution of a satisfactory closet for air-raid shelters. For the lifeboats a still was devised which, if operated for ten hours a day for fourteen days, could produce some 0 gallons of potable water on a consumption of some gallons of paraffin oil. For the airmen's dinghies briquettes were produced to make sea-water drinkable by treating it with silver zeolite, silver oxide, and barium chloride. The briquettes would not readily break up in sea-water; bentonite or fuller's earth was therefore added; it swelled when it became wet, and thus dissolved the compressed briquette. As for the camouflaging of bodies of water, when the Ministry of Home Security sought to make them invisible to enemy aeroplanes, experiments were made with a thin skin of oil and a layer of treated coal powder. The effect on taste, odour, and bacterial growth was not too bad; but the camouflage experts found that the coating failed to remain evenly spread in any but very calm weather.

War damage and developments at Coventry obliged the city to supplement its water-supplies by drawing from the Avon, the intake being returned as a sewage effluent further downstream. This led to an interesting study of the effect of chlorinating the sewage effluent, a practice often urged upon municipal authorities but previously little investigated. The tests suggested that continuous application of a dose of chlorine equivalent to 10 parts per million would consistently destroy nearly all of the bacteria by the end of the 3-hour period during which the effluent was passing through the humus tanks. But chlorination greatly increased the toxicity of matters like gas liquor, usually found in the sewage of towns. Fish poisoning resulted. The Coventry experiment in chlorinating effluents was discontinued, but useful work has been done in a bacteriological survey of the Avon.

Among other phenomena investigated by the Water Pollution Research Board are the nuisance from flies bred in percolating filters, and the discharge of industrial wastes—chromate from tanning, cyanide from electroplating, and other effluents from beet-sugar factories, flax retting, photographic processes, and viscose rayon works. A promising development at Birmingham shows that "alternating double filtration" may enable sewage to be dealt with at three times the rate of the older method of single filtration, the resultant effluent being substantially of the same quality. Thus smaller plant and less land are required for sewage disposal.

These examples of the topics covered by the research board's report will suffice to show its value to students of public health. Camp sites, housing sites, and factory sites were often selected in the last six years for imperative reasons of security and military advantage. The Government departments concerned had the wisdom to ask the advice of the Water Pollution Research Laboratory where helpful data and experience were accumulated. Today, with new towns being planned and new industries introduced, and with rural water-supplies and sewerage being provided and improved under the Act of 1944, the opportunity of consultation must not be forgotten.

Diphtheria Immunisation

The annual return on diphtheria immunisation by local authorities is made on forms provided by the Ministry of Health, which asks the M.O.H. to amplify the information by giving, on an additional form (appendix to circular 62/47), particulars relating to each death from diphtheria in an immunised child. Facts now required include not only the dates of primary immunisation, and of any reinforcing dose given, but also the date when the child was first seen by the doctor and the date on which antitoxin was administered.

Smallpox

Contacts are still under surveillance in connexion with foci of infection at Barnsley and Sheffield, Yorkshire, and at Bilston and Coseley, Staffordshire.

Barnsley.—The source of infection has not yet been determined with certainty, but a man who had been exposed to smallpox in a common lodging-house at Scunthorpe, and at the time was revaccinated successfully (on April 5), arrived at the Barnsley lodging-house (24a, Doncaster Road) on the evening of April 30. Among innumerable marks of acne, scabies, and trauma on his body were one pock-mark, suggestive of variola six or more weeks before, and half a dozen nondescript scars which might have been modified smallpox. Attempts to culture variola virus from him have failed. He has been notified as smallpox and is in hospital.

In addition to the man removed from Bermondsey on May 16 there are now 5 cases in the first generation arising at Barnsley. Of these, 3 were mentioned last week; the other 2, men aged 68 and 70, developed rashes on May 17 and 19. It is doubtful whether the man from Scunthorpe could have infected the earliest case in this generation, who is recorded as having had a pustulo-vesicular rash on admission to a general ward at St. Helen's Hospital, Barnsley, on May 13, where he remained until removed to a smallpox hospital on May 16.

There were 93 men, women, and children sleeping in the Barnsley lodging-house when the disease was detected there on May 16. Of these, 5 absconded, but only 2 (Elizabeth Fenton and Lewis Stewart) remain untraced. Assuming that the period of infection at Barnsley commenced about April 26, several contacts who left 24a, Doncaster Road before surveillance commenced are still untraced. They include the following persons:

Stanley Arnold, William Barker, William Boyce, John Brooks, John Byrne, Elizabeth Cassidy, John Cassidy, Edward Cragan, James Cummins, John Dean, Margaret Dean, Pat Duffrey, George Foster, Mr. and Mrs. Gee, John Hardy, Andrew Henry, Albert Jeffrey, Martin Kearney, James Kennedy, Frank King, Joseph McFeahin, Michael McNamara, John Nylard, Florrie Payne, Albert Pickersgill, Charles Pocklington, Clifford Stringer, John Underwood, Jacob Warren, William Weir, James White, Walter Wright, and Thomas Durkin. The last-named slept at 24a, Doncaster Road on April 27 and 28.

A man named Thomas Durkin was a contact with smallpox at Grimsby. Any news concerning his whereabouts should be communicated immediately to Whitehall 4300, extension 145.

The disease at Barnsley is variola major of a severe type; 2 of the patients have died.

Sheffield.—The father and aunt of the original case have been removed to hospital. The father, successfully vaccinated for the first time on May 5, sickened on May 13, and developed a markedly modified smallpox rash on May 18. The aunt is at present a suspect only.

Bilston.—A new case has been removed to hospital. The patient is an unvaccinated child, aged 11, with onset on May 16 and rash on May 19. She lived in a house near that of cases removed in April.

Coseley.—An unvaccinated kitchen-maid at Moxley Infectious Disease Hospital became ill while living at home in Coseley on May 13. A severe confluent eruption appeared on May 15.

Infectious Disease in England and Wales

WEEK ENDED MAY 17

Notifications.—Smallpox, 12; scarlet fever, 1028; whooping-cough, 2120; diphtheria, 243; paratyphoid, 3; typhoid, 9; measles (excluding rubella), 12,678; pneumonia (primary or influenzal), 578; cerebrospinal fever, 57; poliomyelitis, 11; polioencephalitis, 0; encephalitis lethargica, 2; dysentery, 65; puerperal pyrexia, 139; ophthalmia neonatorum, 85. No case of cholera, plague, or typhus was notified during the week.

Of the 12 cases of smallpox, 6 were notified at Barnsley, 4 at Bilston, Staffs, and 1 each at Birmingham and Bermondsey, London.

Deaths.—In 126 great towns there were no deaths from enteric fever, scarlet fever, or diphtheria, 8 (0) from measles, 11 (1) from whooping-cough, 80 (7) from on August 15, 1945, the troubles of this unhappy region seemed to be at an end; but in the civil strife which followed, lawlessness and disorder gained ground, terrorists robbed and tortured two members of the hospital staff, the chief clerk of the hospital was enticed from his house and shot, and all were working in danger and uncertainty. Nevertheless the work went ahead, and over 700 cases of gunshot wounds were treated. By spring of last year supplies were exhausted and the staff worn out; but from that time things have improved; help has come from all sides—from the British Red Cross, from friends in China and Canada, from CNRRA and UNRRA. Old staff are returning, and the work is ready to grow again.

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[1] Water Pollution Research 1939–45. Report to Department of Scientific and Industrial Research. H.M. Stationery Office. Pp. 78. 1s 3d.

Being a mission hospital, Moukden has received no outside help since 1941, and has had, all that time, to support the medical college. Now dormitories and lecture rooms are needed for nurses, new surgical instruments and nursing supplies, and a new children's ward. UNRRA-CNRRA have promised £5000, but at least £15,000 more is needed. Those wishing to help should write to the Rev. J. C. Dorward, Secretary of the Moukden Medical College, at F.M.C. Offices, Church of Scotland, 121, George Street, Edinburgh, 2.

University of Cambridge

Sir Lionel Whitby, regius professor of physic in the university, has been elected master of Downing College.

University of Leeds

On July 16 the honorary degree of doctor of philosophy is to be conferred on Mr. H. A. Mahony, L.D.S., principal dental officer of the Ministry of Health, and Mr. W. G. Senior, L.D.S., secretary of the British Dental Association.

University of Birmingham

In collaboration with the city public-health department, the pædiatric department of the university is establishing a breast-milk bank. Until a suitable building can be erected the bank will be housed at the Children's Hospital.

Messrs. Cow & Gate have endowed several scholarships to be tenable at the Children's Hospital and at the Children's Institute. One is to be awarded for psychiatric work in connexion with the follow-up of premature babies.

University of Belfast

The minister of health for Northern Ireland has announced that a chair of social and preventive medicine is to be set up at the Queen's University.

University of St. Andrews

To mark the visit by the British Association for the Advancement of Science to Dundee, the honorary degree of LL.D. will be conferred on August 29 on Sir Henry Dale, O.M., and Sir Alexander Fleming, F.R.S.

Royal College of Surgeons of England

The American College of Surgeons have made a further gift to the restoration of the college, bringing their total contribution to over £10,000. Of the £250,000 required for the restoration of the college £176,000 has now been collected. The American college is also giving a desk and lectern for the lecture theatre of the English college, which will be formally presented by one of the members of the board of regents during the congress of the International Society of Surgery to be held in London next September.

Royal Society of Arts

The Albert medal of the society has been awarded this year to Sir Robert Robinson, D.SC., P.R.S., Waynflete professor of chemistry in the University of Oxford, for his contributions to the advancement of organic chemistry.

Middlesex Hospital

Sir Jack Drummond, D.SC., F.R.S., will deliver the Sanderson-Wells lecture for 1947 at the Middlesex Hospital at 4.30 P.M. on Tuesday, June 24, when he will speak on the Nutritional Value of Bread. The lecture is open to all members of the medical profession.

Association of Orthopædic Physiotherapists

At a meeting of the association to be held on Saturday, June 7, at 2.30 P.M., at the London School of Hygiene and Tropical Medicine, Keppel Street, London, W.C.1, Brigadier R. J. Furlong, F.R.C.S., will speak on the Spine and its Physical Treatment.

Congress on Urology

The International Society of Urology is holding a conference at St. Moritz, Switzerland, from August 25 to 28. The subjects chosen for discussion are Ætiology of Primary Renal Calculus, Renal Tuberculosis, Transplantation of the Ureter, Use of Sulphonamides and Penicillin in Urology, Hormone Therapy in Cancer of the Prostate. The speakers will include Mr. H. P. Winsbury-White, Mr. Hamilton Bailey, Dr. Cuthbert Dukes, Mr. David Band, Mr. Arthur Jacobs, Mr. Yates Bell, and Mr. Clifford Morson. Further particulars may be had from Mr. Morson at 86, Brook Street, London, W.1.

Congress on Mental Health

An international congress on mental health will be held at the Central Hall, Westminster, from August 12 to 21, consisting of the following conferences: child psychiatry (12th–15th); medical psychotherapy (12th–15th); mental hygiene (16th–21st). The themes of the three conferences will be Foundations of Mental Health in Childhood, Guilt, and Mental Health and World Citizenship. The National Association for Mental Health is making arrangements for the congress, and further information may be had from the organiser, 39, Queen Anne Street, London, W.1.

International Chemical Congress

The eleventh International Congress of Pure and Applied Chemistry will be held in London from July 17 to 24 under the presidency of Lord Leverhulme. The 14 sections will include: biochemistry (chairman, Prof. A. C. Chibnall, F.R.S.); chemistry in relation to food and nutrition (chairman, Sir Jack Drummond, F.R.S.); and chemistry in relation to medicine and therapeutics (chairman, Prof. C. R. Harington, F.R.S.). During the congress lectures will be given by Sir Henry Dale, O.M., and Sir Robert Robinson, P.R.S. Further information may be had from the press officers of the congress, 11, Garrick Street, London, W.C.2.

Chelsea Clinical Society

Proposing the toast of The Society at the jubilee dinner held at the South Kensington Hotel on May 20, the Earl of Clarendon, Lord Chamberlain, said that fifty years ago 15 medical men began meeting once a month in a Chelsea dispensary. In 1922 dinner meetings were started, and by 1938 the society had 230 members. Lapsing in the war, it was revived in 1945, with the same invaluable spirit of intimacy and fellowship. Dr. Ronald Jarman, the president, who said that the membership is now 214, described the society as a happy family, and spoke of the part played by Mr. Paxton Baylis, Dr. Harriott Coke, and Dr. Kenneth Eckenstein in its restoration. Sir Cecil Wakeley, proposing The Guests, resolved any existing doubts about the tenure of office of the presidents of the three Royal Colleges: for the Physicians, he said, it is 7, 14, or 21 years; for the Surgeons, 7 years; and for the Obstetricians and Gynæcologists, 9 months. Mr. Russell Vick, K.C., replying lightheartedly and gratefully for the visitors, produced a new adage for these latter days: "You've got to take the rough with the rough." Sir Hugh Lett, president of the British Medical Association, said that the society kept its proceedings on a high level both of professional interest and of friendship and social activities. In future medicine would have to encourage such activities. There were those who wanted to see every doctor not only a servant of the State but a member of a trade-union; but the voice of the people was a variable and incalculable thing, and if the people were making a serious mistake we should do our best to persuade them to change their minds. This could only be done if members of the profession talked things over and reached their own conclusions as to what is right, and the closer the association between doctors the better it would ultimately be for the community.

Major-General Sir Colin Gubbins testified to the help given by doctors during the war in the organisation of resistance movements. At the end of the dinner Dr. Jarman handed over the presidential badge to Dr. W. N. Maclay.

Appointments

BAINES, G. H., M.B. Camb., F.R.C.S.: surgeon to outpatients, Children's Hospital, Birmingham.

CAIRNS, J. G., M.D. Edin., D.P.H.: clinical tuberculosis officer, Cornwall.

HAWKINS, L. A., M.B. Camb., M.R.C.P., D.C.H.: physician, Doncaster Royal Infirmary.

RAFFAN, A. W., M.B. Aberd., D.A.: asst. anæsthetist, Royal Aberdeen Hospital for Sick Children.

time the patients amuse themselves by free play with any of the apparatus which takes their fancy. Habit-training is associated with rewards, including a penny a week for sweets.

A sensory-training and occupational class is held in a pavilion. The patients begin by playing with peg-boards, nests of cubes, sets of buttons and buttonholes, and picture puzzles; later they are systematically taught kindergarten occupations, and finally they learn to knit dishcloths, or make wool-mats and paper-bags. In a manual instruction class they do simple repairs, help to fill mattresses, clean shoes and knives, and make up bundles of wood. As far as possible anyone who has been at a sedentary class in the morning goes to a physical-exercise class in the afternoon, and all are encouraged to attempt simple household tasks and personal care. They are also encouraged to feed themselves, even if they are clumsy and untidy about it. Many of the lower-grade patients are able to take part in the percussion bands, which, accompanied by a gramophone and conducted by one of the male nurses who has served in an Army band, gives pleasure to both performing and listening patients.

Good results of this programme of training and occupation are apparent not only among the patients: as Dr. T. B. Jones, the present medical superintendent, points out in a final note to Dr. Fitzgerald's article, "nothing can be so dull as the duty of caring for low-grade patients if they are left to sit about unoccupied. A training scheme gives the staff additional interest which is very real and satisfying."

CONQUEST OF PAIN

Using a simple conversational style, and without probing too deeply, Mr. Bankoff[1] gives an epitome of the chequered history of man's struggle to abolish pain. He writes in a manner calculated to help the lay reader to realise with what faltering steps anæsthetics have reached their present state. It is difficult indeed to believe that it was not until about a hundred years ago that general anæsthesia was born. The primitive efforts of man to relieve pain are lightly touched upon, especially in relation to surgery. Hippocrates was the first to separate medicine from religion, and Mr. Bankoff presents his work in the form of a Socratic dialogue between Hippocrates and his pupil Teucer. But lofty as was his teaching and practice as a physician, Hippocrates got no nearer a solution of the eternal problem of pain, and for centuries mankind continued to suffer the pain of disease and at the hands of the surgeon. It is a remarkable fact that the pioneers of most human advances have had to withstand persecution, mentally and physically and often at the hands of the mob. And so it was in this case: priests were often foremost in their efforts to frustrate attempts to lessen human suffering, and so were many doctors. The grim story of the horrors of surgery up to the early 19th century will help readers of this book to appreciate more fully the boon conferred on us all by the discovery of general anæsthesia.

JEROME CARDAN

In his monograph on Cardan we are indebted to Mr. Eckman[2] not only for a praiseworthy effort to present fairly and temperately the career of one of the most contentious figures in medicine, but also for bringing vividly before us the great resurgence of medicine and science during perhaps the most glorious period of the Renaissance. He recalls many of the great names of those who lived at that time and whose work has come down to us as a priceless heritage. Amid such surroundings, Jerome Cardan lived and worked. Eckman's notes and references show how thorough his investigation has been, and at the same time how difficult it is for us at this period of history to distinguish the genuine seeker after truth from the charlatan. Cardan is in fact a psychological riddle. His personal and family history from childhood onwards was unhappy, and no doubt left its mark upon his later life which was one of storm and stress, indicating at least a certain instability of mind and character. He was disputatious and vainglorious, and apparently had a faculty for making enemies; and in his work he did not seem to scorn the charge of plagiarism. Eckman endeavours to place fairly before us his contributions to medicine and science, condoning nothing unworthy, but at the same time showing us that, either from malice or ignorance, his critics have traduced him. Cardan's belief in astrology and the occult were held against him, but indeed this was shared by many distinguished men of his day now held in high esteem by the scientific world. Did not Sir Thomas Browne himself believe in witchcraft?

ANÆSTHETISTS' SALARIES IN MIDDLESEX

The salary scale for hospital staff adopted by the Middlesex County Council in July, 1945 (*Lancet*, 1945, ii, 717) has now been adjusted to bring anæsthetists more closely in line with other senior clinicians. The original rate of £1000–£50–£1400 was criticised by the Association of Anæsthetists (*Lancet*, 1945, ii, 796). The amended scale rises from £1000 by £100 to £1600 per annum and thereafter on proof of outstanding achievement by further increments of £50 to £1800.

GOVERNMENT COMMITTEE ON RESEARCH

As a sequel to the Clapham report the Government has appointed a standing interdepartmental committee on social and economic research under the chairmanship of Mr. George North, LL.D., the registrar-general. The committee will "survey and advise upon research work in Government departments, and in particular (*a*) will bring to the notice of departments the potential value for research purposes of the material which they collect and will suggest new methods and areas of collection; and (*b*) will advise on how there could be made available to research-workers information gathered for their own purposes by the departments which has potential value as material for research. The members include Dr. G. A. Clark, of the Ministry of Health, and the secretary is Mr. L. M. Feery, North-East Wing, Somerset House, W.C.2.

HOSPITAL ATMOSPHERE

A broadsheet[1] called "Humanise the Hospitals," issued by the health advisory committee of the Communist Party, says nothing new but much to the point. It remarks that something more is needed than new buildings. Many people still fear and shun hospitals in a way that hinders them from benefiting fully from the services offered there. Much of their distaste could be overcome by more kindly and considerate reception of the patient at the hands of someone trained to reassure and direct him, by more privacy during treatment, by a proper appointments system, and by a more homely and intimate atmosphere in the wards.

The committee also put a strong case for better conditions for nurses, and for wider use of part-time nurses; and they make it clear that they think many "unhappy nursing practices," including the custom of rousing patients for washing in the small hours, are due to the widespread refusal of hospitals to adopt the eight-hour shift. The domestic staff are equally deserving of better conditions of work. Doctors are criticised for not taking the patient into their confidence and discussing his case with him, and it is suggested that patients and their relatives should be allowed to see senior consultants in private at arranged consulting-hours. General practitioners should be encouraged to visit their patients in hospital.

Hospital food still gives little general satisfaction, and the committee suggest that a book should be provided for patients' complaints on this and other topics, and that these should be dealt with by a patients' ward committee on which the almoner should sit. The broadsheet ends by reminding the public that the hospitals now belong to them: they must see to it that a more human atmosphere develops.

ADVENTURES AT MOUKDEN

The Moukden Hospital, in Manchuria, founded by Dr. Dugald Christie in 1883, had its beginnings in an old three-roomed house. Nowadays it has 11 departments, 52 wards, 6 theatres, 339 beds, and 2 laboratories, and is staffed by 42 doctors, 107 nurses, and 30 dispensers. When war broke out in the Pacific at the end of 1941, all foreign workers—eight of them British and one Danish—were interned, and their duties fell on the remaining staff. The medical college was supervised by the Japanese, but the hospital was allowed to go on working as a private institution; and in 1943 the nine mission hospitals of the Manchurian Church were brought under the supervision of Moukden. Despite these heavy responsibilities and the scarcity of supplies, the staff maintained the hospital well, the nurses especially doing fine work. In 1945 the suspicions of the bogus government led them to take over the hospital, dismiss the superintendent, and suppress Christian teaching in the wards; but this bad period lasted for only four months. With the end of the war

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1. Conquest of Pain. By George Bankoff, M.D., F.R.C.S. London: Macdonald 1946. Pp. 205. 5*s*.
2. Eckman, J. *Bulletin of the History of Medicine*. Suppl. no. 7. Baltimore: Johns Hopkins Press. 1946. Pp. 110. $2.

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1. Obtainable from Central Books Ltd., 2, Parton Street, London, W.C.1. 2*s*. per dozen.

forward towards determining the biochemical and biophysical abnormalities which underlie the disease. Epilepsy today presents an increasingly hopeful field for research.

THE FAMILIAL FACTOR

The knowledge that epilepsy tends to run in families adds to the impulse for concealment that often has so strong a hold on epileptics and their relatives. The desire at all costs to avoid having a fit in public has led in many cases to a life of limitation and confinement. Cut off from most normal social contacts, surrounded by a wall of equivocations and misrepresentations, if not of actual falsehood, the unfortunate patient is in effect treated with cruelty by those whose sole wish is to afford him affectionate protection. Short of limitations of this type, the presence of the epileptic in the family often introduces that slightly uneasy feeling into the social relationships of the rest of the family with the outside world, an uneasy feeling that suddenly springs into prominence when the possibility of marriage arises.

The social handicap arising from the familial tendency to epilepsy cannot, perhaps, be removed, but it can be lightened by facing the facts frankly. In many cases there is no more reason for concealment or for anxiety than in families one of whose members has diabetes or tuberculosis. Light on the marriage problem, either for the epileptic or for his relatives, is being thrown by the electro-encephalograph. Near relations of declared epileptics show dysrhythmia of an epileptic type five times more often than a control group from the general population (Lennox et al. 1940). This dysrhythmia may rarely be of a type that shows that they are in fact potential epileptics, in which case the routine use of a small daily dose of some anticonvulsant drug should be considered. More often there is irregular slow-wave activity of a type that suggests the likelihood of their being potential transmitters of epilepsy. Here, as in the case of the epileptic himself, an electro-encephalographic record of the prospective spouse may be of immense value. Should this be normal, the chance of epileptic offspring is small—it is perhaps unwise to give any figure at the moment, as data are insufficient. Should, however, it show the same type of dysrhythmia, the outlook for any children of the marriage would be black indeed.

Where the patient's attacks started late in life, and his mentality is up to normal, the inheritance factor is unlikely to be potent (Lennox 1945).

Finally, it must always be remembered that in many epileptics whose fits are due to local brain disease or trauma there is no evidence whatever of a familial tendency.

THE FIT: A DRAMATIC AND UNPLEASANT PHENOMENON

That epileptic fits often come unheralded with dramatic suddenness, and that, in the major form, they are often very unpleasant to witness, cannot be denied. We may view our brother epileptic with good will, but we would rather view him at a distance. Employers, shy of giving work to epileptics, often emphasise the distress that the fits cause to other employees. School-children dislike sitting next to a boy who at any time may give a loud cry, fall on the floor with a thud, and go off into convulsions from which he will emerge with a strong smell of urine on his trousers. The æsthetic shock of major fits is, in the eyes of some people, one that the general public should not be expected to put up with, and the patients should be confined to special institutions. The social corollary of all this is only too obvious. At work or at play, in school or entertainment hall, the epileptic is not wanted, and the effect on his mental outlook and his position in society needs no elaboration.

This attitude to epileptics, which ends up with something like social ostracism, can and must be fought. Surely the long years of the blitz, during which old and young, phlegmatic and sensitive, had to up to strains and horrors almost beyond ima have taught us that human susceptibility to sh less than we had thought, and can be overcome if minds are set in the right direction. Very rarely need a fit cause any alarm; and, if only we could people not to make a fuss and to take the fits in stride, much social suffering would be avoided. who crowd round and call for doctors, ambulances, brandy are unwittingly being unkind to the pa patient and to epileptics in general. True kindness i ignore the fit as far as possible. This lesson must learnt, and it can usually be taught better by employer, the foreman, or the class teacher than by doctor.

EMPLOYABILITY AND EMPLOYMENT

Some of the causes of the heavy social han of epileptics have been indicated, and suggestions that might lead to their diminution or removal. important and debatable question of employment arises. The extreme view that epileptics as a class unemployable still has its partisans, but obviously matter is one for individual assessment, and each merits careful consideration. It is a disservice epileptics generally to recommend an epileptic for if his handicaps are so severe that there is little or hope that he will retain it, for his failure will block market for his fellows. The patient's intellige attainment, aptitudes, interests, and record of p employment all come into the picture, and some atte should be made, by interview with the patient, discover any defects of temperament. Informat about temperament is better obtained from those w whom the patient lives, who should also be asked to check his own statement about his fits. It is most important to know the number of these, their regularity, their severity, their duration, the rapidity of recovery, the presence or absence of adequate warning, and the time at which they most often occur; for all these factors may have a determining influence on employ ability and the type of employment. Thus there is a large group of epileptics who only have attacks at night or at or about the time that they get up in the morning and for them the employment handicap is negligible or very small. Others have a monthly or even longe rhythm, with fits spread over two or three days and long clear periods; and here the handicap can b measured. Patients who suffer from slight petit-ma attacks in smaller or larger numbers, with transient los of consciousness but no fall, are fit for some forms o work but not for others. A warning long enough to allow the patient to assume a position of safety is a obvious asset. Rate of recovery after a fit will be a factor of importance to the employer. Frequent majo fits, occurring at any time without warning, will pu the patient outside the ordinary employment market.

Lennox and Cobb (1942), in a survey of 1000 epileptic of employment age and outside institutions who wer being treated privately or at clinics—i.e., they were al receiving medical attention—found them at work in almost every sphere, from professional or major busines situations down through skilled trades to simple labourin and domestic jobs. They record that of the total about 10% had deficient muscular strength or control (myoclonus, incoördination, weakness, or paralysis), 30% had some degree of mental retardation or deterioration, and 10–15% abnormalities of personality. There is considerable overlap in these figures, and Lennox and Cobb conclude that, taking these handicaps into consideration with that arising from frequent or severe fits, probably 25% of the 1000 were not fit for employment in the ordinary way.

SOCIAL ASPECTS OF EPILEPSY

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The maxim that the patient must be treated as well as the disease from which he suffers is an old one, but it cannot be repeated *too often. Especially is this the* case just now when a flood of new remedies is impressing us with our ability to control infective and other disorders by chemical means.

During the last few years we have had a dramatic demonstration of the value of the combination of social with medical treatment. The urgent need for manpower led the Government to cast a questioning eye on the physically handicapped who were apparently able to contribute little or nothing to the common cause. To knowledge of medicine was added that of industrial need and opportunity, science was supplemented by good will, and encouragement combined with training; as a result tens of thousands of handicapped men and women were converted from passengers to active participators, reaching, many of them for the first time in their lives, the full status of citizenship as wage-earners. Little imagination is needed to grasp the significance of this for the men's well-being and self-esteem, for the happiness of the homes from which they came, and for the national economy in time of need. It was one of the heartening constructive accomplishments of a dark period of destruction.

The moral for us is obvious. Faced with a patient who suffers from chronic disease or disability, we shall be doing less than our duty unless we ensure that by modifying his outlook and his environment in the right directions we can enable him to take his place in the community as a wage-earning citizen, or as near that place as his handicap allows. But all this will mean a much more extended knowledge of our patient. Past medical history and present physical signs will only be the beginning. We must know something of his intelligence, his temperament, and his general mental outlook, of his educational attainment and his employment record, of the physical and emotional conditions in his home. Most doctors have neither the time nor the facilities for obtaining this information, and we must face the fact that for the adequate treatment of chronic disability, and of the social handicap that chronic disability brings with it, the doctor will have to be one of a team.

CAUSES OF THE SOCIAL HANDICAP IN EPILEPSY: THE ASSOCIATION WITH MENTAL ABNORMALITY

Especially is this true of epilepsy, where the social handicap is out of all proportion to the size and quality of the physical disorder. What are the causes of this altogether disproportionate social handicap? First and foremost is the unhappy association in the public mind of epilepsy with mental disorder, and the all too common belief that no epileptic can be quite normal. Now it is true that there are over 10,000 epileptics in the mental hospitals of this country, and probably rather less than half that number *in certified institutions for mental* defectives. Epileptic insanity may simulate any of the recognised clinical psychoses, but most of the epileptics in asylums are suffering from progressive dementia. The relationship of epilepsy and mental defect varies. Fits are a common accompaniment of the lower grades of primary amentia, while mental retardation may appear early as the result of epileptic fits in early life. Or again, both the mental deficiency and the fits may be expressions of cerebral lesions, whether traumatic, inflammatory, or vascular in origin. In any case, it is clear that the incidence of insanity and mental defect is considerably greater among epileptics than in the population generally.

Short of certifiable disorder, epileptics are believed to possess a temperament which makes them difficult to live with, to be antisocial, even to be potential criminals. A specific epileptic temperament has indeed been described, with egocentricity and hypersensitiveness as its basic characteristics; whence come unsociability, moodiness, unreliability, sudden gusts of bad temper, leading on to antisocial acts and even crimes of violence. That this picture fits some epileptics is true, as indeed it does a good many people who are not epileptic, but to apply it to epileptics generally is a grave and tragic error. I doubt if one in ten of epileptics living outside institutions possesses the epileptic temperament in any discernible degree, and the number would be much smaller but for the heavy social handicap under which epileptics exist. For, though the temperament is in some cases part and parcel of the disease, and, like fits, a manifestation of the paroxysmal dysrhythmia of cerebral cells, in many cases it is but a secondary phenomenon, the outcome of the social frustration which has dogged the patient's life from his youth up.

At a conservative estimate we may assume that there are in this country at least 100,000 epileptics outside institutions. A few of these have a severe social handicap in the form of an awkward temperament, no doubt some are mentally retarded, and a few in a prepsychotic stage, but the mental condition of the great majority is within normal limits, and many are men and women of exceptional intelligence and ability. But the almost universal belief in the close association between epilepsy and mental abnormality hangs like a cloud over the lives of them all.

THE GLOOMY PROGNOSIS

"Once an epileptic, always an epileptic." A clear diagnosis of epilepsy is almost equivalent to a life sentence in the minds of most people. Even doctors, unfortunately, often adopt this gloomy view. "There is no cure for this disease" is the medical verdict often brought along by sorrowing parents on their child's admission to a residential school; a verdict occasionally fortified by the rider "and anyhow no medicine will do him any good." Still worse is the belief that mental deterioration is the ultimate fate of every epileptic.

All this gloom is most emphatically unjustified. Very many people have repeated epileptic fits for a period during childhood and adolescence, and then the attacks disappear and do not recur. This applies, of course, particularly to cases of pure petit mal, but is far from unknown among those who have major fits as well. Naturally these people do not go about advertising their past medical history. Moreover the control and arrest of attacks by medication is becoming more effective every year. Given time, patience, and perseverance on the part of the doctor, and coöperation on the part of the patient, a drug, or combination of drugs, with optimum dosage and timing, can be worked out with resultant effective control in a surprisingly large number of cases. Mental deterioration, again, may be typical of chronic institutionalised patients who have had large numbers *of fits for many years*, but most epileptics living in the community show *no signs of it*.

There is justification for optimism about therapy in epilepsy at the present time. New anticonvulsant remedies are on their way to us across the Atlantic. And now we have the electro-encephalograph. Apart from enabling us to select cases suitable for neurosurgical investigation and treatment, it may be said that this has little therapeutic value at present, but the demonstration of cerebral dysrhythmia in its varied forms, its origin, and its mode of spread is surely a dramatic step campaign. About epileptics it may indeed be said that only knowledge of the truth will make them free.

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INFECTIVE JAUNDICE IN ICELAND

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The following observations are made on nineteen outbreaks of infective jaundice in Iceland between 1929 and 1940, involving 854 cases.

Iceland is a country rather larger than Ireland, three-fifths desert and glacier, with a population in 1930 of about 110,000. Its intercourse with the outside world has never been very great, and there has been little immigration to or emigration from the country, so that its particular interest therefore lies in the fact that it is a small closed community whose stock has remained unaltered for about a thousand years.

The climate tends to be dry, with more or less constant high winds, which raise clouds of fine floury dust near any centre of population. Hard frosts in winter render flush sanitation systems difficult to maintain except in the most modern installations.

The social and economic field is not easy to describe in brief; but, at the risk of over-simplification, one can divide the population roughly into three numerically equal groups: fishing, farming, and professional and administrative (*Hagskyrslur Islands*, 1926, 1937).

The fishing community is mainly compressed into small groups scattered round the coast; hence its people tend to live closely packed together. The industry is largely seasonal; in summer the herring season is in full swing on the north and east coasts, attracting many people from the south to take part. So great is the northward migration of the coastal folk in summer that the populations of some of the fishing villages may treble themselves during the season, leading to violent overcrowding. The herring season ends in early November, and soon pack-ice may render the north and east coasts dangerous, but in the south and west the cod and white-fishing continues through the winter.

The farming community, on the other hand, is very widely diffused—so widely that in winter families may be isolated for several months from contact either with other farms or with the villages, and a visitor from another district is an event of some note. In summer most of the farmers employ casual labour, often from far away, to help with the hay-making, on which the maintenance of their stock through the winter will depend, and, later, for the sheep-gathering and slaughtering in September, of which the subsequent sale represents their main and often only source of cash return.

It is difficult in a country like Iceland to draw a distinction between urban and rural populations which would be comparable with a similar distinction drawn in Britain, because, where the largest town is only the size of Falkirk or Ramsgate, it can hardly be said that there is a real urban population, but for the purposes of the present study it seems reasonable to divide the population broadly into those people, on the one hand, who live in the two main towns, are likely to spend most of their days in and round buildings with no great walking distances between, and who work with others in stuffy centrally heated rooms, but whose water and services are relatively up to date, and, on the other those who live in distinctly rural surroundings. In paper the people of Reykjavik and Akureyri have taken as "urban" and the remainder as "rural." relative populations are shown in the table.

The population of Iceland has increased very rap having doubled itself in the last hundred years, increased by 57% in the forty years up to 1930 (Jon 1940). Pari passu there has been an urban tren for, whereas in 1910 the two towns held 15% of t population, in 1930 they held 29%, and that this is n due to a higher urban birth-rate is shown by the f that in 1910 two-thirds of the people in Reykjav and even in 1930 over one-half, had been born in rural areas.

Owing to Iceland having been a democracy fo millennium, wealth and poverty are fairly evenly tributed, and the democratic habits of the people reflected in their tendency to overcrowd the liv and sleeping-rooms of their small houses. There few or no *social* barriers.

INCUBATION PERIOD

It can readily be seen that, whereas movement contact between members of the fishing communi tend to be fairly free, similar contacts among the farm folk are very much fewer; and the key to the spread infective jaundice in their case appears to be the itiner casual workers already mentioned. Hence the obser tions of the rural doctors (*Heilbrigdiskyrslur Islan* regarding the length of time which elapsed between movements of strangers known to be contacts and

GEOGRAPHICAL DISTRIBUTION OF INFECTIVE JAUNDICE IN ICELAND

Place	Population (1930)	No. of cases	Period of outbreak	No. of months	Attack-rate (per 1000 per annum)	Increase of population
Reykjavik ..	29,000	200	January, 1929–March, 1931	27	4·0	6
Akureyri ..	4000	65	March, 1929–June, 1930	16	12·2	6
Nordfjord ..	1500	36	August, 1929–May, 1930	10	28 8	.
Stykkisholm ..	1600	36	October, 1929–July, 1930	10	27·0	–
Olafsvik ..	1700	12	Jan.–March, 1930	3	28·2	–
Husavik ..	1600	35	Jan.–May, 1930	5	52 5	4
Akranes ..	1600	16	Jan.–August, 1930	8	15·0	3
Hafnafjord ..	4800	34	Feb.–August, 1930	7	12·1	5
Keflavik ..	2800	34	Feb.–Nov., 1930	10	14 6	6
Westmanneyyar	3400	38	March–Oct., 1930	8	16 8	4
Faskrufjord ..	1200	21	October, 1931–February, 1932	5	42·0	3
Isafjord ..	3500	93	Jan.–Dec., 1932	12	26 6	2
Bolungarvik ..	800	19	April–Oct., 1932	7	40 6	–1
Blonduos ..	2200	15	May–Sept., 1933	5	16 4	1
Patreksfjord ..	1500	42	July, 1936–June, 1937	12	28·0	4
Husavik ..	1900	25	August, 1936–March, 1937	8	19·7	4
		39	October, 1937–April, 1938	7	26 7	
Kopasker ..	1000	20	December, 1937–March, 1938	4	60·0	..
Westmanneyyar	3400	24	June–Dec., 1940	7	11·7	41

A rather more hopeful picture is presented to us by the Ministry of Labour in this country. On August 19, 1946, the names of about 7500 epileptics appeared on the register of disabled persons, and of these no less than 5150 were actually in jobs on that date. This is only a partial picture; there are probably many thousands more at work who have declined to register. Many of these will be slighter cases, who have concealed their complaint. On the other side the number out of work, about 1350 or 18% of those who have registered, indicates a brighter state of affairs than actually exists. Of those in work probably a fair percentage only hold temporary jobs; and, in any case, if and when the labour demand lessens, epileptics will be among the first to go. There must, moreover, be a large number, especially of the more severe type with mental retardation, who through ignorance, laziness, scepticism, or hostility have not registered. It further appears that the disablement and resettlement officers (D.R.O.'s) of the Ministry are finding great difficulty in placing those who want work, and estimate that about half of them are so severely handicapped that they are not fit for open employment but should be placed in "sheltered workshops."

Certain types of work must be ruled out for people liable to fits, the chief of them being work with moving vehicles or live machinery, and work involving climbing ladders. There are no doubt other jobs unsuitable for epileptics, but positions of employment without risk should easily be found in any large factory or workshop.

The approach to the prospective employer should be frank; concealment can never form part of medical advice. The recommendation should be made that those with whom the employee will work be informed that he is liable to *occasional* fits, but that these need cause no alarm, and that only one man, detailed to give him the necessary minimum attention, need stop work when a fit occurs. For it is not the loss of the patient's time occasioned by a fit that worries employers so much as the general loss of time in the room in which the fit occurs. The advantages of employing a small group of epileptics, rather than an individual epileptic, might well be put to the large employer; and hesitant employers may be encouraged by the fact that many epileptics, aware of their handicap, are most anxious to do their best, and make excellent workmen.

Regular work is good for us all, including epileptics, but occupation and interest are also direct anticonvulsants. This has long been a matter of clinical observation by those who have the opportunity to watch their patients closely. We now know that carbonic and lactic acid and other products of cerebral and muscular metabolism are direct inhibitors of fits, and indeed the inhibition by mental alertness of the petit-mal type of dysrhythmia can be effectively demonstrated on the electro-encephalograph. Work in which he is interested is exceptionally good therapy for the epileptic.

For those whose handicap is severe enough to exclude them from ordinary employment, sheltered workshops, set up under the provisions of the Disabled Persons (Employment) Act, will now be an alternative to institutional treatment. The Disabled Persons Employment Corporation has already opened three of these, and plans for 50 have been approved by the Ministry (Ministry of Labour 1946). The suggestion that there should be an epileptic bay in each of these factories has now been carried into effect in one of them, and is reported to be working satisfactorily. To cover the whole epileptic population, either residential hostels in the neighbourhood of these factories, or facilities for providing work at home, would be required.

COMMUNITY CARE

The task of finding employment for epileptics, besides other disabled persons, now falls on the D.R.O.'s, who will need a working knowledge of medicine and surgery if they are to function effectively. The individual assessment of each case of epilepsy will be a formidable problem; but, unless this can be made and every case dealt with on its own merits, epileptics will be in danger of being lumped together as impossible. To assist in the original assessment, and to provide a follow-up service, a third party is needed—the trained social worker. Finding suitable employment is not going to be easy, but for many epileptics mere work-finding will not be enough. Long periods of unemployment and frustration, awkward dispositions, and mental dullness mean easy discouragement and poor powers of adaptation. Talks to the patient and his friends at home, and visits to the prospective employer, the actual employer, and the patient at work will just make the difference between success and failure, and for all this sympathy, understanding, experience, and training are needed.

At the National Association for Mental Health we have for ten years had a trained social worker providing community care for epileptics outside institutions, and nearly 1000 cases have passed through our hands. The results have been encouraging. Some indeed of the cases referred to us would have made good anyway, and for a few little or nothing can be done, but we estimate that, in more than half, the advice and encouragement that we have been able to give has been a determining factor in keeping them going. That under the Disabled Persons Act the task of finding epileptics employment is taken out of our hands in no way removes the need for community care of this type. Ideally, it should be associated with, and complementary to, the work of the D.R.O., and linked up with the patient's doctor. We should then have the framework of a real community treatment for a group of handicapped people for whom, in the past, practically no such provision has been made. Indeed a consideration of the care and provision made for certain members of society, notably the blind, the crippled, and the mentally deficient, can only lead to the conclusion that epileptics have been the victims of something like social neglect.

TWO CONCLUSIONS

There are two main conclusions to be drawn from this brief survey of some of the social aspects of the epileptic problem. One is the paramount importance of treating each patient as an individual, and avoiding any preconceived notions attaching to the group to which he belongs. In fact the basis of the social treatment of the epileptic can be expressed in the two words "avoid generalisations," a maxim that can usefully be borne in mind in the medical, as well as the social, sphere.

The other conclusion is the need for more general knowledge about epilepsy—what it is, and what it is not. Epilepsy is a tendency to recurrent attacks of loss or modification of consciousness, which may or may not be accompanied by muscular spasm, and which arises in conjunction with paroxysmal dysrhythmia of cerebral cell activity. With this one manifestation in common, a large and varied group of people is assembled. Because of ignorance and prejudice, other characteristics are commonly, but erroneously, ascribed to the group as a whole, with a resultant grievous and quite unjustifiable increase in the social handicap of many of them. Only by the removal of this ignorance and prejudice can amelioration of the lot of the epileptic be achieved. On the other side of the Atlantic, the American Epilepsy League has for years carried out nation-wide propaganda with a view to making the facts about epilepsy generally known. By books and by articles in the public and medical press, by lectures, and by broadcasting, the League is attempting to remove the deep-rooted prejudices of the past, and a perusal of their literature and reports can leave no doubt about the effectiveness of their

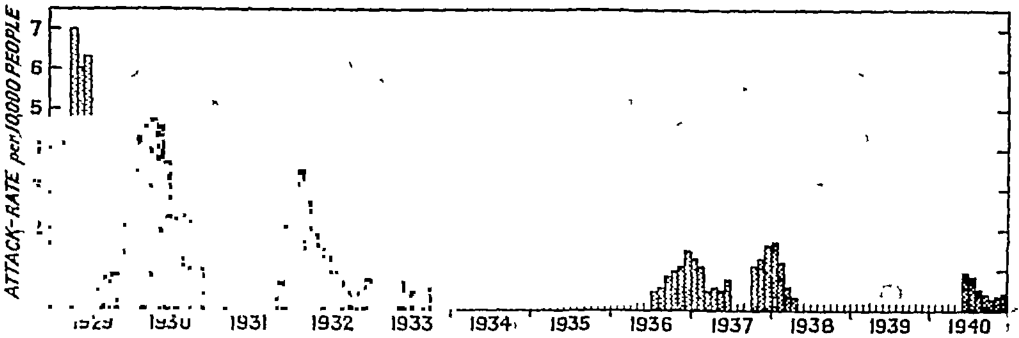


Fig. 3—Attack-rate of infective jaundice per 10,000 of urban (Reykjavik and Akureyri) and rural populations of Iceland.

polluted during the period of military occupation. Domestic washing facilities were often of the most primitive order; hence washing after defæcation would be most improbable. Disposal of fæces is often very casual, as can be imagined when no earth remains unfrozen with which to cover it. Conversely, in some rural areas a serious attempt had been made to tackle this problem.

In fig. 4 the mean urban attack-rate for 1929 and 1930 is taken as unity, and the relative attack-rate for the *affected* rural areas is superimposed. The average rate for the affected rural areas is about four times that of the urban areas, or nearly twice if one includes the unaffected rural population.

Though rapid increase in population nearly always implies domestic overcrowding, since new building cannot keep pace, it has usually meant in Iceland that the problem of water-supply and disposal of fæces has been taken in hand. In Reykjavik and Akureyri most of the houses have a piped supply which is beyond suspicion; and, though 10% still had earth closets in 1930, these were methodically emptied by the municipalities. The same applied on a smaller scale in Keflavik, Hafnafjord, and Akranes, all near Reykjavik.

Fig. 5 shows the attack-rate per 1000 of the population of each place against the percentage increase in population of that place in the ten years before 1930. Those places where there has been a diminution of population are shown simply as zero increase, because in practice the diminution of population did not mean that the remaining people spread themselves out among the surplus houses, which appeared merely to have disintegrated. It is clear that there is a highly significant inverse relation between increase in size of place and prevalence of infective jaundice.

SOURCE OF INFECTION

The explosive nature of most of the outbreaks, the predominance in rural areas where water-supply and sanitation, though varying in quality, are mostly worse than in the towns and often very primitive indeed, and the patchy distribution throughout the country, all point fæces as the prin source of reinfect a hypothesis w the dry climate, winds, and preval of dust reinforce.

The observation several other wri tend to support view. Walker (19 considered the v to be present in patients' fæces. B (1945), describing outbreak among N Zealand troops in the Alamein line, showed g evidence for spread by flies from fæces and/or fi infected corpses left half-buried by the retreat enemy.

Hallgren (1942 and 1943) described three explo outbreaks in 1942 and 1943 in Sweden which en after (1) chlorination of the relevant water-sup (2) repair of a leaky sewer which had been pollutin well, and (3) boiling of all water, which was norm taken from a river draining an area in which infective jaundice was endemic.

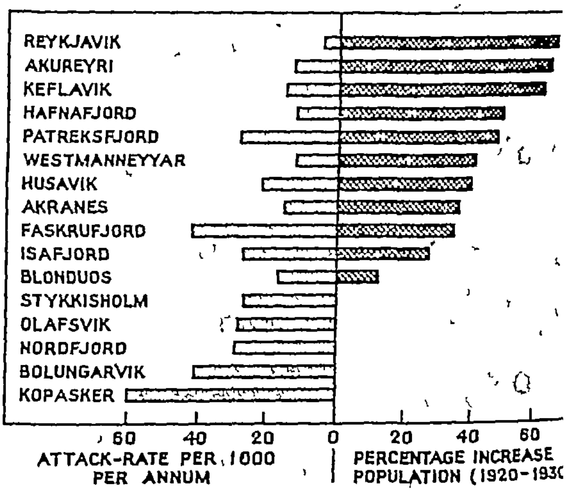


Fig. 5—Comparison of attack-rates of infective jaundice per 100 population with percentage increases of population in diffe places in Iceland.

Thorne and Estabrooke (1941) described concurrent outbreaks of bacillary dysentery and infective hepatitis in which about 22% of the patients had both diseases, and which stopped when strict measures were directed toward elimination of the intestinal-oral circuit.

Finally, Havens et al. (1945) and Findlay and Willcox (1945) showed that infective jaundice can be produced in man by ingestion of fæcal material, urine, or serum from infected patients, or by spraying the nasopharynx with fæcal material.

In Iceland one can exclude flies as vectors of any importance. Though there are parts of the island where, in summer, mosquitoes, &c., abound, infective jaundice was not in any degree localised to these areas.

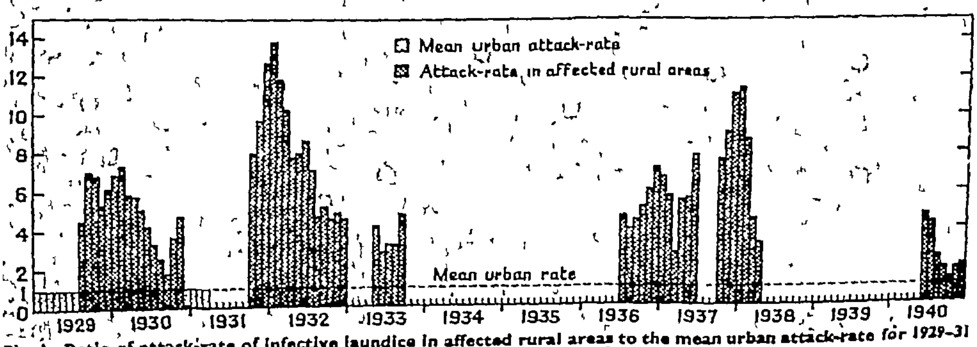
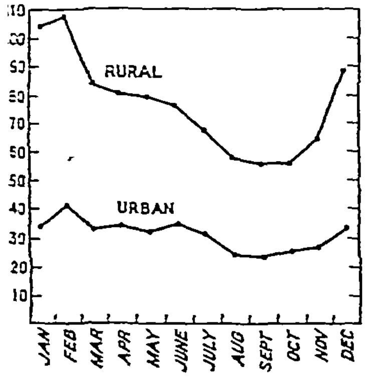


Fig. 4—Ratio of attack-rate of infective jaundice in affected rural areas to the mean urban attack-rate for 1929–31 (expressed as unity) in Iceland.

pearance of the disease in distant farms afford bstantial evidence of its incubation period.

In 1914 an instance was recorded of infective jaundice being carried by a traveller to a house in the remote district of Nanteyrar, as a result of which five people became ill; and in 1920 infective jaundice was carried from Axarfjordur (Kopasker) by the post southwards as far as Borganes, a distance of about 340 miles. In the following further examples ex-icted from these reports the possibility of infection m other sources has been excluded:



1—Seasonal incidence of infective jaundice urban and rural districts of Iceland over welve years, 1929–40.

Place	*Date*	*Sequence*	*Minimal incubation period (days)*
rdtunga ..	Early November, 1929	Woman arrives from farm where all children have recently had infective jaundice (I.J.)	
	Nov. 11	She develops I.J.	
	Dec. 12	Boy at Nordtunga develops I.J.	31
aedabolstadir	July 14, 1930	Woman arrives from infected household in Westmanneyyar	
	July 21	She develops I.J. and is isolated	
	August 21	Manservant in same house develops I.J.	31
rgsdal ..	July, 1930	Son A of farmer returns from infected house in Westmanneyyar	
	August 3	Girl A (friend) leaves Horgsdal for her home at Flotskverfi	
	August 4	Son B of farmer develops I.J.	
	Sept. 4	Girl A develops I.J. at Flotskverfi	32
	Sept. 6	Son C of farmer develops I.J.	33
	Sept. 6	Daughter of farmer develops I.J.	33
	Oct. 6	Woman at neighbouring farm to Horgsdal develops I.J.	30

These reports demonstrate the decimating effect of le disease in the little rural communities, and show the rerage minimal incubation period, in these six recorded stances, *to be 32 days, with a variation of two days.* hey agree with the conclusions of Walker (1945) conrning the U.S. Army, and of Pickles (1939), in his 'ensleydale epidemics, that multiple cases developed in milies but not simultaneously—rather were they laced, just as in Iceland, about a month apart. Hallgren .942) also noted multiple cases, developing in this stance simultaneously, in families in a Swedish rural istrict.

SEASONAL INCIDENCE

The table shows against each place its population, the umber of cases involved in the outbreak, the period overed by the outbreak, and the attack-rate. It also hows the change in population during the ten years before 1930. In the case of later outbreaks at Husavik, in 1936 the population had increased slightly since the first outbreak in 1930, and the figure of 40% increase is an average.

It was impossible to trace the start of even a majority of the nineteen outbreaks to those months when the seasonal increase in population of the places subject to variation was at its peak, and when, therefore, overcrowding and the chances of droplet infection were at a maximum.

Fig. 1 shows that in both rural and urban areas the range is about the same, the winter incidence being double that of the summer.

In many cases the epidemics tended to be of explosive onset, to reach an early peak, and to die away equally suddenly, sometimes with a second peak three or four months after the first.

AGE- AND SEX-DISTRIBUTIONS

The age- and sex-distributions, based on the 1250 cases of infective jaundice which occurred in Iceland during the twelve years, 854 of them in the nineteen epidemics and the remaining 396 sporadic cases reported from all parts of the island, are shown in fig. 2; the incidence was heaviest in children and young adults. Unfortunately the population age-group ratios for this period are not to hand; so an attack-rate cannot be calculated for age-groups. But the distribution agrees with that found by Hallgren (1943) in outbreaks among mental defectives at Strömsör Institute, and among patients, staff, and villagers at Hallnas sanatorium, Sweden: just under 46% in age-groups 5–19, 46% in groups 20–24, 24% in groups 25–34, and lower thereafter.

URBAN AND RURAL INCIDENCE

On the population trend already noted, one can assume *that the urban population will contain a far higher proportion of the childhood and young adult age-groups,* and the rural population correspondingly fewer; hence, since this is a disease of young people, the urban attack-rate might be expected to be much higher than the rural rate. That this is not the case is shown by fig. 3, which gives the urban attack-rate against that of the whole of the rest of the country. Though the two rates are of the same order of magnitude, infective jaundice tended to recur outside the two large towns.

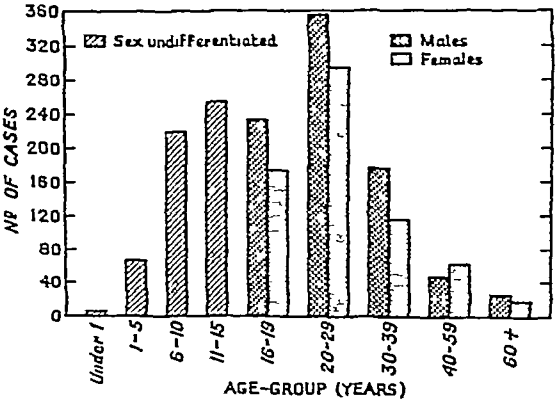


Fig. 2—Age- and sex-distributions of 1250 cases of infective jaundice in Iceland over twelve years, 1929–40.

In the country the outbreaks were confined to fourteen localities comprising 43% of the non-urban population, and infective jaundice only appeared sporadically, if at all, in the remaining areas during the twelve years.

This limitation of the outbreaks to certain areas is significant because, apart from the broad differences between farmers and fishermen already mentioned, the pattern of life throughout the country areas is fairly uniform, and therefore, if droplet infection were to blame, one would expect a measure of uniformity in distribution of the outbreaks.

Rural water-supplies and sanitation, on the other hand, are anything but *uniform.* Water was drunk from streams, wells, or lakes, and was often found to be levels after ingestion of colostrum (Howe 1921b). Similarly, *B. abortus* agglutinins appeared in calf blood only after intake of colostrum (Little and Orcutt 1922, Orcutt and Howe 1922). The dependance of the calf on natural colostrum has been confirmed and extended by Blakemore et al. (1944; see also Worden 1946). Famulener (1912) demonstrated that in the goat the greater part of artificially induced hæmolysin immunity was carried by the colostrum.

In a classical study on the transmission of immunity in the sheep, mare, cow, and bitch, Mason and colleagues (1930) emphasised that in the animal kingdom the young obtain antibodies from the mother either by diaplacental transmission or by ingestion of colostrum. In the latter case, which includes the animals studied, the permeability of the intestine would appear to be much greater than normal during the first one or two days of life.

Comparative experiments on the transmission of diphtheria antitoxin and antityphoid immune bodies through the placenta and in the colostrum have been made by Schneider and Szathmáry, who found that in sheep (1939a) and dogs (1939b) such transmission was almost entirely by the colostrum, whereas in rabbits (1939c) and guineapigs (1940), which possess a simpler placental barrier, transmission was almost entirely across the placenta. It should also be borne in mind that the permeability of the placental barrier changes during gestation—e.g., that of rabbits increases as regards agglutinins and hæmolysins from the 22nd to the 30th day (Rodolfo 1934). This phenomenon may be of considerable importance clinically and in the interpretation of the results of animal experiment.

Both active and passive sensitisation may be transferred from mother to young in utero in guineapigs (Ratner et al. 1927a and b).

Placental transmission of diphtheria antitoxin in man has been studied repeatedly, and quantitative determinations made by Kuttner and Ratner (1923) revealed that the concentration of antitoxin in the cord blood corresponded to that in the blood of the mothers.

The newborn infant is immune to measles if the mother has had measles. The passive character of this immunity was demonstrated by Herrmann (1923, 1924) and by Debré and Joannon (1926). Umbilical cord blood and the blood of the newborn infant contain antistaphylococcal antitoxin in practically the same amounts as does the maternal blood. This is lost during early infancy and is followed by a gradual rise to what is assumed to be a normal level (Bryce and Burnet 1932). A passive transfer of scarlet-fever antitoxin seems also well established, but the serum of infants usually contains little opsonin for virulent hæmolytic streptococci, and even this small amount is lost in a few weeks (Ward and Lyons 1935).

An interesting case is reported by Neff and Schwartz (1933) of an infant born three weeks prematurely of a mother in the third week of typhoid fever. The mother's Widal reaction was positive in 1 : 2560, and that of the infant's cord blood negative. The infant was bottle-fed and had no contact with the mother after delivery, but a month after birth its Widal reaction was positive in 1 : 20,480. This case suggests that the antigen rather than the antibody passed the placenta and gave rise in due course to antibody formation in the infant.

The placental transmission of syphilis and of malaria is well established, as is also that of many virus infections. Ratner et al. (1927c), reviewing the evidence, concluded that, whereas colostrum was essential for the transmission of immunity in goats and cattle, it played a negligible rôle in man. In contradiction to this view may be cited the studies of Toomey (1934) on the agglutinins against the enteric group of organisms in mother's blood, baby's blood, mother's milk, and placental blood. The agglutinins were transmitted through the placenta, but the amount was small and much less than the titre in the mother's serum. The blood-serum of the infant 10 days after birth showed a considerable increase in agglutinin titre over the placental serum; and, since the titre of the infant's serum approximately paralleled that of the mother's milk, it seems probable that the milk was the source of agglutinins. The possibility of a delayed active response, as in the case of Neff and Schwartz (1933), is difficult to exclude.

From these findings it is apparent that both active and passive sensitisation may take place in utero, but that the immunological response of the normal newborn infant is limited and but poorly developed. The part played by colostrum and milk in the defence of the human infant is still somewhat doubtful but does not appear to be large.

IMMUNITY IN THE PREMATURE INFANT

Little is known about the immune responses of premature infants, and whether they develop the ability to produce antibodies at times chronologically comparable to normal infants, though certain types of infants seem to be more susceptible to infections than the group as a whole. Thus, in an epidemiological survey (McKhann et al. 1938) of infections arising in a group of infants in hospital, only 5·5% of previously well-fed infants became infected, whereas 19% of premature infants, 35% of chronically malnourished, and 17% of luetic, eczematous, and congenitally defective infants were infected.

Will an infant, delivered at twenty-four weeks, reach immunological maturity at a date corresponding to that of its conception or of its birth? There is still a wide field for investigation of such problems. "One should not be satisfied with the term 'serologic immaturity' but must attempt to establish by chemical and physiological studies the basis of such immaturity. Is the genesis of plasma-proteins the important factor?" (McKhann and Kapnick 1938).

SERUM-PROTEIN LEVELS IN HUMAN INFANTS

Only meagre information exists about the albumin and globulin levels in the blood of newborn human infants.

Lewis and Wells (1922) reported that in 6 cord bloods examined the euglobulin fraction was below normal. Their results and those of Boyd (1922) also suggest that the ingestion of colostrum is necessary for, and is followed by, a rise in the euglobulin level.

Darrow and Cary (1933) compared the total protein concentration in sera of full-term and premature infants, finding 5·52% in the former and 4·9% in the latter. Hickmans et al. (1943) also give figures for the total protein: 4–7% in full-term infants (180 subjects), and 3·7–5·4% in prematures (20 subjects), during the first four weeks of life.

Trevorrow et al. (1942), who followed the albumin and globulin levels of normal full-term infants from the time of

DURATION OF PREGNANCY AND ALBUMIN AND GLOBULIN LEVELS IN MATERNAL AND CORD BLOODS

Duration of pregnancy (weeks)	Maternal blood		Cord blood	
	Albumin (%)	Globulin (%)	Albumin (%)	Globulin (%)
20	3·72	2·18	3·30	0·83
20	4·68	2·74	2·71	0·43
24	5·19	2·88	3·56	0·52
28	4·20	1·84	2·74	1·53
30	3·72	3·21	3·48	1·63
30	2 02	1·09	3·46	0·42
32	3·40	2·40	3·48	1·91
32	4·20	2·35	2·47	0·81
32	4·75	2·59	1·98	1·68
32	5·75	2·53	4·10	1·59
33	2·87	2·28	4·68	2·53
33	4·10	2·86	3·30	1·26
34	2·87	4 63	3·22	3 02
34	3·30	2·98	4·20	2·71
34	4·20	2·22	3·62	1·88
34·5	3·56	3·43	2·53	0·93
36	3·38	3·21	2·95	1·84
36	3·94	2·20	4·65	1·28
36	2·77	2·60	3·25	1·40
36	4·23	3·22	4·00	3·39
36	4·32	2·33	2·95	3·40
37	4·65	2·29	3·32	1·80
37·5	3·45	2·27	3·94	2·36
38	4·25	3·03	3·56	2·10
38	2·72	2·31	4·10	2·35
39	3·62	3·77	4·41	3·22
39	3 72	2·05	3·67	2·02
39	3·45	2·96	4·23	2 97
39·5	3·42	3·65	4·15	2·58
39·5	3·91	2·98	3·88	2·45
40	3·91	2·63	5·59	1 88
40	3·56	3 46	4·12	2·34
40	3·72	2·00	4·12	2 29
40	3·86	2·68	4·36	2·38
40	3·01	2·63	5·39	1·88
41	4·39	1·98	4·52	1·73
43	4·44	2·93	4·52	1·36
43	4·23	2·87	4·44	3·23

It is difficult to entertain the view that each of the nineteen outbreaks described arose from fæcal contamination of the relevant water-supply. In a country where the disposal of excreta is so casual, where the atmosphere is dry and, because of the volcanic origin of the surface, heavily charged with fine particles of floury lava dust, and where the gales are so constant, the possibility of local spread by the inhalation or ingestion of dust contaminated by infected excreta cannot be overlooked, and indeed this hypothesis fits the facts of this survey better than any other.

This is not to exclude or to disregard the transmission of infective jaundice from person to person by contact of food and utensils with the hands, or even occasional droplet spread, but simply to suggest in the light of the Icelandic outbreaks that it can be dust-borne.

It is worth noting that there is nothing in Kirk's (1945) lucid case against droplet infection to exclude a dust-borne infection except the myriads of flies. In Iceland the circumstances, temperature apart, were much the same—namely, greater prevalence among small scattered rural groups with bad sanitation than in the relatively crowded towns where sanitation was good, together with the dust and constant high winds, but virtually no flies. Kirk's remark that there was no northward spread up the Alamein line owing to the prevailing wind being northerly is significant, as is also his observation that in a fresh unit, which occupied the ground after the New Zealanders were withdrawn, an outbreak started about one incubation period after their arrival, and that the disease left the New Zealanders shortly after they moved to fresh ground. This strongly suggests dried fæces or mummifying corpses as a reservoir.

SUMMARY

Nineteen outbreaks of infective jaundice in Iceland between 1929 and 1940 are analysed.

The social and economic structure of Iceland is briefly described.

The whole population is shown to have increased by 57% in the forty years before 1930, and the proportion of urban population from 15% in 1910 to 29% in 1930.

The seasonal distribution of infective jaundice is the same in rural and in urban areas.

The incidence of infective jaundice is greatest in school-children and young adults, which age-groups are probably heavily weighted in urban areas.

In spite of this the rural attack-rate in the affected areas is four times higher than the rate in the towns, where disposal of excreta is more efficient.

The incidence of infective jaundice is in inverse relation to recent increase of population in any given place.

Conditions for droplet spread are most favourable in the towns, where, however, the attack-rate is lowest.

Evidence is offered which suggests that in many cases infection may be due to dust-borne dried excreta.

I wish to thank Prof. F. A. E. Crew; Dr. Vilmundur Jonsson, chief medical officer for Iceland, without whose ready coöperation these observations could never have been made; and Lieut.-Colonel S. C. Truelove, D.M.(S.)R. War Office, for kindly advice and criticism.

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PRE- AND POST-NATAL DEVELOPMENT OF IMMUNITY

SERUM-ALBUMIN AND SERUM-GLOBULIN LEVELS IN MATERNAL AND CORD BLOODS OF PREMATURE INFANTS

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VERY little is known about the serum-protein levels of infants and their mothers at and before parturition, and our knowledge of the early biogenesis of serum-albumin and serum-globulin is therefore largely conjectural. The present investigation was undertaken to fill this gap and so provide a basis for a possible relation between susceptibility to neonatal infections and the degree of development of the protein-elaborating mechanisms.

NEONATAL INFECTION

Prematurity, asphyxia, birth injury, and congenital deformity cause more than two-thirds of the deaths in the first few weeks of life, most deaths taking place within a week of birth (Cruickshank 1946). Infection, which is relatively unimportant as a cause of death during the first week, becomes the major cause in succeeding weeks, when bronchopneumonia and gastro-enteritis are the principal causes of mortality.

Corner (1946) reported that in one hospital 25·3% of all newborn infants acquired some infection, 3 dying of bronchopneumonia, and in a second hospital 29·9% acquired infection, 5 dying of gastro-enteritis, the death-rates from infection in the two hospitals being 0·89 and 3·76 per 1000 live births during the period under review.

Many factors contribute to the high incidence of neonatal infection—e.g., adverse environment (Cruickshank 1946) and inadequate nutrition (Clausen 1934)—but the most important must be the poorly developed immunological response of the newborn, called by Hirszfeld (cited by McKhann and Kapnick 1938) "serologic immaturity."

Clinical observations have established that the newborn are immune to some diseases but susceptible to others; thus, there is a substantial immunity, lasting several months, to measles, scarlet fever, poliomyelitis, and diphtheria, but the newborn are susceptible to pyogenic and colon-bacillus infections and to pertussis, and staphylococcal infections are particularly virulent in early infancy. Pneumococcal infection is uncommon in the early weeks of life but thereafter rises in incidence and tends to be of a diffuse infiltrating type; meningeal involvement is common (Fothergill and Sweet 1933).

IMMUNITY IN THE NEWBORN

An analysis of the resistance displayed by the newborn shows that two factors require consideration: (1) passive transient immunity derived from the transmission of maternal antibodies or antigens across the placenta or through the mother's milk; and (2) the active immunological responses of the infant itself.

Some years ago a considerable amount of work was done on the placental transmission of antigens and antibodies both in animals and man, and interest in this subject has recently revived.

Smith and Little (1922a) found that 75–80% of calves not fed colostrum died from colon-bacillus septicæmia, but that cow's serum administered by mouth or by injection was protective (Smith and Little 1922b). The proteinuria exhibited by the normal calf coincides with the period of intake of colostrum (Lewis and Wells 1922). Howe (1921a) showed that the blood of the newborn calf was deficient in euglobulin and pseudoglobulin, but that both rose rapidly to normal and globulin levels in cord blood and the age of the fœtus. The regression lines were calculated from the respective statistical equations. A regression equation expresses the rate of change of a variable with respect to unit change in another quantity, and graphically the regression line is the mathematical "line of best fit." A multiple regression equation, as used in the appended statistical analysis, similarly relates the rates of change of two variables each changing with respect to a third quantity. Only by adopting such mathematical procedures can precise relationships be established with certainty from observations showing an appreciable degree of scatter as in the present instance.

Though the scatter of individual determinations is fairly considerable, the statistical evidence shows clearly that fœtal albumin and globulin increase at approximately the same rate, as may be seen from the equal slopes of the regression lines in figs. 1 and 2.

Calculation of the conventional A/G ratio has been purposely omitted from the table because, in this case particularly, it would obscure rather than illuminate the position. Thus the A/G ratios for the twentieth and fortieth weeks are 4·47 and 1·76, figures which do not bring out the equally rapid increment of the two proteins during this time. The mean fœtal albumin and globulin at full term were found from this investigation to be 4·16 and 2·37 g. per 100 ml. of serum.

DISCUSSION

The finding that the rates of increase of albumin and globulin from the twentieth to the fortieth week are similar is somewhat surprising. The absolute amount of albumin is, however, greater than that of globulin, and it is clear that an infant born prematurely—e.g., at thirty weeks of fœtal age—will *start* life with a considerably lower globulin level than will a full-term baby. The evidence relating to the transplacental passage of proteins from the mother to the fœtus has been discussed above; but if, as seems likely, the greater part of the serum-proteins, both albumin and globulin, are being synthesised by the fœtus, the parallelism in the rate of their formation tempts one to speculate whether, at this stage, one and the same mechanism is elaborating both albumin and globulin. The general view regarding the origin of the immune bodies of globulin nature is that these are elaborated in the adult either by the cells of the reticulo-endothelial system or possibly by lymphocytes (see Landsteiner 1945), but the newborn is deficient, as has been pointed out, in antibody globulins, and only slowly acquires the ability after birth to produce them.

A globulin component, fetuin, characteristic of the fœtal stage and disappearing as the fœtus matures, has been demonstrated in the calf and sheep (Pedersen 1945). In these animals it makes up 48–68% of the total globulin. A protein differing physicochemically in similar degree from the globulins of the adult is also present in human fœtal serum and that of the fœtal rabbit, but the quantity is much less, about 2–6% of the total globulin. In serum from chicken embryos it could not be detected ultracentrifugally, but its presence was suggested by the asymmetry of the albumin peak (see Pedersen 1945). The study of Trevorrow et al. (1942) shows that there is a *fall* in the serum-globulin of the infant from the first to the fifth week of life, and the existence of a fœtal type of human hæmoglobin which gives place, shortly after birth, to adult hæmoglobin is well established. The hypothesis may well be entertained that globulin and possibly albumin are synthesised by a special mechanism in the fœtus which becomes progressively less important as the adult mechanism develops. The serological immaturity of the newborn, especially of the premature infant, would then be understandable, and from the point of view of practical immunology a closer study of the reticulo-endothelial and lymphatic systems of the newborn would be indicated.

The data presented here also suggest that the osmotic relations of the premature infant, with a relatively low total serum-protein, would be of peculiar interest. At twenty weeks the mean total protein is only 3·1%, and values of less than 3·5% were encountered in some of the older infants. In this connexion reference may be made to the studies of McCarthy (1938, 1942) on the osmotic pressures of fœtal sheep and horse serum-proteins. The unusually high osmotic pressure per g. of protein, which he observed in the sheep, may have been due to fetuin.

SUMMARY

Very little information exists about the serum-protein levels of full-term and premature infants.

Determinations have been made of the total protein, non-protein nitrogen, albumin, and globulin in the maternal and cord blood from 38 cases, mainly of premature birth, the youngest fœtuses being twenty weeks old.

The fœtal albumin and globulin increase with the length of gestation and at about the same rate. Mean full-term values were 4·16 g. per 100 ml. for albumin and 2·37 g. per 100 ml. for globulin.

The maternal albumin and globulin are not affected by the length of gestation in the period studied and are only slightly correlated with the fœtal values.

The bearing of these results on immunity and the biosynthesis of the serum-proteins is discussed, and it is suggested that there may be a fœtal mechanism of synthesis of both albumin and globulin which becomes relatively less important as the adult mechanisms of synthesis develop and take its place. The serological immaturity of the newborn would be understandable on this basis, and evidence is brought forward in support of this suggestion.

Statistical treatment of the results shows that the regression coefficients of both albumin and globulin on length of gestation are highly significant.

APPENDIX

Statistical Analysis of Relationship between Fœtal and Maternal Proteins and Duration of Gestation.—As a first step, two multiple regressions were calculated: (1) that of duration on maternal and fœtal globulin; and (2) that of duration on maternal and fœtal albumin. It was thought that this would improve the fit of the relation between fœtal protein and duration by eliminating the maternal variability. It also allowed a test to be made of the significance of the regression of maternal protein on duration. The analyses of variance resulting from this investigation are as follows:

FŒTAL AND MATERNAL GLOBULIN: REGRESSION ON DURATION

	Sum of Squares	*Degrees of Freedom*	*Mean Squares*
Regression on fœtal protein	407·2689	1	407·2689
Improvement from introducing maternal protein .	3·5808	1	3·5808
Error	716·2033	35	20·4630
Total ..	1127·0530	37	

FŒTAL AND MATERNAL ALBUMIN: REGRESSION ON DURATION

	Sum of Squares	*Degrees of Freedom*	*Mean Squares*
Regression on fœtal protein	758·8112	1	758·8112
Improvement from introducing maternal protein ..	8·9710	1	8·9710
Error	359·2708	35	10·2649
Total ..	1137·0530	37	

In both cases the regression of fœtal protein on length of gestation is significant, whereas the improvement in the fit

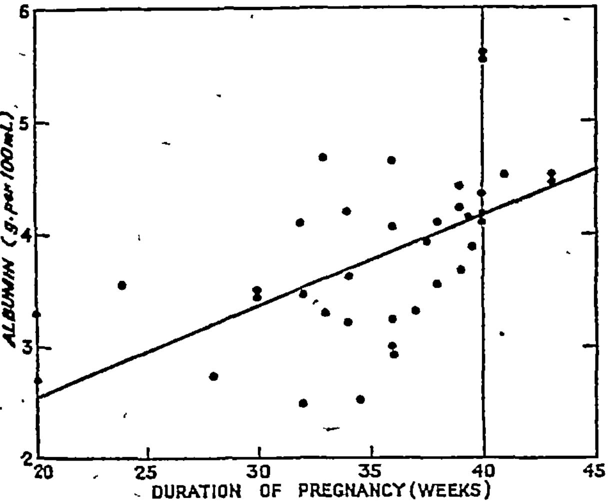

Fig. 1—Relation between amount of albumin in cord blood and duration of pregnancy. Regression equation, where A=albumin in g./100 ml., and T=length of gestation in weeks: $A = 0{\cdot}9536 + 0{\cdot}08007\,T$.

birth until adult values were reached, reported a mean albumin level at birth of 3·79±0·33%, beginning to rise after about a month, until the adult level of 4·70±0·32% was reached at six months to a year of age. A seasonal variation was also apparent. Globulin at birth was 1·66±0·29% and fell from the first to the fifth week to a value of only 1·31±0·25%. After this it remained steady for about six months and then rose gradually (four years) to an adult level of 2·03±0·34%.

Rapoport et al. (1943), from a study of 17 premature infants (birth-weight under 5 lb.) and 17 full-term babies, confirm the low total serum-protein of premature infants—4·55±0·59% against 5·11±0·76% at full term—and in particular the low globulin value—1·01±0·45% against 1·34±0·41% at full term. They point out that the globulin is still low in the infant at a time when the albumin reaches the adult level. It is the euglobulin or γ-globulin fraction (by salt precipitation) which they consider to be deficient in infancy.

A discrepancy between the human serum-protein levels in maternal and cord blood at full-term delivery was reported by Rinehart (1945), who claims to have been the first to provide such information. He found little difference in albumin level but consistently less globulin in the cord blood. Similar results were reported by Achard et al. (1930).

Longsworth et al. (1945) have applied the Tiselius electrophoresis method of separation of the individual globulin fractions to this problem, and in 10 pairs of maternal and fœtal plasmas or sera have shown that the distribution of globulins is different in the two. Judged by this method, the maternal concentrations of α_1, α_2 globulins and especially the β-globulins are above normal, whereas in the cord blood β-globulin tends to be below normal and the γ-globulin both relatively and absolutely above normal.

The discrepancy between these conclusions and those of Rapoport et al. (1943) and of Lewis and Wells (1922) is probably due to the difference in methods used. The question is important, since it is the γ-globulin fraction which carries most of the immune bodies. Nevertheless, taken together, the globulins of the fœtus were always distinctly lower than those of the mothers, affording a high albumin/globulin (A/G) ratio. No premature infants were studied.

METHODS USED IN PRESENT INVESTIGATION

Material.—The material comprised maternal and cord blood from 30 cases of premature birth and 8 cases of normal or over full-term pregnancy; cases of pregnancy toxæmia, &c., were excluded. The earliest fœtuses obtained were twenty weeks old, pregnancy in these cases having been terminated by surgical intervention.

Duration of Pregnancy.—The age of the child was computed from clinical records and information supplied by the mother.

Blood Specimens.—Blood samples were taken from the mothers by venepuncture, usually at the onset of labour, with dry syringes, and after delivery, from the placental end of the cord by pouring. The blood was allowed to clot, and the serum was separated, centrifuged, and analysed with as little delay as possible. Many of the cord bloods clotted very slowly, but no correlation with age of fœtus was apparent. All possible precautions were taken to avoid hæmolysis, and any badly hæmolysed samples were rejected.

Analysis.—All determinations of proteins were made by the micro-Kjeldahl method. The technique adopted also allowed of the determination of non-protein nitrogen (N.P.N.) as follows:

(1) *Total protein + N.P.N.*: 0·1 ml. of serum used for digestion, &c.

(2) *Total protein*: 0·1 ml. of serum was mixed in a centrifuge tube with 2·4 ml. of water and 2·5 ml. of 10% (w/v) trichloroacetic acid. After standing for about 10 min., the precipitate was centrifuged and drained by inverting the tube over filter paper. 0·5 ml. of 2N sodium hydroxide was then added to dissolve the precipitated protein, and the solution was transferred quantitatively to the micro-incineration flask with a capillary pipette, the centrifuge tube being rinsed first with 0·5 ml. of water and then with 2 lots of 1 ml. each of digestion acid.

(3) *Non-protein nitrogen*=(1)−(2).

(4) *Albumin*: 0·1 ml. of serum was mixed with 1·9 ml. of 42% (w/v) crystalline sodium sulphite, and after half an hour at room temperature the mixture was filtered through a no. 42 Whatman paper and 1 ml. of the clear filtrate used for nitrogen determination. The albumin value so obtained was corrected for the N.P.N.

(5) *Globulin*=(2)−(4).

On several occasions the results found by this method were checked by ammonium or sodium sulphate precipitation and found to be reliable. The micro-Kjeldahl procedure was in each case as follows:

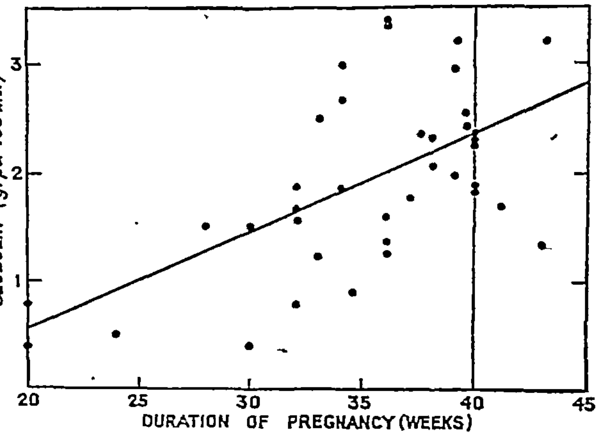

Fig. 2—Relation between amount of globulin in cord blood and duration of pregnancy. Regression equation, where G=globulin in g./100 ml., and T=length of gestation in weeks: $G = -1{\cdot}1837 + 0{\cdot}08878\,T$.

For incineration 2 ml. of a solution of 50% (w/v) sulphuric acid containing 1% selenium dioxide was used for each sample. A drop of saturated copper sulphate solution was also added, and heating was carried on for two hours after the mixture became clear. In distilling, 4 ml. of 50% (w/v) sodium hydroxide was used for alkalinisation, and the distillate (5 minutes) was collected in 10 ml. of saturated boric acid (A.R.) solution. The ammonia was titrated directly to match the blank by $N/70$ sulphuric acid, 3 drops of methyl red being used as indicator. The factor 6·25 was used to convert nitrogen to protein values.

Statistical Analysis.—The results have been subjected to a rigid statistical analysis, and regressions have been calculated (see appendix).

RESULTS

The data obtained are presented in the table and in figs. 1 and 2, which show the relation between albumin

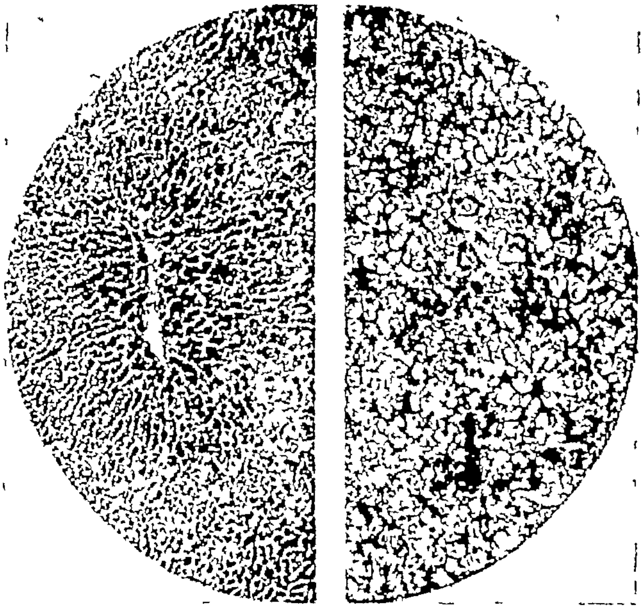

Fig. 1—Left: section of liver nodule stained by Best's method for glycogen and showing depreciation of glycogen. **Right:** section of adenoma of pancreas showing closely packed rosette formations of cells. (× 44.)

so closely resembled that of hysteria that, as physical signs were absent, he would probably have been sent home if his doctor had not reported a history of suspected hypoglycæmia.

Next day he seemed normal and gave the following history. For three and a half years he had at times had attacks of giddiness, headache, and tingling, which spread from the feet to the waist and were occasionally noticed in the lips and mouth. These attacks always occurred on rising in the morning; but, curiously, the effect of taking food had not been remarked. Soon after the onset he began to have attacks of unconsciousness starting usually about noon and lasting about an hour; on recovering consciousness, according to his relations, he behaved like a drunken man, talking incoherently and staggering about. He would go to bed and be normal by next morning. There had been periods of freedom from attacks for as long as twelve months, but latterly the early morning symptoms had occurred about three times a week. Apart from these attacks his health was good.

Clinical examination was entirely negative. His physique, though spare, was good, and though understandably interested in his health he did not appear in any way neurotic.

A few days after admission, when about to start his dinner, he became suddenly drowsy and lapsed into deep coma, accompanied by profuse sweating but with no other abnormal findings apart from extensor plantar responses. He was given 50 c.cm. of 50% glucose intravenously and rapidly recovered consciousness. On another morning drowsiness and sweating at midday were relieved by 5 minims of adrenaline hydrochloride.

(1) *Glucose-tolerance Test* (50 g. of glucose by mouth).

Hr. after glucose		*Blood sugar (mg./100 c cm.)*	*Hr. after glucose*		*Blood-sugar (mg./100 c.cm.)*
Fasting	..	45	2	..	45
1/2	..	125	2 1/2	..	40
1	..	128	3	..	40
1 1/2	..	80	3 1/2	..	40

(2) *Prolonged Fasting*

Hr. after meal		*Blood-sugar (mg./100 c.cm.)*	*Hr. after meal*		*Blood-sugar (mg./100 c.cm.)*
12	..	45	16	..	45
13	..	45	17	..	35
14	..	45	18	..	35
15	..	35			

At eighteen hours symptoms of hypoglycæmia developed and food was given.

Operation (Mr. B. T. Rose).—The tail and body of the pancreas were normal. Embedded in the anterior surface of the upper part of the head of the pancreas was a discrete encapsulated tumour of firmer consistence than the rest of the gland, and about the size of a small cherry-stone. This was removed without difficulty; and, when its character had been established by a frozen section, abdomen was closed. The liver appeared normal.

Postoperative Course.—Recovery was uneventful, apart f a transient external-rectus palsy attributed to spinal thesia.

A glucose-tolerance test (50 g. of glucose by mouth) done three weeks after the operation gave the following figures:

Hr. after glucose		*Blood-sugar (mg./100 c.cm.)*	*Hr. after glucose*		*Blood-sugar (mg./100 c.cm.)*
Fasting	..	110	1 1/2	..	130
1/2	..	160	2	..	155
1	..	170			

Four months after the operation no further symptoms of hypoglycæmia had occurred and the man was well.

Pathological Report.—Two specimens were sent for histological examination: the pancreatic tumour and a nodule from the liver.

The pancreatic tumour was 0 5 cm. in diameter. A thin capsule surrounded the tumour mass, clearly demarcating it from the adjacent pancreatic acinar tissue. The tumour consisted of closely packed small rosette formations of cells (fig. 1). The cells were fairly uniform in shape and size. One of the first impressions obtained was the well-marked vascularity, and on closer examination under high power many of the acinar structures were seen to possess a lumen containing blood (fig. 2). Also, several large blood-vessels traversed the adenoma. The rosette formations were each surrounded by a fine layer of connective tissue, and a few coarser intersections of fibrous tissue were seen running across the adenoma. Neither hyaline degeneration nor calcification, which are features often observed in the islet cell adenoma, was present.

A uniform cellular tumour of the pancreas with a definite capsule and associated clinical manifestations of hypoglycæmia point to the diagnosis of an islet-cell adenoma. A portion of the tumour was stained for specific granules by the method of Dunn et al. (1944). This procedure gave a uniform blue colour to all of the adenoma cells, which contrasted with the bright red erythrocytes in the blood-vessels and small sinuses, thus indicating a tumour composed of the beta cells of the islets of Langerhans.

The liver nodule was fixed in alcohol, and sections were prepared and stained by Best's method for glycogen. They showed some depreciation of glycogen at the periphery of the liver lobules (fig. 1).

SUMMARY

A classical case of adenoma of the islets of Langerhans is reported which presented no difficulty in diagnosis at the stage at which it was seen.

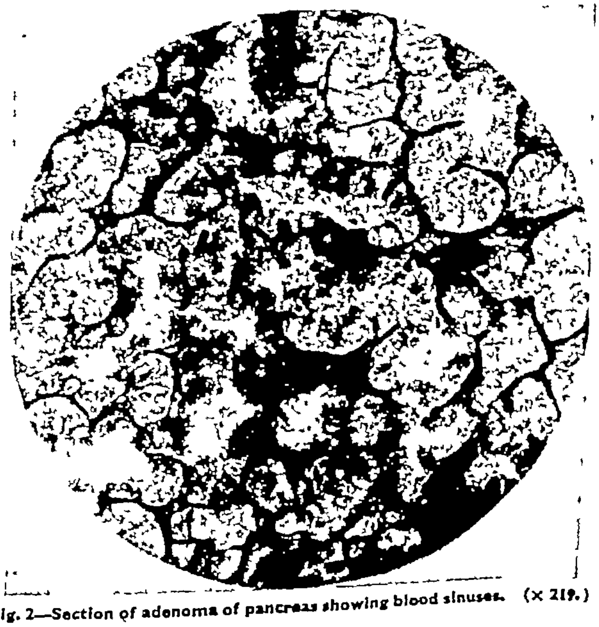

Fig. 2—Section of adenoma of pancreas showing blood sinuses. (× 219.)

resulting from the introduction of maternal values is negligible. The regression coefficients of maternal proteins are not significant in either case. The fœtal regression equations uncorrected for maternal protein are:

$$D = 27{\cdot}2709 + 4{\cdot}0705\ G$$
$$D = 20{\cdot}5301 + 3{\cdot}8814\ A$$

A further regression was calculated of the fœtal albumin and globulin on duration. This allows a test to be made of the significance of the difference between the rates of increase of the two proteins. The equation is:

$$D = 18{\cdot}8794 + 3{\cdot}1097\ G + 2{\cdot}7206\ A$$

The regression coefficients are both highly significant, but the difference between them, 0·3891, has a standard error of 1·4633 and is clearly not significant.

We are greatly indebted to the colleagues who have assisted us in the supply of material and to the assistant and nursing staffs of the hospitals concerned. In particular we wish to thank Sir Allen Daley, Prof. W. C. W. Nixon, Prof. Aleck Bourne, Prof. J. Young, Prof. F. J. Browne, Dr. K. M. Harding, Dr. M. F. Butler, Dr. A. Carter, Dr. H. Walker, Dr. E. Field, and Dr. M. Thornton. We are especially grateful to Prof. J. C. Spence, Prof. A. St. G. Huggett, and Prof. A. N. Worden for their interest in this investigation, and to Dr. S. Way for procuring the very early fœtuses for us and for much helpful discussion. We have also received information relative to methods from Dr. D. P. Cuthbertson and Dr. W. Young. Finally, we wish to acknowledge the assistance of Dr. C. C. Spicer, of the British Bombing Survey Unit, who kindly subjected our results to statistical analysis.

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Mr. R. Victor Howell has been appointed general secretary to the Empire Rheumatism Council in succession to Sir Frank Fox, who has retired. Mr. Howell has also been appointed secretary to the Heberden Society.

HYPOGLYCÆMIA DUE TO ISLET-CELL ADENOMA OF PANCREAS

CURED BY OPERATION

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AFTER the discovery of insulin, Harris (1924) suggested the possibility of hyperinsulinism occurring as a disease in contrast to the hypo-insulinism of diabetes mellitus. Gray and Feemster (1926) published a case of hypoglycæmia associated with islet-cell hyperplasia in the infant of a mother who had severe diabetes. The first recognised case of hyperinsulinism due to a pancreatic tumour was reported by Wilder et al. (1927), the lesion being a carcinoma of islet tissue. The growth had produced metastases, one of which yielded an extract which gave the biological reactions of insulin.

Surgical treatment of the condition was then considered, and Roscoe Graham (Howland et al. 1929) excised a pancreatic tumour with clinical cure. No metastases were seen at the operation, but the tumour, which appeared to be encapsulated, was reported histologically as a slowly growing carcinoma of islet tissue. Next year (1930) Harvey Cushing reported the removal of a benign adenoma of islet cells with resultant abolition of hypoglycæmic attacks. Several papers have since been published on the subject from both the clinical and the histological aspects.

Laidlaw (1938) suggested the term nesidioblastoma for the simple islet-cell adenoma. He discussed the origin of the tumour on an embryological basis, and, using the Greek word for islet, coined the word nesidioblast for the cell which differentiates out of the duct epithelium to form the islet. Hence the benign tumour arising from these cells would be a nesidioblastoma.

Surgical Pathology

The following points are important to the surgeon. Hyperinsulinism is probably due to a tumour of the pancreatic islets and may be either benign or malignant. Laparotomy settles the diagnosis. It is worth noting that Anderson (1930) reported a case of hypoglycæmia which proved at operation to be caused by a malignant adrenal tumour; no explanation of the mechanism was offered.

The simple adenoma is usually small, the average diameter being about 1·5 cm. It is encapsulated and is commonly encountered in the tail of the pancreas, where the islets are most numerous. Multiple tumours may be present; hence the whole of the pancreas should be palpated, particularly the tail. Occasionally no pancreatic tumour is detected at laparotomy. This may be due to one of two reasons: (1) an adenoma is present but lies deep in the pancreas and is of the same consistence as the surrounding tissue; or (2) the lesion is a generalised overactivity on the part of the islets of Langerhans due to increased number or size. Subtotal pancreatectomy has been performed in the cases presumed to be of the latter type, but the results have not been so successful as those in which a tumour has been excised (McCaughan 1935).

The question of malignancy concerns the surgeon, and apparently the presence of a capsule does not altogether exclude malignancy (Howland et al. 1929). Metastases should therefore be looked for at the operation, although of 62 cases of islet-cell tumour reviewed by Whipple and Frantz (1935) only 3 were reported to have shown metastases.

CASE-RECORD

A dancing teacher, aged 49, was admitted to the General Hospital on June 5, 1945, in a stuporose state. His condition breast and begin to feed at once, the last explanation would be the one of choice so far as they were concerned.

SUMMARY

The blood-urea level is higher on the third day of life than it is at birth or on the sixth and subsequent days.

The functional dependence of the kidney on the state of hydration of the body is the most important reason for the rise and for the subsequent fall.

We are much indebted to Prof. K. J. Anselmino for welcoming us at the Landesfrauenklinik, and to Dr. M. A. von Finck and other members of the staff there for their coöperation. Some of the technical work was done by Frl. I. Arrenberg.

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POSTVACCINAL ENCEPHALITIS

TWO PROBABLE CASES IN AFRICAN CHILDREN

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Postvaccinal encephalitis, though not uncommon in Europe, appears to be very rare in the tropics, where virulent smallpox is so much more common and vast vaccination campaigns are continually in progress. Cases have been reported from British Guiana (Grace 1930), Mexico, India, and Oceania (van Rooyen and Rhodes 1940), but only one case seems ever to have been recorded in an African (Stott 1945). In view of the millions of vaccinations performed yearly in Africans this immunity is striking and may be connected with the African immunity to other demyelinising diseases of the central nervous system. The two probable examples here reported thus have more than local interest.

Both children resided at the Kumi Leper Settlement, under the care of Miss M. Laing. In May, 1945, a case of smallpox having occurred in the vicinity, it was decided to vaccinate all the 400 children in the settlement, as this had not been done for some years. The multiple-scratch method was adopted, the bigger children having three scratches and the smaller two. The lymph was manufactured in East Africa from seed lymph of a strain obtained from Tanganyika which had been rabbit-passed; there had been no recent change in the method of production. Apart from 3 children with swollen arms, only 2 of the 400 children showed any ill effects, and in these 2 the acute stages of the illness were very similar.

Both were primary vaccinations, and on the fourteenth day after vaccination each child was taken ill with drowsiness, headache, vomiting, meningismus, pyrexia ranging up to 99–100°F, pulse-rate 90–100 per min., respirations slightly increased. Both had stiffness in the joints and appeared to have diplopia, but neither was incontinent. Quinine was given for seven days without effect, the temperature mounting towards the end of the course till on the seventh day it was 101–102°F, pulse-rate 100 per min. It was then suspected that they had meningitis, and from the eighth to the fourteenth day sulphapyridine was administered by mouth. By the tenth day the temperature had begun to fall and there was much clinical improvement, yet the pulse-rate was still 100 per min. Unfortunately they were not seen by a doctor during the acute stages, and no lumbar punctures were performed.

CASE-RECORDS

Case 1.—A male Mugishu child, aged 2 years, became paralysed in both legs about the fifth day of illness (19th day after vaccination) and could not walk; legs apparently not painful, but sensation seemed to be affected. Full power came back within a few days to the right leg, and he could stand on it.

When seen in August, 1945 (four months later), he stood with the left leg extended, rotated and abducted at the hip, partially flexed at the knee, plantar flexed at the ankle, and abducted at the mid-tarsal joint. There was weakness of the flexors, extensors, and abductors of the thigh, with complete paralysis of the calf muscles and the extensors of the leg and foot. The peronei and the short flexors were not much affected. The tone was flaccid; tendon reflexes absent; plantar response extensor; sensation apparently normal; wasting extremely slight.

Right leg: ankle and knee jerks absent; plantar response extensor; sensation apparently normal. No other lesions elsewhere in the body.

In September lumbar puncture was performed. Cerebrospinal fluid (C.S.F.) contained 2·5 cells per c.mm., protein 25 mg. per 100 c.cm. Kahn reaction negative in C.S.F. and blood.

Revaccination on Oct. 5 produced no reaction.

Case 2.—A female Mugishu child, aged 4 years, lost the use of both legs about the fourth day of illness (18th day after vaccination) but recovered rapidly, and it was only after the illness was over that it was noted that the left arm was paralysed.

Examination in August revealed a scar of successful vaccination over the left deltoid muscle. Apart from chronic right otorrhœa, the clinical findings were confined to the left arm. There was flaccid weakness of the arm and forearm, with very slight muscular wasting of the muscles of the whole limb, but no apparent sensory change. All tendon reflexes were abolished. Patient could dorsiflex wrist and extend and flex third and fourth fingers, and extend middle and index fingers slightly. Kahn test of blood gave a negative result.

DISCUSSION

As neither case ended fatally, no certain diagnosis can be given; but the occurrence, in a closed community of over 400 children, of 2 cases showing evidence of encephalitis starting within fourteen days after vaccination and leaving residual monoplegias strongly suggests postvaccinal encephalitis. Syphilis has been serologically excluded; and, though poliomyelitis has occurred in the vicinity but not in the settlement, there are several reasons why it was not considered to be the causal condition in these two children. The extreme flaccidity of the limb paralysis, associated with loss of tendon jerks and with extensor plantar responses and extremely slight wasting of the muscles, is against a diagnosis of poliomyelitis (Brain 1940). Likewise the selection of single limbs, rather than asymmetric patchy lesions, is against a diagnosis of poliomyelitis. The clinical picture as a whole did not resemble poliomyelitis, which is all too well known in Uganda.

The illness was not very like meningitis; and, though monoplegias may follow meningitis, it is extremely unlikely that two sporadic cases in a closed community would occur and leave such a rare sequel. Though meningitis is common in the vicinity of the colony, residual monoplegias have not been seen. Neal (1942) states that she believes that a diagnosis of postvaccinal encephalitis cannot be made by clinical observation, but such a diagnosis in these cases seems reasonable.

If this is the true diagnosis, the question arises why it is so rare in Africans in Africa and why two cases should crop up. It seems very unlikely that such a dramatic sequel to vaccination should occur without being noticed in such a well-vaccinated country as Uganda, where the population in many areas is very "hospital

The response to adrenaline during a hypoglycæmic ttack suggested that the liver glycogen was not comletely deficient, and this was confirmed by the histoogical examination of a biopsy specimen of liver.

Surgical removal of the adenoma completely cured he hypoglycæmia.

We wish to thank Dr. A. B. Taylor and Mr. B. T. Rose for ermission to publish this case.

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BLOOD-UREA IN THE FIRST NINE DAYS OF LIFE

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WHEN the introduction of micro methods first made determinations of the so-called serum chemistry a practical possibility, it was natural that investigators, interested in the metabolism of infants, should apply these methods to children in the first few days of life.

Schlutz and Pettibone (1915) were probably the first in the field and they were followed by Sedgwick and Ziegler (1920), Balint and Stransky (1920), Lucas et al. (1921), and Sherman et al. (1925). A study of their results for non-protein nitrogen (N.P.N.) and urea shows great individual variations and the unsatisfactory nature of their averages for determining the trends from day to day. Lucas et al. (1921) included studies of the blood at birth, but no serial determinations seem to have been made by any of these workers, and curiously little work appears to have been done on this subject since that time. The obvious shortcomings of these studies were not lost upon Smith (1945), who was unable to draw any firm conclusions from the evidence about the day-to-day levels of the N.P.N. or of the blood-urea.

The present investigation was undertaken as part of a more general study of renal function in early life.

SUBJECTS AND METHODS

The subjects were all normal full-term babies. They were put to the breast for the first time when they were 18–24 hours old, and they were given nothing but mother's milk. Their progress was regarded as completely satisfactory. Samples of blood were taken from the umbilical cords at birth, and from the heels on the third, sixth, and eighth or ninth days of life. The second and subsequent samples were usually taken at 10 A.M., but this was not invariable. Coagulation was prevented with sodium oxalate, and the urea was determined by Lee and Widdowson's (1937) method.

RESULTS

The results are given in the accompanying table, which shows that in every case there was a rise in the blood-urea level on the third day of life, and a fall later. In some babies the blood-urea level probably reached its peak on the second or fourth day, but there is insufficient data to establish this point. It is, however, quite clear that a small rise in blood-urea level is to be expected in the first few days of life, and that levels outside the "normal" range should be regarded as unusual and possibly as pathological.

DISCUSSION

A steady blood-urea level indicates that a balance exists between the forces of production and of excretion. A rise, therefore, in the first three days of life means that during this time the production of urea is exceeding its excretion, for the 5–10% concentration of the body fluids which may take place at the same time would only account for a fraction of the changes observed.

In the first three days of life a baby takes little food; hence the urea produced from the proteins in the milk will be immaterial. But red blood-cells are being destroyed, and some urea is being formed from the breakdown of the proteins of some tissues to supply the needs of other more essential organs. A relatively large amount of urea may be coming from this source, for in the first few days of life babies are in a state of hydropenia, and this has been said to exaggerate tissue breakdown. The evidence for this has been discussed by Schiff (1929) and McCance (1936). It seems improbable, nevertheless, that more urea will be formed from the tissue proteins in the first three days of life than from the food proteins in the second three days; hence it is unlikely that an overwhelming production of urea is the cause of the rise in concentration of this substance in the blood.

There is abundant evidence, however, that hydropenia will curtail very materially the ability of a newborn child to excrete urea (McCance and Young 1941, Young and McCance 1942). By reducing the volume of the urine, moreover, and hence the urea clearances, hydropenia may produce a comparable rise of blood-urea level in an adult (Black et al. 1944). The rise in the blood-urea should therefore be attributed primarily to the effects of hydropenia on renal function, and the fall after the third day—in spite of the increased intake of protein food—primarily to the infant's return to a state of full hydration and consequently to increased urea clearances.

One further reason may be advanced for the rise and fall in the blood-urea level revealed by these investigations. The kidney is relatively inefficient for some time after birth, and it is possible that a rapid expansion in its functional capacity takes place in the first few days of extra-uterine existence. There is no evidence on this point at present in man, but if a rise in blood-urea level is found to occur in newborn animals which take the

FLUCTUATIONS IN BLOOD-UREA LEVEL DURING THE EARLY DAYS OF LIFE

No. of baby	Blood-urea (mg. per 100 c.cm.)			
	At birth	3–3½ days	6–6½ days	8 days or over
1	28·8	36·2	25·8	16·3
2	12 0	27·4	20 6	19·4
3	17·6	29·6	20·6	19·7
4	12·7	22·0	17·0	16·0
5	25·9	31·8	16·9	15·4
6	27·5	36·8	27·4	25·0
7	16·7	30·8	18·8	18 8
8	22·5	39 6	19·9	15·4
9	19·7	27·8	20·8	18·7
10	17·3	27·0	19 2	18·0
11	8·0	18·5	9·9	10·4
12	18·0	21·4	20 0	19·3
Average	18·9	29·1	19·7	16 8

those with hyperthyroidism, and thus must be accepted with reserve as an indication of a true diminution in incidence or severity of hyperthyroidism.

Table I shows that the number of patients with hyperthyroidism attending at our two clinics in the pre-war years 1936–39 was almost the same as in the war years 1941–44, being 77 and 76, or an average of about 19 cases a year. In 1940, when there was no malnutrition but much nervous strain, the number of cases was 14. The number of thyroidectomies done every year in the surgical department of the same hospital also remained about the same throughout the whole period. If these figures are expressed as a percentage of the total cases of all diseases dealt with, there is an apparent fall in incidence for 1940–44. But similar, though slighter, falls in percentage incidence occurred during the war in cancer of the stomach and disseminated sclerosis. It would therefore be rash to conclude that the fall in incidence of hyperthyroidism was real. What is certain is that the incidence of hyperthyroidism did not rise.

There is some evidence that during the war years hyperthyroidism was less severe. Table II shows that the B.M.R. determinations done in the medical and surgical clinics in 1936–39 were on the whole higher than those of 1941–44. This difference is not statistically significant, but the frequency-distribution curve suggests that there was a genuine change. A general decrease in the severity of hyperthyroidism might be related to malnutrition, especially to lack of protein. According to Wegelin (1926) and Paal and Kleine (1933), a diet rich in protein induces hyperplastic changes in the thyroid, whereas a diet poor in protein, or starvation, has the opposite effect. Similar evidence has been produced by Divry (cited by Brull et al. 1945). That severe malnutrition lowers the B.M.R. of otherwise normal persons is known, and during the famine in Belgium Govaerts and Lequime (1942) showed that in such cases the B.M.R. might fall 40–50% below normal. There is, however, another possibility. During the occupation the population consumed large amounts of vegetables of the brassica family, and these contain substances allied to thiourea (Kennedy 1942).

TABLE II—BASAL METABOLIC RATE IN HYPERTHYROIDISM

Basal metabolic rate (+ %)	No. of patients	
	1936–39	1941–44
0– 10	4 (*4·5%*)	8 (*8·6%*)
11– 20	12 (*13·5%*)	18 (*19·3%*)
21– 30	24 (*27·0%*)	25 (*26·9%*)
31– 40	11 (*12·4%*)	18 (*19·3%*)
41– 50	5 (*5·6%*)	11 (*11·8%*)
51– 60	10 (*11·2%*)	7 (*7·5%*)
61– 70	11 (*12·4%*)	4 (*4·3%*)
71– 80	6 (*6·7%*)	1 (*1·1%*)
81– 90	4 (*4·5%*)	1 (*1·1%*)
91–100	2 (*2·2%*)	—
Total	89	93

SIMPLE GOITRE

Cases of simple goitre have been observed only in the outpatient clinic. Table III shows the numbers of such patients attending in 1936–44. Both the absolute number and percentage incidence rose: the number from an average of 13 per annum in the pre-war years to 30 per annum in the war years; the percentages from 16% to 26%. These differences are statistically significant. The incidence of simple goitre has increased at all ages, particularly in the age-group 15–25 years.

TABLE III—INCIDENCE OF SIMPLE GOITRE

Year	No. of cases	Percentage of total new *patients*	Year	No. of cases	Percentage of total new patients
1936	11	13·5	1940	9	25·0
1937	13	10·5	1941	21	23·6
1938	14	14·0	1942	30	40·5
1939	14	20·0	1943	29	22·7
			1944	40	24·7
Total .	52	16·0	Total	120	26·0

Simple goitre can be produced experimentally by *lack of iodine (Marine 1935)*, by *interference with* the synthesis of the thyroid hormone by such preparations as thiourea, and perhaps by impairment of oxidative processes in the peripheral cells by means of substances like methyl cyanide. Brussels is located in a non-goitrous country, 80 miles from the sea. There is no reason to believe its population lacks iodine; if they did, goitre should have been prevalent before the war. It is possible that the lowered metabolism associated with severe malnutrition may, on the analogy of methyl-cyanide poisoning, have stimulated a hyperplasia of the thyroid.

Another possible explanation is that here again the increased incidence may be related to the heavy consumption of brassica vegetables. A diet rich in these is known to be goitrogenic in animals (Chesney et al. 1928, Marine 1935), and Kennedy (1942) showed that this may, at least in part, be related to their containing allyl-thiourea, which, in common with other compounds containing a thiourea grouping, produces simple goitre. Observations on closed communities forced to subsist on such diets in other parts of Belgium strongly suggest that simple goitres can be produced in this way.

MYXŒDEMA

The lowered metabolism of malnutrition might have been expected to raise the incidence of myxœdema. Our figures are too small for us to form any opinion on this point, though they show that in 1936–39 there were 3 cases, whereas in 1941–44 there were 11. But there are reasons for doubting whether starvation alone can produce myxœdema. By such means the B.M.R. can be lowered to −40% or even to −50%, but the cases show none of the characteristic clinical signs of myxœdema (Govaerts and Lequime 1942). The microscopical appearance of the gland in myxœdema is characteristic, and the glandular tissue remaining shows signs of temporary stimulation followed by degeneration (Bastenie 1944). In death from starvation, on the other hand, we have observed that the histology is that of the normal resting gland. Whether malnutrition may precipitate *incipient myxœdema into the full clinical syndrome* is another matter, on which no opinion can be expressed.

SUMMARY

The number and severity of cases of thyroid disease observed at the St. Pierre Hospital, Brussels, in the years *before* and *during* the German occupation have been compared.

The incidence of hyperthyroidism did not increase and may perhaps have decreased; and its severity probably diminished.

There was a significant increase in the incidence of *simple goitre*, especially in adolescents and young adults.

No opinion can be expressed about *the incidence of* myxœdema, save that starvation alone *does not produce* it.

There was no evidence that psychogenic factors influenced the incidence of diseases of the thyroid.

minded."' Encephalomyelitis is not uncommon in Uganda, Muwazi and Trowell (1944) seeing 20 cases in a series of 269 neurological cases. Though the pathology has not been worked out, these cases appear to be due to both myelinoclastic and polioclastic viruses. Disseminated sclerosis has only been reported in Africans by Sharp (1938), and very considerable doubt has been thrown on this diagnosis, Gelfand (1944) suspecting them to be cases of encephalomyelitis. The factors influencing the rarity of demyelinising diseases in Africans are completely obscure; but, if demyelinisation is associated with dietetic deficiencies, it should commonly be seen in Africans.

I am indebted to Miss M. Laing, M.B.E., S.R.N., for the history of these cases; Dr. P. W. Hutton, specialist physician, Mulago Hospital, for his advice; and the Director of Medical Services, Uganda, for permission to publish

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DISEASES OF THE THYROID GLAND IN OCCUPIED BELGIUM

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IT is commonly held that the thyroid gland reacts both to nervous and to nutritional strains, and that thereby abnormal states may be produced. Both these strains have been operative in Belgium since the German occupation in May, 1940: the nervous as the result of invasion, battles, air-raids, and inquisition by the enemy; the nutritional through restricted food-supplies.

It therefore seems worth while to record the changes observed in the nature and incidence of diseases of the thyroid gland during that period and to see if these can be correlated with environmental factors. Such an inquiry seems the more possible because the nervous and nutritional strains varied independently of each other. Nervous strain was present as a background throughout; the food situation varied significantly from the early to the latter part of the occupation.

The *food situation* during the war fell into two periods. During the first, which lasted from the end of 1940 to the middle of 1942, the rations supplied about 1300 calories, consisting of 250 g. of carbohydrates, 20 g. of fat, and 48 g. of protein, of which only 12·5 g. was animal protein. Vegetables were, however, available on the free market, and large quantities of kohlrabi, cabbages, &c., were consumed. In the second period food shortage was less severe. Official rations rose to 1400 calories a day, and a black market—of which an enlightened account has been given by Ellis (1945)—was organised. A survey carried out in January, 1945 (Bastenie et al. 1945), revealed that cereals, potatoes, and vegetables formed an abnormally high proportion of the diet, which was deficient in calories, fats, animal protein, calcium, and riboflavine. The gross figures showed an average intake of 2100 calories—43 g. of fat and 66 g. of protein, of which 19 g. was animal protein.

Signs of malnutrition appeared during the first period. Loss of weight to the extent of 20–30% of the initial weight was usual; there was a general fall in plasma-protein and blood-urea concentrations; many cases of hunger œdema appeared (Govaerts and Lequime 1942, Govaerts and Gregoire 1941, Brull et al. 1945); and there was an increased incidence of infectious diseases, especially tuberculosis. In the second period hunger œdema disappeared, and the tuberculosis-rate regressed, but the weight remained at its previous low level or rose only slightly, and there was a general complaint of muscular weakness, easy fatigability, and inertia.

Thus the environmental factors under consideration group themselves in three periods: in 1940 there was acute nervous strain but no malnutrition; in 1941 and 1942 acute malnutrition but rather less nervous strain; and in 1943 to 1945 chronic malnutrition but heightened nervous strain consequent on the recurrence of intensive air-raids and battle.

MATERIAL

The material on which the following observations are based was drawn from the university medical clinic of Prof. P. Govaerts at the St. Pierre Hospital, Brussels, and from the endocrine outpatient clinic of the same hospital. For comparison some data from the surgical clinic of Prof. R. Danis at the same hospital have been included. The patients attending all these departments are drawn from the lower classes and were exposed throughout, without special mitigation, to the nervous and nutritional strains outlined above. They came from the environs of Brussels, a district where goitre is not normally endemic. Reference has already been made to the general increase of ill health during the occupation. The effects of this were seen in increased admissions and attendances at the hospital. A further factor swelling admissions to our hospital was the requisitioning of other hospitals in Brussels by the enemy. The only major population change which is known to have taken place is that in 1944 many young men were deported by the Germans, but the admissions to the medical clinic in 1936–44 show that the age-distribution did not change appreciably. Due consideration must be given to these factors in comparing the incidence of any illness before and during the occupation. The changes in incidence of thyroid disease are recorded below as a percentage of total admissions, but more weight should perhaps be attached to the absolute number of cases.

HYPERTHYROIDISM

Attention was first drawn to the changing incidence of diseases of the thyroid by Brull (1942), who found that the basal metabolic rate (B.M.R.) of all goitre cases sent to his clinic showed a steady decline from an average figure of +21·9% in 1939 to +6·6% in 1942. But this study makes no distinction between simple goitre and

TABLE I—INCIDENCE OF HYPERTHYROIDISM

Year	Endocrine outpatients clinic		Medical clinic	
	No. of cases	Percentage of total new patients	No. of cases	Percentage of total admissions
1936	9	11·1	10	0·55
1937	13	19·7	12	0·65
1938	12	12·0	6	0·32
1939	8	11·5	7	0·39
Total ..	42	13·3	35	0·49
1940	3	8·3	11	0·43
1941	9	10·1	7	0·18
1942	5	6·7	12	0·28
1943	16	12·5	6	0·17
1944	9	5·5	12	0·38
Total ..	39	8·5	37	0·25

In 1941–44 the number of patients attending either clinic was about double the number attending in 1936–39.

The analyst—the personal element—is finally eliminated. We are left with a series of essentially disciplinary exercises for the tackling of which considerable narcissism would be required, combined with an intellectual watchfulness rarely found in those who need help. He cogently contrasts these exercises, to their advantage, with Yoga, Christian Science, and Couéism. But every Yogi knows how rare it is to find someone capable of understanding Yoga. Is this chemico-mechanical affair with its vague vital principle really worth working for? For most people it is not. The ordinary man incorrigibly remains a person.

Early Ambulation and Related Procedures in Surgical Management

DANIEL J. LEITHAUSER, M.D., F.A.C.S., chief of surgery, St. Joseph Mercy Hospital, Detroit, Michigan. Springfield, Ill.: Charles C. Thomas. London: Baillière. 1946. Pp. 232. 25s.

LEST there should be any misunderstanding about the meaning of "early ambulation," the dust-cover of this book explains that 810 of the 2017 cases under review were out of bed three or four hours after operation. "Early" is thus no exaggeration, and this is the more surprising since Dr. Leithauser advocates spinal anæsthesia. He thinks it is the patient's "natural instinct to get up and move about after an operation" and that only outworn tradition and the wicked surgeons and nurses prevent him. At least in this country, surgeons appreciate the importance of early and unrestricted movement in the prevention of atelectasis and thrombosis; but the advantage of performing such movement in the erect rather than the recumbent position is debatable. Dr. Leithauser's series of cases lends support to his method: atelectasis, thrombosis, and embolism are, he says, almost eliminated, bedpans are dispensed with, and the period in hospital is enormously reduced, the average stay of 795 cases of acute appendicitis being only two days. (These were all private patients whose homes were presumably more suitable for their early return than those of hospital patients in this country.) He suggests that râles, indicating the presence in the lungs of secretion requiring expulsion, were often only apparent when the patient stood up and consequently dislodged some mucus, and he believes that coughing is much more effective in the upright position. The reader, even if he does not accept all these contentions, will probably be sufficiently stirred by Dr. Leithauser's confidence to want to put some of them to the test.

Chemical Methods in Clinical Medicine

(3rd ed.) G. A. HARRISON, M.D. Camb., reader in chemical pathology in the University of London at St. Bartholomew's Hospital. London: J. & A. Churchill. 1947. Pp. 630. 40s.

PAST editions of this standard work have done much to bring the chemical laboratory into close contact with the ward, and to stimulate the interest of pathologists and clinicians in each other's activities and in the application of the latest scientific knowledge to both treatment and diagnosis. It is not only a guide to laboratory knowledge and technique, and to the interpretation of biochemical results, but also, in Dr. Harrison's own words, "my own journal," carrying descriptions of many useful inventions, as well as observations and interpretations which will not be found elsewhere. The new edition besides being thoroughly up to date contains much new material—on pigmentation, sulphonamides, and new analytical procedures and functional tests.

L'ostéosynthèse au clou

R. SOEUR, chirurgien-adjoint des hôpitaux de Bruxelles. Paris: Masson. 1946. Pp. 132. Fr. 325.

M. Soeur has developed the idea of intramedullary nailing for shaft fractures of all the long bones, using c-shaped steel nails, inserted through the medullary canals. In his hands the results have been good, and the [illegible] emboli and sepsis—have not [illegible]. But on the face of it the method will not appeal to those pleased with the results [illegible] treatment. The most interesting [illegible] a short digression dealing with [illegible]s. Here he claims, and illustrates [illegible]vels's angles are caused by a beak of bone on the under-surface either of the proximal distal fragment. If on the former, union is doubtful if on the latter, the fracture almost always heals.

A Study on Oxygen Toxicity at Atmospheric Press

WILHELM T. L. OHLSSON. Lund: Hakan Ohlsso Boktryckeri. 1946. Pp. 93.

THIS interesting little monograph is mainly résumé of investigations in which the author tried determine the effect of the inhalation of 80–90 % oxygen at atmospheric pressure on rabbits previously exposed to either phosgene or blast injuries. In addition, the effect of this concentration of oxygen was investigated in healthy human subjects. He concludes that the pulmonary damage caused by oxygen in high concentrations is not produced by a direct irritant effect on the lungs, but by a disturbance in the blood carriage of carbon dioxide. He also believes that oxygen only becomes harmful when the supply exceeds the demand. A reasonably full review of the literature provides a useful background to his observations and all they imply. While the case presented is by no means watertight, it contributes to our knowledge of the subject, and will interest all concerned with the therapeutic use of oxygen.

Experiences with Folic Acid

TOM D. SPIES, M.D., associate professor of medicine, University of Cincinnati. Chicago: Year Book Publishers. London: H. K. Lewis. 1947. Pp. 110. 21s

THIS is a useful account of what has been learnt about folic acid since the therapeutic use of the synthetic substance began about 18 months ago. The history of the investigations leading up to the discovery of folic acid is outlined, but the greater part of the book is concerned with the diagnosis and selection of suitable cases, and with the effect folic acid had on them. The necessity for correct diagnosis is rightly stressed again and again but the detail is transatlantic in luxuriance; for instance the record of the size of the ears, and the 36 investigations listed for every case of sprue, show what is possible to those who have no difficulties over man-power or equipment. All the same, among the detail the critical points are always observed and clearly noted. It is stated that 218 cases have been treated, including 78 of Addisonian pernicious anæmia, 5 of cirrhosis of the liver (only 1 responded), and 8 of an undefined entity "nutritional leukopenia"; the rest were mostly nutritional macrocytic anæmia and sprue. The results of treatment are well described and illustrated, sometimes in colour. Spies does not minimise the difficulties and puzzles that folic-acid treatment has raised. He notes that the results in pernicious anæmia were no better than with liver, and gives figures confirming that lesions of the central nervous system are unaffected and may progress or even make their first appearance while the patient is being maintained on folic acid. He therefore agrees that folic acid is neither the most effective nor the safest remedy for pernicious anæmia; it is in the treatment of nutritional anæmias that it will be most useful. The part played by folic acid in hæmopoiesis, including the place of the conjugates, is briefly discussed; but Spies thinks that there is insufficient evidence as yet to say any more than that it functions as part of an enzyme system that is disturbed in these diseases. Folic acid is neither the extrinsic nor the intrinsic factor of Castle.

Electrocardiography (2nd ed. London: H. Kimpton. 1946. Pp. 881. 60s.). **Exercises in Electrocardiographic Interpretation** (2nd ed. London: H. Kimpton. 1946. Pp. 288. 30s.).—Dr. L. N. Katz has made the second edition of his *Electrocardiography* considerably larger than its predecessor, with 250 new tracings. New matter is included on the normal cardiogram, on the patterns of axis shift and right and left heart strain, and on coronary disease, which is very well illustrated; there is also a new section on cardiograms simulating the coronary pattern. With its perfect black-and-white tracings and lucid style this book remains an outstanding exposition of cardiology, though too detailed for the average beginner. The second edition of the companion volume has been enlarged and revised to conform with the larger volume, and reaches the same high standard.

The observed changes of incidence and severity are hought to be related to the quantity and quality of the liet, especially the increased consumption of cabbages nd related vegetables which contain substances of the hiourea group.

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GUMMA OF THE THYROID

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GUMMA of the thyroid is extremely rare, with a very variable clinical picture. Williams and Steinberg[1] concluded that women were more often affected than men, and that the gumma might result from either hereditary or acquired syphilis. They found that there was usually no disturbance of thyroid function; but, if there was, it was myxœdema rather than hyperthyroidism, and symptoms of mechanical interference and confusion with carcinoma sometimes arose.

A woman, aged 37, had a slight swelling in her neck in October, 1939. She did not feel ill but sometimes felt breathless. She was bronchoscoped, but nothing abnormal was found. I first saw her in August, 1942. At that time her neck was swollen, and the thyroid, which was slightly enlarged, felt very hard. There was a little exophthalmos, and her pulse-rate was 120 per min., with fibrillation. She appeared to be a case of thyrotoxicosis, but the thyroid was unusually hard, suggesting carcinoma. She was admitted to Boundary Park General Hospital, Oldham, for rest and observation, and improved slightly on Lugol's iodine. In December she began to have difficulty in swallowing and became slightly hoarse. It was felt that an exploratory operation was justified.

Operation (Dec. 17, 1942).—The thyroid gland was found to be extremely hard and densely matted to the surrounding structures. It was impossible to do anything except remove a portion for section, the macroscopical diagnosis being carcinoma of the thyroid. Immediately after the operation she felt much better, her pulse-rate dropped from 120 to 90 per min., and she was discharged on Dec. 30.

A little later she developed two ulcers in the scar and others on the right thigh and left shoulder. These were undoubtedly gummata and gave the clue to the condition of the thyroid. Dr. William Susman, of Manchester University, who kindly examined the section, reported: "The lesion in and about the thyroid is a gumma. The gland also shows chronic thyroiditis, with loss of typical thyroid structure. The gland is adherent to some neighbouring voluntary muscle."

The patient was given large doses of pot. iod. and liq. hydrarg. perchlor. and made a complete recovery. At the time of the operation she weighed 6 st., and her weight 2½ years later was over 9 st.; the exophthalmos had disappeared, the heart-rate, though rapid, was regular, and she had no obstructive symptoms whatever. The Wassermann reaction however was still positive.

There are several unusual features about this case. There were undoubted symptoms of hyperthyroidism with some tracheal obstruction, but the thyroid, though only slightly enlarged, was unduly hard. It seems that in such circumstances a Wassermann reaction and an exploratory operation should always be done. In this case, had she not been operated on, gumma of the thyroid would not have been thought of. Crotti[2] has already emphasised this point; he urges that, since syphilis of the thyroid has often been taken for a malignant tumour, whenever malignancy is suspected the possibility of syphilis should be investigated.

Reviews of Books

Child Health

Editors: ALAN MONCRIEFF, M.D., F.R.C.P.; W. A. R. THOMSON, M.D. London: Eyre and Spottiswoode for *The Practitioner*. 1947. Pp. 254. 14*s*.

FOR over fifty years there have been good books on the diseases of children, but until recently there was no convenient manual for the increasing number of doctors who spend their days in supervising the health of children, in the maternity hospital, the welfare centre, or the school. Two of the new professors of child health have produced such books during the past year, and now Professor Moncrieff and Dr. Thomson give us a third, most of whose chapters have already been published as articles in *The Practitioner*. The authors of the various sections have been well chosen; they write of what they know, and the result is a practical book built on first-hand experience. Rather over half of them are employed by local authorities, who are responsible for most of the child-health services. The book tells about the lay-out of a child-welfare centre, the home treatment of the blind baby, the vitamin and mineral requirements of the infant, the establishment of respiration, and what happened when typhus patients were distributed through the wards of the Edinburgh Royal Infirmary. The print is clear, the paper only slightly transparent, the binding attractive, the index detailed (even diverse: "*torticollis*" gives one reference, "wry-neck" another). This compact compendious book is negligible as an anatomy of health (it does not even contain tables of growth), but as a handbook about the prevention of illness and the care of the handicapped child it will be found very valuable.

Ego-Hunger and Aggression

F. S. PERLS, M.D., captain, S.A.M.C. London: Allen & Unwin. 1947. Pp. 273. 12*s*. 6*d*.

EVEN in Dr. Perls's most abstract discussions it is easy to perceive the wealth of clinical experience which his fine critical mind has not ceased to align with his desire to think consistently. But the need to argue his own philosophico-psychological standpoint, to disagree here and there with Freud, to state his own neo-freudian psychopathology as well as make his own contribution to psychotherapeusis—and all in the same book—tend to cloud the issues. The reader requires a clear-cut statement of either Dr. Perls's therapeusis, or of his philosophic standpoint, or of his argument with Freud: the three-in-one make for obscurity.

On the way to his philosophic standpoint of belief in the Creative Present, Dr. Perls criticises *mind-body* parallelism, and discards subjective observations except in so far as they can be restated in objective terms. Preservation of the organism demands ego-feeling—the consciousness of boundary—but there is no "self." He discards libido in favour of a rather vague Bergsonian *élan vital* and a striving after fulfilment of "the figure background" need, the gestalt.

Freud gave to Dr. Perls what classical philosophy, he says, had withheld. But Freud was not a philosopher. He did unintentionally provide a near-religion for some (but he did not so regard it himself), and in common with others he implied a philosophy of determinism, the negation of personal value. Dr. Perls also negates this value, though differently: the objective, by definition, is non-personal. He disposes arbitrarily of religion, diagnosing God as a projection of man's omnipotent self. The suspicion arises that Omnipotence has been ousted by Omniscience and God has merely become impersonal.

In his underlying philosophy lies the weak point in the therapeutic technique described in the last section.

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tissue specificity—may, in last analysis, have been derived from the genetic system of host cells. In his most interesting lecture CRAIGIE took us step by step through the various forms of latency until he reached what he termed "cryptic" infection—that hypothetical state in which the virus has lost its cytoclastic properties and multiplies inside the host cell at just the tempo that will ensure there being enough virus to maintain infection when the cell divides. Such an infection would defy detection by the usual methods. Although, as CRAIGIE said, cryptic infection, in the case of viruses affecting man and animals, is still in the realm of hypothesis, recent work with the bacteriophage lends it support.

He instanced work of his own on an avirulent variant of the type II Vi phage, the gamma agent. This gamma agent is carried by all type D_1 strains of *Salmonella typhi*, and seems to be able to multiply along with the bacterium, without obvious harm to the latter, over long periods. Only with difficulty can the gamma agent be demonstrated as a bacteriophage, and it is hard to maintain, being lost from time to time, or rather (as CRAIGIE suggests) returning to the fully cryptic avirulent state. Infection with this gamma agent has definite effects on its bacterial host, making it either resistant to Vi phages or susceptible only to D_1 phage; it is possible also that infection may result in the loss of H and O antigens.

Discussing the bearing of latent or cryptic infection on the basic problem of cancer, CRAIGIE pointed to the similarity between the hypothetical cryptic virus and the plasmagenes—those hypothetical cytoplasmic particles which some biologists are postulating to explain the inheritance of cytoplasmic traits—and said that some virus workers are prepared to identify certain of the more lowly viruses with plasmagenes. But he went on to speak of the dilemma which acceptance of this view entails. Though there are differences between, on the one hand, the viruses of the psittacosis-lymphogranuloma group or the pock viruses, and on the other hand the very small viruses of poliomyelitis and foot-and-mouth disease, there is no indication that these differences betray a fundamental difference in their nature.

T. M. RIVERS, alone almost among virus workers, seems to hold that the agents now grouped together as viruses may be heterogeneous, and that while the large viruses like psittacosis are probably micro-organisms the very small and simple viruses are non-living things. The large majority would agree with both CRAIGIE and BURNET when they say that the viruses present an unbroken series, proceeding from the smallest and simplest to the largest and most complex, and from them to the rickettsias, and that there is no sign of fundamental difference between the members of this series. If, then, one were to agree that some of the less complex viruses are derived from genes, it would presumably follow that the more complex ones have evolved from them; and one would have to consider when, how, and why the naked gene decided to clothe its nudity. More acceptable is the hypothesis, propounded independently by GREEN[10] in America and LAIDLAW[11] in this country, that viruses have arisen from higher forms of micro-organisms by a process of progressive adaptation to a parasitic existence, in which the parasite is finally reduced to a bare nucleoprotein molecule, capable of self-replication but relying on the host cell entirely for the necessary materials a energy. It is this hypothesis which BURNET adopts, since "there seems to be no visible alternative", and, having accepted viruses as micro-organisms adapted to a parasite existence, and capable, like other living things, of producing variants—in point of fact highly endowed in this respect—he proceeds to consider the evolution of virus disease.

Human virus infections, he thinks, must have been derived from similar conditions in animals, because, for a parasitic micro-organism to survive, there must be sufficient opportunity for the transfer of infection; and until man changed from hunting to cultivation of the soil, and took up communal life, the chances of transfer of infection were too small to make him a suitable host for the continued existence of a virus. Epidemic typhus has arisen from rodent typhus by the adaptation of the causal rickettsia to the human body-louse; and in the chapter on psittacosis BURNET suggests that at the present time we are probably witnessing the adoption by psittacosis virus of man as a permanent host. (In some outbreaks of infection with viruses of this group the virus has passed readily from man to man and there was no evidence that the infection came from birds.) But besides change in the virus, leading to change in an infectious disease, one may have change in the other partner, the host, though this is probably a less important factor. Host change is usually immunological, but that it may be social is suggested by BURNET when discussing the epidemiology of poliomyelitis. This disease, from being essentially one of the early years of life, infection coming from the adult, is changing to one in which the main incidence is in children of school age, infection passing from child to child and the adult escaping. This change in epidemiological pattern is seen especially in those countries—North America, Australia, and Scandinavia—where social hygiene and sanitation have reached higher levels than elsewhere, and BURNET suggests that these factors may be responsible for the change.

Although, in their evolution, virus diseases show many fluctuations, the virus variants of increased virulence must tend to eliminate themselves, since they are too destructive to their hosts. Hence the general tendency is towards an equilibrium in which host and parasite are so adjusted to one another that infection is widespread but the host little incommoded. The unique example of this state in virus diseases is herpes simplex.—This, in very broad terms, is the argument which runs through BURNET's fascinating monograph.

War, Famine, and Goitre

IT might be expected that the stresses of war would lead to an increase in toxic goitre. In neither of the two world wars, however, was a high incidence noted among the fighting troops; in fact toxic goitre remained a rare condition in the Army. Clinicians do not seem to have found any increase among civilians in the United Kingdom, though in the absence of statistical data an increase might not have been detected. The Registrar-General's figures for the deaths from toxic goitre do not suggest that the war had any appreciable effect on the mortality. Yearly deaths from this condition rose slowly and steadily from 1913 to 1936, and then declined at a

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THE LANCET

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Viruses and Disease

BELIEF in spontaneous generation has died hard. In the 17th century its exponents were forced to admit that it was inapplicable to the larger living things, like mice and the larvæ of the blue-bottle fly; but when, in the earlier part of the last century, bacteria were discovered, many felt sure that here at least was a form of life which must arise spontaneously. The carefully planned experiments of PASTEUR and TYNDALL proved them wrong: bacteria were shown to arise from bacteria; they followed the normal reproductive process of like producing like. One might have thought then that the last had been heard of spontaneous generation. Yet with the discovery of filtrable viruses, and inquiry into their reproduction, this conception was reborn. In the years between the two wars much time was spent in discussing not only how viruses are generated but also whether they are alive, and the outcome was never quite decisive. Most of the workers concerned, however, came to the conclusion that, for all practical purposes, viruses behaved like autochthonous living things. After all, this had been tacitly assumed in every experimental transfer of a virus infection, and also in all our attempts to control virus diseases by the same preventive measures as have proved effective in controlling micro-organismal disease. The eradication of rabies from this country, the exclusion of rinderpest from Australia, and the considerable success achieved against foot-and-mouth diseases in Britain indicated that the assumption was well founded.

In his illuminating monograph, *Virus as Organism*,[1] F. M. BURNET treats of viruses from an ecological angle, considering how they "make a living" in the environment which nature and mankind have allotted them. He begins by discussing their reproduction, variation, and survival, and he points out that in the last two decades a great deal more has been learnt about them. We can measure them and have established that the larger ones can be seen by ordinary microscopy. The electron microscope has rendered visible the smallest viruses, and has revealed signs of a definite internal structure in large viruses such as vaccinia.[2] The large viruses have been shown, like bacteria, to be complex antigenically, and for some of them, including vaccinia,[3] there is reason to presume a chemical structure recalling that of a typical bacterium. The large viruses appear also to possess complex enzyme systems; of this we have direct evidence in the case of vaccinia virus,[4] while the sensitivity to sulphonamides exhibited by the viruses of lymphogranuloma venereum, inclusion blennorrhœa, and the mouse pneumonia of Nigg and Eaton is indirect evidence of the same thing. All this, and the fact that, whatever the environment in which they multiply, viruses breed true, leaves little doubt that they are extrinsic agents of micro-organismal nature, each virus particle being a direct genetic descendant of a similar particle. And yet, as BURNET says, some workers are reluctant to abandon the conception of viruses being derived from the cells of higher animals or plants; they suggest that viruses may be genes which, freed from their normal setting, have become capable of abnormal multiplication and survival by transfer from host to host. In his lecture on Latent Virus Infections, delivered before the Royal College of Surgeons on April 16, Dr. JAMES CRAIGIE, F.R.S., considered this possibility, particularly in reference to what he calls "cryptic virus infections"; and DOERR[5] in 1938 stoutly maintained that herpes virus is the product of deranged cells. Though we now know that DOERR's thesis is untenable, probably one of the most interesting chapters in BURNET's monograph is that in which the natural history of herpes is reviewed.

ANDREWES and CARMICHAEL[6] in 1930, and R. T. BRAIN[7] in 1932, observed that in adults the presence of herpetic antibody in the blood was related to a history of herpes; and the suggestion was made that sufferers from this condition were carriers of the virus. The time when they were first infected remained unknown until 1938, when DODD, JOHNSTON, and BUDDINGH[8] showed that aphthous stomatitis in young children was usually due to herpes virus. It was here that BURNET and his colleague WILLIAMS[9] took up the work. After confirming the American findings on the ætiology of aphthous stomatitis in children, they proved that this was in fact a primary infection, since herpetic antibody was absent in the acute phase of the disease but appeared during convalescence. From this they proceeded to a serological survey of herpetic antibody, using a more accurate method of titration than previous workers. Their results were of an all-or-nothing character: herpetic antibody was either absent or was present in high titre, and again its presence was related to affliction by herpes. Only the failure to isolate the virus from carriers prevented BURNET and WILLIAMS from completing the story, but enough evidence had been found to make it clear that herpes virus was an extrinsic agent and that infection with it, which commonly occurred in the second or third year of life, persisted after clinical recovery, leaving a carrier state which revealed itself by an attack of symptomatic herpes when some factor depressed the host's resistance and allowed the virus temporarily to get the upper hand. These facts are doubly interesting, because they give us a picture of an infectious disease which has reached a state of equilibrium—in which host and parasite are so well adjusted to one another that the infection can be widely disseminated with little detriment to the host.

If, however, we can dismiss with confidence DOERR's hypothesis of the origin of herpes virus, we may not feel quite so sure about the claim that some other viruses—particularly those concerned in the production of tumours, with their very strict host and

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two months of beginning folic-acid treatment. VILTER et al.[5] reported that, out of 24 cases of pernicious anæmia treated with folic acid and observed for a year, 4 developed pathological signs in the nervous system, and no improvement was obtained by increasing the dose of folic acid up to as much as 500 mg. daily. Both reports agree that improvement is obtainable by giving liver or desiccated stomach extract; WILKINSON prefers the latter. Another finding is the tendency for increasing doses of folic acid to be required to maintain a normal blood-count. At first the dose was cut down to 5 mg. daily or less; in time the blood-counts of these patients began to fall and the dose was raised; but after an interval the fall began again WILKINSON had 2 and VILTER et al 3 such patients needing increasing doses over a year, and it may well be that more such cases will be noted as time goes on. WILKINSON concludes that folic acid is "neither the best nor the cheapest form of treatment for pernicious anæmia, whether neurological signs are present or not," and SPIES[1] says that "liver extract is the safest and most effective therapy for the routine treatment of pernicious anæmia." Folic acid will retain a limited place in the treatment of this disease, for it can be given parenterally to obtain a rapid initial response in a critically ill patient and it will be useful temporarily in patients who are sensitive to liver extracts, though such patients should be desensitised or given desiccated stomach as soon as possible. No advantage is to be gained from "blunderbuss" preparations containing added folic acid. It is clear that in pernicious anæmia folic acid will do nothing that liver—or desiccated stomach—will not do somewhat better; therefore added folic acid is merely wasted and may cover up an inactive liver preparation.

In nutritional anæmias, including pernicious anæmia of pregnancy, nutritional macrocytic anæmia, and the sprue syndromes, folic acid can be used with impunity since there is no risk of spinal-cord disease. SPIES's account of the striking effect of folic-acid treatment in this group of diseases in the southern U.S.A. and Cuba is very convincing, and reports from other parts of the world on nutritional macrocytic anæmias—e g., that of DAS GUPTA and CHATTERJEE[6] in India—are equally good. The results in sprue vary because it is not clear that the diseases met with are comparable. The "sprue" of Cuba and Puerto Rico is a failure of fat absorption from the stools, causing diarrhœa with a megaloblastic anæmia and occurring among natives who have been undernourished for years; folic acid clears both the anæmia and the diarrhœa and improves the stools. The sprue of India and the Far East is a syndrome affecting foreigners with normal nutrition, and the non-tropical sprue and cœliac syndrome of temperate climates appears also in persons who are not significantly undernourished; signs of malnutrition develop during the course of the disease as a result of the partial failure of intestinal absorption. It is therefore not surprising that the results with Asiatic and non-tropical sprue are different. MANSON-BAHR and CLARKE[7] reported a favourable response to folic acid in a typical relapse case of sprue; DAVIDSON et al.,[8] in 4 similar cases, found that though the diarrhœa was improved the blood state was unaffected; MORRISON and JOHNSTON[9] had excellent responses in 2 soldiers who developed sprue after their return to the U.K. from India, but in 2 relapsed cases there was no blood improvement In non-tropical sprue (idiopathic steatorrhœa) DAVIDSON et al. noted a moderate improvement in 3 cases, WILKINSON had 1 patient showing an excellent blood and intestinal response, 1 with moderate, and 2 with little improvement. Reports on cœliac disease are similarly variable. Every case of these syndromes that responded to folic acid at all had a megaloblastic marrow. Thus in nutritional macrocytic anæmia—including West Indian sprue—if there is a megaloblastic marrow a good response from folic acid can be predicted. Other forms of macrocytic anæmia may respond if there is a megaloblastic marrow but not if the marrow is normoblastic. It is in nutritional anæmias that folic acid is likely to be most useful, and since such anæmias are widespread in the tropics this is a sufficiently important application.

What part does folic acid play in hæmopoiesis? It is neither the extrinsic nor the intrinsic factor, for it is possible to get responses with liver extracts that contain only traces of folic acid. Folic acid exists in nature in several forms that differ according to the number of glutamic-acid groups in the molecule. Thus, the synthetic acid—which is the same as that obtained from liver and from yeast—contains one glutamic-acid group; another form contains seven[10]; and the "fermentation acid" three.[11] The synthetic acid is known as "free" and the others as "conjugated" folic acids. When free folic acid is given to a patient with pernicious anæmia, or to a normal person, a good deal is excreted in the urine. When conjugates are given, normal people excrete free folic acid, but pernicious-anæmia patients excrete hardly any until they are given liver extract when there is a large excretion. It has been reported that folic acid conjugates do not produce a hæmopoietic response in pernicious anæmia.[12] [13] Hence, it might appear that the defect in pernicious anæmia is inability to release folic acid from its naturally occurring conjugate forms in food. DAVIDSON and GIRDWOOD[14] therefore suggested that liver extracts act in virtue of a "liberating factor" that allows free folic acid to be formed from conjugates stored in the body and so initiate the hæmopoietic response. The American workers, however, do not subscribe to this attractively simple theory, though it had occurred to them; there are difficulties. SUAREZ et al.[15] found that West Indian sprue responds to treatment with conjugates, and that some pernicious-anæmia patients also respond. SPIES[1] holds that the doses of conjugates used in the negative reports were not large enough; lately he and his colleagues[16] have reported successes with various conjugates in pernicious anæmia as well rather sharper rate. When the figures from 1913 to 1945 are plotted there is no suggestion that either of the two major wars made the slightest impression on the curve.

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[5] Vilter, C. F., Vilter, R. W., Spies, T. D. *J. Lab. clin. Med.* 1947, 32, 262.

[6] Das Gupta, C. R., Chatterjee, J. B. *Indian med. Gaz.* 1946, 81, 402.

[7] Manson-Bahr, P., Clarke, O. *Lancet*, 1946, ii, 903,

[8] Davidson, L. S. P., Girdwood, R. H., Innes, E. M. *Ibid*, April 19, p. 511.

[9] Morrison, R. J. G., Johnston, C. R. St. *Ibid*, May 10, p. 636.

[10] Pfiffner, J. J., et al. *J. Amer chem. Soc* 1946, 68, 1392.

[11] Hutchings, B. L., Stokstad, E. R. (quoted by Suarez et al., see below)

[12] Welch, A. D., et al. *J. biol. Chem.* 1946, 164, 787.

[13] Bethell, F. H., et al. *Univ. Michigan Hosp. Bull.* 1946, 12, 42.

[14] Davidson, L. S. P., Girdwood, R. H. *Brit. med. J* 1947, i, 587.

[15] Suarez, R. M., et al. *J. Lab. clin. Med.* 1946, 31, 1294.

[16] Spies, T. D. *Sth. med. J.* 1946, 39, 634; Spies, T. D., Stone, R. E., Lopez, G. G., Milanes, F., *Ibid*, 1947, 40, 46; Spies, T. D, Lopez, G. G., Milanes, F., Aramburu, T. *J. Amer. med. Ass.* 1947, 134, 18.

The experiences of enemy-occupied Europe should be more illuminating, though the stresses to which the inhabitants were subjected were different from ours and there was also the complicating factor of famine. So far, the only information has come from Denmark, where Meulengracht[1] reported a sudden increase in thyrotoxicosis during 1942; and from Belgium, where Professor Bastenie, in this issue, records that there was no apparent increase. Meulengracht's account only takes us up to the end of 1942, and a final assessment must await the publication of data for subsequent years His evidence was derived from admissions to his own department, supplemented by figures for all the hospitals in Copenhagen. There was a slow rise in the number of cases of thyrotoxicosis from 1933 to 1941, with a slight fall in 1939 and 1940, probably related to a fall in all admissions to hospital. But in 1942 the number of cases seen in Meulengracht's own department rose to 118, from 34 in the previous year. Other clinicians in Copenhagen seem to have had a similar experience. Meulengracht discussed the possible statistical fallacies, and concluded that both the slow rise during 1933–41 and the abrupt increase in 1942 were real phenomena though probably independent. He could not explain the rise and was reluctant to ascribe the 1942 "epidemic" to the emotional disturbances of war, because he found no abnormal incidence of mental crises in the histories of his patients, and there seemed to be no evidence of a similar increase in the other countries involved in the war.

Bastenie shows that the number of cases of toxic goitre treated at the St. Pierre Hospital, Brussels, remained relatively constant before and during the war. His data are open to criticism in that they are derived from a single hospital Not only may the population from which the cases were drawn have changed in size and composition, but cases may also have been diverted to or from the hospital by reason of such factors as the acquirement of a reputation for the treatment of toxic goitre, or fluctuations in available accommodation. Bastenie is plainly aware of these possible fallacies, and he makes it clear that the total number of patients treated for all diseases in the hospital did in fact rise during the war years. For this reason changes in the percentage incidence of toxic goitre relative to all medical admissions cannot be admitted as evidence; Bastenie rightly takes the absolute number of cases of toxic goitre as being a more reliable index, and these do not seem to have changed significantly His second point is that there was an apparent decline in the severity of the toxic cases (as judged by the B.M.R. figures) during the war. By itself this is slender evidence; but it does agree with his third observation, that there was an apparent increase in the number of cases of simple goitre. The cause of this is unknown but it might well be the result of famine, as Bastenie suggests. It may be that the lowered metabolism of starvation stimulates the pituitary to produce more thyrotropic hormone; but, as he points out, there is no evidence of thyrotropic stimulation in cases of death by starvation. His second explanation is more plausible. Because other foodstuffs were not easy to obtain the population of Belgium tended to eat more and more vegetables of the brassica family; and vegetables of this type are known to contain goitrogenic substances of the thiourea group. If the increase in simple goitre in Belgium was in fact comparable to the "cabbage" or "rape-seed" goitre of animal experiments, a reduction in severity might be anticipated in cases of toxic goitre on the same diet. Such patients would, in effect, be treating themselves on the most modern lines. If this is the correct explanation it leaves open the possibility that there was an actual increase in thyrotoxicosis in Belgium during the war, which was masked because the population was being simultaneously dosed with thiourea compounds taken in the diet. No such masking effect would be expected in Denmark, where the food situation was much better than in Belgium throughout the war.

Thus it may be possible to reconcile the findings of Meulengracht and Bastenie. But the foundation of fact on which these speculations are built is exceedingly slight and badly needs supplementing from other countries involved in the war.

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[1] Meulengracht, E. *Acta med. scand.* 1945, 121, 446.

Folic Acid

The therapeutics of folic acid has been especially interesting because, as Spies[1] put it, "it offered the prospect of a specific form of therapy with a pure chemical compound of known molecular structure." At first it seemed that a wide field of disorders of the blood and alimentary tract would be open to folic-acid therapy and that much new information would be obtained on the nature and mode of action of the anti-anæmic, or erythrocyte-maturing, factor. But experience has already contracted the therapeutic field, and the relation of folic acid to erythrocyte maturation has not yet been clarified.

In pernicious anæmia the short-term results of folic-acid treatment are uniformly good. The drug can be given by mouth in a dosage of 20 mg. daily or as a single injection of 50–100 mg. intravenously or intramuscularly. There follows a typical and early reticulocyte response, transformation of the marrow picture from megaloblastic to normoblastic, sustained rise of red cells and hæmoglobin, and striking clinical improvement. The response parallels, but is no better than, that obtained with a first-rate liver extract[1 2]: Frommeyer and Spies[3] thought that the balance was in favour of the liver. The long-term results, however, have produced unexpected and serious difficulties. The first concerns the involvement of the posterolateral tracts of the spinal cord. It was early noticed that folic-acid treatment did not improve the nervous symptoms—in fact, that some patients became worse even though the blood levels were satisfactory.[4] Next it was reported that patients apparently adequately controlled by folic acid developed signs of posterolateral cord sclerosis which rapidly became intensified. Wilkinson[2] had 6 out of 19 patients with signs of spinal-cord disease, and in 3 the signs appeared de novo within between transfusions (doses of antigen) given. Professor Diamond mentioned a group of 142 Rh-negative men, 43% of whom had demonstrable antibodies; 10% of these had had recorded reactions while another 33% had had symptoms and signs of reactions (not recorded as such) at the second, third, or subsequent transfusion. By contrast, immunity which has developed more slowly, as during a Rh-positive pregnancy in a Rh-negative mother, is stronger and more lasting and the subject is more liable to reactions after transfusions of Rh-positive blood, even the first. It is unwise to use a husband as a donor for his wife if his Rh grouping is unknown—he might be Rh-positive and so sensitise or induce a fatal reaction in his spouse. The importance of ante-partum, postpartum, or subsequent transfusions for Rh-negative women being of blood compatible in ABO group and Rh-negative cannot be too strongly emphasised. All women should be grouped (ABO and Rh) when first pregnant, and in affected and special cases the simple and specific Rh (genotype) of the father and children should also be determined.

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[1] Spies, T. D. Experiences with Folic Acid, Chicago, 1947.
[2] Wilkinson, J. F. Royal Society of Medicine, section of experimental medicine, May 13, 1947.
[3] Frommeyer, W. B., Spies, T. D. *Amer. J. med. Sci.* 1947, 213, 135.
[4] Spies, T. D., Stone, R. E. *Lancet*, Feb. 1, p. 174.

Infants who show gross hydrops at birth, or during their first few days of life develop jaundice and anæmia with erythroblastæmia, enlarged liver, and spleen, or with kernicterus and later muscle incoördination and mental defect, are Rh-positive children of Rh-negative mothers and Rh-positive fathers. When the mother is Rh-negative and the father is Rh-positive and homozygous (Rh-Rh) every fœtus will be Rh-positive and will develop hæmolytic disease *in some form.* The chance of the fœtus being affected will be reduced to 50% if the father is Rh-positive but heterozygous (Rh-rh)—thus, in heterozygous twin pregnancy the healthy child is Rh-negative and the Rh-positive child is stillborn with hydrops or jaundiced. Since the first child of such unions, which constitute 13% of all marriages, is usually unaffected; the general chance of a Rh-negative mother having an affected child is 1 in 22 and the over-all incidence of hæmolytic disease is 1 in 200 births.

Until 1941 tests applied were unsatisfactory even in proved cases of erythroblastosis fœtalis. In 1944 Wiener and Race and Diamond were concerned with the demonstration of "blocking" or incomplete- or hyperimmune-antibodies. With hyperimmune antisera Rh-testing is as simply done as tests for the ABO groups, and Professor Diamond emphasised that there is now little excuse for the Rh, Hr, and Rh-Hr groups not being determined as a routine. By using six different sera the genotype can be determined with fair accuracy. Hyperimmune sera are prepared chiefly from Rh-negative male volunteers by giving them at short intervals over a period of several months 50 c.cm. transfusions followed by 0·1 c.cm. injections of Rh-positive blood. By ordinary agglutination methods, using red cells suspended in saline, the titre in these sera continues to rise for a time and then falls sharply. The fall is explained by the presence of "blocking" antibodies which are said to be adsorbed to and to protect the red cells from agglutination in the test. When however the tests are repeated with the red cells suspended in plasma or albumin instead of saline, the high level of the hyperimmune or "blocking" antibody content is apparent and titres of 2000 or 4000 are recorded. Ordinary agglutinins are demonstrable during the concerned pregnancies but are absent between and after them, while "blocking" antibodies may be demonstrated as long as 35 years later in a Rh-negative woman who has had a succession of children with hæmolytic disease. There is only the roughest correlation between the two titre levels and the birth of children with hæmolytic disease.

Jaundice and anæmia in the newborn remains a clinical problem, though the mortality has been reduced by treatment based on the work of the last five years. Twenty years ago, when treatment was by intramuscular injection of the father's blood, 40% of cases succum to jaundice, œdema, or cardiac failure and 15% of survivors showed evidence of brain damage. Betw 1941 and 1944 treatment was directed towards rep the destroyed red cells with Rh-negative blood in s transfusions and the case-mortality was reduced to 30 (Diamond). The fact that jaundice and anæmia appeare in such infants three to four days after birth suggeste that earlier delivery (37th to 38th week, at the discretio of the obstetrician) might reduce the duration of actio of the maternal (hæmolytic) antibody. Over a period two years, in a series of 350 cases, Professor Diamon reduced the case-mortality to 20% by combining ear delivery with small transfusions of Rh-negative bloo More recently it was shown that the cord blood ofte has appreciable amounts of circulating Rh-antibod (carried over from the mother) and this suggeste treatment by exsanguination-transfusion with R negative blood as soon after birth as possible. Th technical difficulties of the method—clotting in cannul &c.—are considerable, said Professor Diamond, and sinc heparinisation is contra-indicated because of the tendenc of these children to bleed (hypoprothrombinæmia) h and his colleagues use a special plastic catheter passe into the umbilical vein to reach the ductus venosus inferior vena cava. The infant's blood is graduall replaced with Rh-negative blood, 20 c.cm. at a tim through a two-way syringe set-up, until after an hou 500 c.cm. of blood has been transfused and 400 c.c *of the infant's blood replaced.* The umbilical vei has been used up to 18 hours after delivery; thereafte arm or leg veins are cut down upon and the plasti catheter is passed into the subclavian or femoral ve By this treatment the case-mortality has been reduce to 10%.

Much work has yet to be done before all the tissu changes and immunity mechanisms involved in thi group of diseases are fully understood.

CONSENT TO DEATH

THE Voluntary Euthanasia Society are planning t reintroduce into the House of Lords their Bill to legalis euthanasia for people suffering great pain from incurabl disease. The Bill, it will be remembered, was before th House in 1936 but was not given a second reading. At th annual meeting of the society, on May 21, Dr. E. A Barton spoke of the risk taken by doctors who acced to a patient's appeal for release, and argued that responsibility of this kind should not rest on the shoulder of the doctor alone. In a contribution to the sprin issue of *University College Hospital Magazine*, he mad the same point at greater length. Though cases needin euthanasia are rare—he has seen only half a dozen i fifty years—they are peremptory: the impulse to hel the patient at his own urgent plea is almost impossibl to deny. Many, he hopes, are willing "to risk criticis and worse by doing for a patient that which they woul desire for themselves under similar circumstances."

The present situation is sometimes cruel to the patient yet it is very doubtful whether legislation could mak things any better. The difficulties were discussed b Dr. Harry Roberts[1] when the bill was last before th House. Were he himself dying of carcinoma of th throat, he said, his hope would be that his doctor "with-out significant word or gesture" would "hasten the pac over a bit of bad going." He went on:

> "My exit would not be quite such a happy one if, as suggested in the Voluntary Euthanasia Bill . . . I had first had to make an application stating to the appropriate authorities that I had been informed by two medical practitioners, whose certificates I enclosed, that I was suffering from an incurable disease and that my nearest relatives

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1. Euthanasia and Other Aspects of Life and Death, London, 1936.

s in sprue and nutritional macrocytic anæmia. he conjugates are difficult to prepare and they are nly apparently pure; SUAREZ et al. point out that hey may be contaminated with naturally occurring onjugase-inhibitors. Folic acid, in the free form, s known to be a product of bacterial synthesis in he intestine of animals, and there is evidence that roduction also occurs in man,[17] so that accurate stimates of deficiency cannot be made. The number f patients so far treated with conjugates is small, nd the results are not always clear. For all these easons, the American school, while agreeing that liver extracts are concerned with the release of stored complexes of folic acid, suggest that liver extracts have a "more deep-seated action."[12] They point to the partial effect of folic acid and to the difficulty of explaining why such relatively large amounts of folic acid, compared with very potent liver extracts, are needed to produce a satisfactory response SPIES maintains that folic acid is an enzyme or coenzyme concerned with the formation of the anti-anæmic principle and that the principle is not folic acid but "a more powerful substance, which, when obtained in pure form, will be more efficacious per unit weight than any now available." There is clearly not yet enough firm information for the rôle of folic acid to be accurately assessed, and experience teaches us that resolution of the contradictions may take some time.

Annotations

NURSING IN PERSPECTIVE

HAVING assumed responsibility for a National Health Service from next April, the Minister of Health has assumed responsibility for finding and keeping enough nurses to make it work. The shortage of nurses, even more than the shortage of food, is world-wide, and it is partly the result of greater demands which modern medicine everywhere makes on nursing time and skill. Obviously, however, it is not going to be relieved without positive action in various directions, and important new proposals are expected in the forthcoming report of the Ministry's working party which is reviewing possibilities.

At such a time it is well that the situation should be seen in its historical perspective. An article published in last Monday's *Times*, and another in our Reconstruction column this week, take us back to the controversy preceding State registration as established by law in 1919, and display the difficulties arising from insistence on a single qualifying State examination. Florence Nightingale herself opposed this constricted portal of entry to the profession, and our correspondent argues that the time has come for a change of policy, by which henceforth the training schools should hold their own entrance examinations, arrange their own curricula, and grant their own certificates of proficiency. Schools recognised as reaching a suitable standard would receive State support in the same way as universities receive money from the State through the University Grants Committee, and their certificates would entitle the holder to State registration. Under this less rigid system these schools would have more freedom to make the best use of their material, both human and educational.

The syllabuses imposed by the General Nursing Council, and the significance attached to success in examinations, have done much to promote knowledge, but they have also lost the profession a great many girls who would have made excellent nurses. All will agree that the standards of teaching are ultimately more important than the standards of examination; and, whatever may be thought of the present proposals, the time has certainly come for some change of emphasis as well as for grants to the training schools apart from the hospitals they serve.

THE ROYAL SOCIETY ENTERTAINS

A CONVERSAZIONE is intended to promote conversation, and on May 29 the Royal Society gathered a notable assembly for this purpose at its rooms in Burlington House. Between conversations the guests looked at exhibits and demonstrations illustrating the range of scientific research. They witnessed attacks on plants by living flea-beetles transmitting a newly crystallised virus whose molecular arrangement has been indicated by electron microscopy; they studied diagrams showing how a stomiatoid fish is able to open its mouth widely; they examined mirrors and lenses (from the plastics division of Imperial Chemical Industries) made by a "surface-finishing" process which allows optical components to be manufactured rapidly, and hence cheaply, once the glass moulds have been prepared; they were initiated into the problem of the "correlated response," by which selection for one genetic character is liable to affect the expression of other quite different characters; and they enjoyed a colour film of growing crystals. Most nearly allied to medicine, perhaps, were a beautiful collection of microscopes from the Wellcome Historical Medical Museum; an exhibit of differential staining (in bone-marrow) of pro-erythroblasts and premyelocytes, depending on their difference in desoxyribose-nucleic acid charge; a meter devised by K. Mendelssohn for measuring radiation flux (energy/area/time) in order to prevent accidents to patients treated with radiant heat; and D. Herbert's demonstrations with the enzyme catalase isolated from *Micrococcus lysodeikticus*—the first bacterial enzyme to be obtained in a pure state, and also the first to make a whistling noise at Burlington House by its semi-explosive action on hydrogen peroxide. In entertainment appeal this whistle was beaten only by a mechanical model illustrating the uranium chain reaction, in which a single anarchical impulse caused a large number of groups of ping-pong balls, each representing a neutron, to be successively disrupted.

RHESUS FACTOR IN RETROSPECT

THOSE not numbered among the devotees of the rhesus factor may think that the group of conditions covered by the term "hæmolytic anæmia of the newborn" are a fairly recent discovery, but Prof. Louis K. Diamond, of Harvard, speaking at a meeting of the Royal Society of Medicine on May 23, recalled that the published work dates from 1900. In the early period (1900–10) the papers written on fœtal hydrops, familial icterus gravis, and erythroblastæmia were mainly English; in the second period (1910–20) the pathological findings were described by German workers. Since the rhesus agglutinins were recognised in human blood in 1940, extensive studies of erythroblastosis fœtalis from the clinical aspect have been supported by full serological investigations.

In the white races 85–87% of the population (negroes 95% and Chinese 99%) are Rh-positive. The Rh-negative remainder may become sensitised (immunised) to the Rh factor by being transfused with Rh-positive blood or by bearing a Rh-positive child, and may then have serious and even fatal reactions on subsequently being transfused with Rh-positive blood. Immunisation of Rh-negative persons following transfusion(s) of Rh-positive blood is not uncommon, but the level of antibody developed is usually low and depends on individual variations and on the number of and intervals

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[17] Denko, C. W., et al. *Arch. Biochem.* 1946, 10, 33.

Modern Care of Old People

II

LIVING IN A SMALL GROUP

Hill Homes, Highgate

THE needs of the old vary with the state of their health ; and though the line between health and sickness is easily crossed in the later years there is no reason why an old person who feels well should be obliged to live the life of an invalid, or a sick old person be forced to do more than he is fit for. The hospital is not the right place for the one nor the residential home for the other, though transference from hospital to home and back again should be made easy. Fit old people are probably happiest in small homes with a family atmosphere. Both the Ministry of Health [1] and the Department of Health for Scotland [2] have lately endorsed this principle, urging local authorities to establish small homes for 30–35 old people in suitably adapted houses. Both encourage a greater degree of freedom in the homes than has been customary in the past—freedom for the old people to come and go at will, to keep personal belongings in a private place, to wear their own clothes, and to be visited on any day of the week. They also favour the use of light colours for decoration, and suggest that small tables should be substituted for the long dining table. Chairs should be comfortable, floors not slippery ; big rooms may well be divided into small rooms, and pictures should be used for decoration.

These principles in the care of the old have been established largely by the work of voluntary societies; and a particularly successful experiment along such lines is being conducted by the public-utility society known as Hill Homes Limited, of 16, Bishopswood Road, Highgate, under the chairmanship of Alderman Margaret Hill (Mrs. A. V. Hill).

One of their homes—the Delia Grotten Home, named after the first resident—was set up in 1938. The others have developed out of the experience gained in the Highgate Homes for Aged War Victims which were run on behalf of the Ministry of Health with the help of the Hornsey borough council. Some 130 old people are at present housed in the various types of home. The society was formed to maintain the happy plan of grouping in small communities both very old and also disabled old people. These latter are not received in the first instance if bedridden, but are not necessarily sent away if they become so in course of time. The homes are experimental, and endeavour to work out the most satisfactory methods of dealing with a difficult problem.

The committee found that, while the well-to-do and the very poor are catered for, those with small means, though often in great need of help, have no provision made for them ; and it was on these old people that they decided to concentrate. Growth of the scheme has been handicapped by scarcity of suitable houses and of labour to convert them ; but there are now four Hill Homes running, and a fifth about to open.

FOR THOSE WHO NEED NURSING

Since the aim is partly to experiment, the homes are run on slightly different plans. In every case the matron is a trained nurse, and one of the homes is in fact a nursing-home into which disabled or infirm old people can be moved when they become unfit for ordinary life. Here they are medically supervised, and nursed in bed if need be. If they need special investigation or treatment they are transferred to hospital for a time ; one of them spoke warmly of her happy return "home" after such an excursion. The bedrooms in this house are really small three or four bedded wards, very comfortable, with walls painted in light shades, and pleasantly c curtains to the cubicles. The old people busy them with needlework, or chatter sociably with their group, to whom they become much attached.

FAMILY LIFE

There are two sunny sitting-rooms and much made of a terraced garden in the summer-time. family atmosphere has been maintained : the home not suggest a hospital.

This principle of the family group holds in the o homes. One plan has been to fit a congenial little com together in a big comfortable room with an open (guarded) fire, comfortable chairs, convenient tables, the beds and dressing-tables of the party. Every resid sets out what possessions she likes on her dressing-t There are no rules, except that anyone who cannot in to the life of the home is asked to leave. The commi have set their faces against the principle of "safety fir Except in the nursing-home, the old people come go as they please ; if they lose their way there are alw policemen to help them, and aphasic ones can c their address in their pockets. If they want to risk g out in wet or snowy weather they are not preven The committee take the view that life, in order to worth living, must be lived ; and unnecessary restrictio designed to protect them, are as misplaced with the o as with anybody else.

The houses have central heating, so the old peo are not exposed to changes of temperature when t move about the landings or visit the rooms of friends. In a home shared by both sexes, the dining-room, equipped with small tables, has an open fire as well as radiators ; here all the residents meet for meals. There are always more women than men, for women live longer ; but the mixed society is welcome to both, and in the case of one couple friendship ended in marriage. In one home five or six rooms are occupied by women, two or three by men, and one by a married couple. All the homes have a few single rooms. Many of the residents have only their old-age pension ; these pay 28s. a week and

In the garden.

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1. Circular 49/1947.
2. D.H.S. Circular 41/1947.

had been notified; my request being duly attested by a magistrate; if, further, my application had then to be submitted to an official 'euthanasia referee,' after whose approval seven days must elapse to allow time for appeal by a relative to a court of summary jurisdiction, which may then cancel the permit. Only practitioners who had been named for the purpose would be eligible to act as euthanisers, and the administration must take place in the presence of an official witness. I can almost hear the cheerful announcement: 'Please, ma'am, the euthaniser's come.'".

Dr. Barton, however, pictures no such cruel postponement of relief. He thinks England should be divided into areas, in each of which two doctors of high standing and ability would be registered, who would be called in by the general practitioner to carry out the final act. The patient would have to ask relief, and only urgent pleas would be taken into account. The consent of friends would not be asked, for if it was refused the patient must continue to suffer, whereas if it was given "misunderstandings might arise later." The two specialists would see the patient together, without anyone else in the room; after which the patient's own doctor would be heard, and a clear decision made; and after that the patient would be released. This again would mean moments of suspense and heavy responsibility for the patient.

THEIR FIRST CENTURY

At their convention, which opens on June 9 in Atlantic City, the American Medical Association will celebrate the 100th anniversary of their foundation; and in his history, which has been appearing as a pious serial in the *J.A.M.A.* since last November, Dr. Morris Fishbein aptly writes: "the birth of the Association followed travail of many months; the pains, the jealousies and the love associated with its conception forecast the great career to be achieved by this extraordinary progeny." Their first meeting was held at Philadelphia in 1847—the year in which Simpson first used chloroform in obstetrics, Semmelweis discovered the cause of puerperal fever, and Ludwig invented the kymograph. This year at the invitation of the association Prof. G. W. Pickering will give an address on Hypertensive Encephalopathy, Prof. H. J. Seddon on Nerve-grafting in the Limbs, and Sir Howard Florey, F.R.S., on New Antibiotic Agents. Other English guests will include Sir Heneage Ogilvie, Dr. R. M. B. MacKenna, Prof. John McMichael, Mr. G. E. Martin, Sir Stewart Duke-Elder, Dr. E. Ashworth Underwood, and Dr. A. R. Hunter. A commemorative 3-cent maroon postage-stamp is to be issued by the United States government, and the design chosen is Sir Luke Fildes's picture *The Doctor*.

INTESTINAL ANTHELMINTICS

A recent recommendation[1] in France to place oil of chenopodium and its active principle ascaridole in table C of their poisons list directs attention to the possible dangers of anthelmintics or vermifuges. Ascaridole has undoubtedly been responsible for occasional fatalities, but it is well to recall that none of the intestinal anthelmintics is free from such a risk. In the mass treatment of tropical populations for worm infestation deaths have resulted from the use of almost every known anthelmintic.

In normal clinical practice the chance of accidents in the treatment of intestinal parasites can be minimised by following a few principles. Individual idiosyncrasy to any of the usual anthelmintics is almost impossible to forecast, but happily rare. Some protection against it can be obtained by giving the full dose of the drug in three parts at half-hour intervals, rather than as a single draught, if the first dose produces ill effects the others can be abandoned. Dividing the dosage is also to be commended because it prolongs the contact of the drug with the worms and thus increases its action. Most intestinal anthelmintics are soluble in alcohols and in absorbable oils and fats. These solvents must therefore be avoided over the period of treatment, to lessen the risk of the drugs being absorbed from the gut. Again, once the drug has done its work it should be removed from the body as completely and as rapidly as possible, further to lessen the risk of absorption. To this end a vigorous *saline* purge should be given one or two hours after the last dose of the drug, to sweep it from the bowel. This vigorous purgation serves the added purpose of removing worms temporarily incapacitated by the drug, which if left in the bowel would recover and re-establish themselves there. If these simple precautions are taken anthelmintic treatment can be embarked on in otherwise healthy patients without anxiety and with a good hope of success.

SMALLPOX IN NEW YORK

Smallpox is a rare cause of death these days in the United States. In the last fifteen years fatal cases have never exceeded 50 annually, though Seattle had 68 cases, with 20 deaths, last year. It is thirty-five years since anyone died of the disease in Manhattan, but this record has now been broken by the death of a Mexican businessman who had travelled from Mexico City to New York a week before by bus, a four days' journey. The Mexican felt ill on arrival. His wife took care of him at their hotel for a time but finally sent him to hospital, where he died. His symptoms were atypical, and nobody knew he had had smallpox until two people at the hospital developed a typical eruption. Immediately the public-health services were mobilised. The city of New York set out to vaccinate its 7,500,000 inhabitants in three weeks. Air transport solved the problem of getting enough vaccine, and the programme went ahead at the rate of 250,000 a day. Dispensaries, hospitals, police stations, factories and offices, labour union halls, and doctors' surgeries were transformed into clinics, and the newspapers and radio stations distributed official announcements and advice to the public. Meanwhile the route of the bus was traced and precautions were set on foot along the way. In Camden, New Jersey, there was a death from smallpox, and mass vaccination began immediately there and in Philadelphia nearby. Jersey City, across the Hudson from New York, immunised 50,000 inhabitants, and the State of New Jersey authorised the expenditure of $65,000 to immunise 180,000 people. The Americans have not forgotten the tragic example of Manila, in the Philippines, where vaccination had become lax and a sudden epidemic in 1914 caused 50,000 deaths. In England mass vaccination during an outbreak is not ordinarily adopted. As Dr. W. H. Bradley told the Royal Sanitary Institute on May 14, last year 15 introductions of the disease from outside led to only 40 secondary cases, thanks to the prompt application of routine measures of control.

THE NEW REGIONAL POSTS

Names of members of the 14 regional hospital boards appointed by the Minister of Health under the National *Health Service Act* will probably be announced in the near future. Each board will require an administrative medical officer, and doubtless one of its first acts will be to advertise this important post. The salary offered is likely to range from £2000 a year in the two smallest regions to £2500 in the largest ones, and the appointments made will be of interest not only to the successful candidates but also to the whole profession.

We regret to announce the death on June 1 of Dr. Noah Morris, regius professor of materia medica and therapeutics in the University of Glasgow; and on June 3 of Dr. Richard Clitherow, M.P.

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[1] Fabre, R. *Bull. Acad. nat. Méd.* 1946, 131, 226.

ment grants them an appropriate allowance. The residents are responsible people, and have not presented any problems by rash spending. Many of them are women living alone in cottages or in single-room flats, but there are some married couples, and often two friends will share a cottage. Each flat consists of a good-size bed-sitting-room with a gas-fire, and with a kitchenette opening from it; and the residents in this block share bathrooms. Some of the older cottages are without bathrooms, but baths—and plenty of hot water—are always to be had at the *nursing-cottage*.

At the nursing-cottage there is one moderately large ward, with cubicles, for women, a smaller ward for men, and an isolation ward for a single case; 11 patients can be received at a time, and since the nursing staff are able to visit and nurse convalescent patients in their cottages, this small number of beds proves adequate. A doctor visits the nursing-cottage three times a week, and besides treating the inpatients sees any other residents who come for examination. Surgical cases are transferred to one of the neighbouring general hospitals. The nursing staff consists at present of the matron, a trained sister, and three assistant nurses, two of whom have had mental-hospital training; and a second trained nurse is to be added to the staff. Residents pay nothing for medical and nursing attention, but if they move into the nursing-cottage for treatment they pay 15s. a week for their board: there are no other charges.

Much supervision naturally falls to the matron, who has quarters in the central building and is on friendly terms with the residents. Housework in the cottages is done by the residents themselves; and plans are on foot to establish a home-help service. Old people who cannot look after themselves—mostly widowers, or old people with infirmities—live in the rest-home, and are given complete service. Their rooms, each with its own gas-fire, are furnished for them as bed-sitting-rooms, and cleaned by the staff; their meals are prepared for them and served in a common dining-room; a warm common lounge, with wireless and plenty of easy chairs, has some of the quality of a club.

Apart from life in the rest-home, there is little communal life in the estate. There is a good hall in the central building, suitable for concerts and whist drives, but this has not been used since before the war. Plans are now being made to use it again, but for the most part residents prefer to follow their own interests, joining in the church or social activities of the neighbourhood and visiting chosen friends in or outside the homes. Though the Linen and Woollen Drapers are entirely responsible for developing and supporting the cottages, the residents are never made to feel that they are recipients of charity, and certainly never entertain such a notion themselves. They have worked for the textile industries in the past, and now feel they are receiving their due. Mr. Donald Cave, the secretary of the institution, suggests that the example of the Linen and Woollen Drapers should be followed by other industries: if each took care of its own, much distress among old people could be prevented.

Worthing Council of Social Service Homes

Two similar voluntary homes are sponsored by the Worthing Council of Social Service. One of them—the Church Walk Home—is for old people who have nothing but the 33s. a week they derive from the old-age pension and their public assistance allowances. As in the Hill Homes, they pay 28s. a week and keep 5s. to spend, and these contributions are sufficient to keep the home running. The comfortable house in a quiet sunny street was left to the council, and the gracious solid furniture was also a bequest. Here two or three old people share each bedroom, but instead of living in their rooms, as the residents in the Hill Homes do, they share a warm and comfortable common-room, well stocked with easy chairs. The sunny french win opens on a small paved terrace where there is a g seat, with a pleasant garden beyond. The home small, taking only 14 residents, and the dining- with its two shining family tables will seat them comfortably. Electric stoves set high on the walls their bedrooms are directed downwards to warm air; they are turned on by the matron from a mas switch for half an hour or so before the old peo go to bed, and before they get up in the morn *Mrs. Bernard Methold, the secretary of the council,* w has had much to do with the work of founding the hom finds that if they keep the old people warm they ke them well. Every room has its own washbasin, wi running water; and though there is not room fo separate wardrobes and chests for everybody, each re dent has her own share of hanging-space and drawe and space to put out the photographs and ornamen she likes.

The residents are carefully chosen, and taken for while on probation before they are finally accepte If they fall ill they are visited by one of two honorar medical officers, and if necessary sent into hospita Colds and trifling illnesses are nursed by the matron who is on the State register. Her work is catholic, for besides looking after the welfare of her old people she cooks their meals, and manages the house with the help of daily cleaners. Some of the old people in this house have foot troubles, for which an honorary chiropodist attends them. They help with the sewing and mending, make their beds and dust their rooms, and, if they wish, give a hand with table-laying, washing-up, or other light jobs.

The second home, the Caer Gwent Club, which had only been open about a month when visited, is much larger, being capable of taking 24 residents. At present there *are 18, and the number will not be increased* until a fire-escape to the top floor has been completed. The club is designed for people with an income of two to three pounds a week, and every resident pays £2 2s. weekly. This comprehensive fee covers all essential needs. Each resident has a room to herself in which she may, if she wishes, place her own furniture. Every room has a radiator, and some at present have gas-fires, but these are to be replaced by electric convection stoves which can be plugged in wherever they are needed. Since they have no exposed wiring and are too solid to be knocked over, these stoves are specially appropriate for use in a home where old people have rooms to themselves, though of course they are not as cheerful to look at as the open fires of the Hill Homes. The club has two comfortable common-rooms where the residents can meet and talk, play cards, or listen to the wireless. So far there is only one man among them, but it is hoped that others will join him when the remaining rooms are opened. The big dining-room has small tables; but its Edwardian stained glass windows unfortunately give it rather a sombre air. The garden of this house is particularly pleasant and well kept, with wide sunny lawns, and plenty of flowers and trees. The matron—again a State-registered nurse—has non-resident domestic staff to help her, and is shortly to have a resident cook. She was formerly the matron of the first home, so she brings good experience to this new venture. *The residents have hardly settled down to their new life yet, but they* expressed pleasure in the comfort of the home.

Messrs. Sharp and Dohme Ltd., of Hoddesdon, Herts, have issued a revised version of their coloured chart "Characteristics of Certain Sulphonamides." The chart measures 17 in. × 11 in. and summarises the main pharmacological and therapeutic data of six widely used drugs in a convenient form for reference. It will be sent free of charge to any doctor applying.

ain 5s. for pocket money. All the residents y something, up to a maximum of £3 3s. a ek; and all the houses reckon to be self-pporting, though this is becoming difficult r those charging less than 35s. weekly.

One house is a residential club for educated men, some of whom furnish their own rooms. ey arrange their own pursuits, which clude bridge and music, though only three them are under 80. The new home which is ortly to be opened is to be for men and arried couples, and will also have some bicles in which old people can stay for a ne while their relatives are on holiday, or hich they can use after coming out of spital, until they are fit to go back to dinary life.

These homes seem a first-class example the care of old people. The small home 25–40 residents has a happier, more timate atmosphere than can be achieved a large institution. Throughout the country just now ere are old people living dangerously lonely and glected lives, as well as young people handicapped in eir own development by the need to give close care to single old relative. In both cases the old people could e more happily and fully in the company of a group their contemporaries, while the strength of the young people could be used less extravagantly for the service of the community. Local authorities should be quick to adopt the principle of the small home, which though not new is not used nearly widely enough.

A little mending.

THE LOCAL AUTHORITY'S PART

One difficulty encountered by the Hill Homes is worth emphasising, for unless it can be removed it may imperil the whole scheme. If the pleasant family atmosphere of the homes is to be maintained it is essential that there should be some other haven for old people who become unsuitable for this type of care. Patients with delusions, sometimes of persecution, and those with senile dementia, for example, cannot be fitted into the plan; and it is inevitable that a proportion of residents will eventually become mentally incapacitated in these or other ways. The help of the local authority is badly needed in finding other quarters for old people in such straits; for if they are not withdrawn the character of the homes will gradually change, and instead of offering congenial surroundings for sane and active old people they will become, like the old poor-law institutions, a limbo for those beyond all hope and understanding. The county in which the Hill Homes are situated in many respects takes the lead in public health; but it so happens that its arrangements for the care of the old—owing to lack of buildings and staff—are defective; and so far the authorities have not been successful in finding sufficient quarters for old people who deteriorate. If schemes of this kind are to develop as they should, local authorities must not only sponsor such homes themselves but encourage voluntary bodies to found them; and this can hardly be achieved unless the authorities will undertake the care of residents who become unsuitable. Under the National Health Service, the care of the sick and the able-bodied old people will be respectively in the hands of the regional hospital board and the local authority. Two-way traffic in and out of hospital, and transfer from one authority to the other, must be made as easy as possible.

A party in one of the rooms, all aged 90–100.

The Linen and Woollen Drapers

Care on an unusually generous scale is offered to elderly members of the textile trades, or their old dependents, by the Linen and Woollen Drapers' Institution and Cottage Homes. These houses, built on an open site at Mill Hill, include 129 cottages, a block of 20 flats, a rest home, and a nursing-cottage. Residents, elected by the board of management, must be over 60, must bring a medical certificate of good health on admission, and must be sponsored by some person well known in the textile industries. Though the cottages have increased in number since the estate was first planned in 1898, they have not kept up with the demand; there is a waiting-list of some 90 people, many of whom have waited several years.

The cottages are solidly built on lines in favour at the beginning of the century, and contain two or three rooms and a kitchenette. The rooms are sizable, with cream walls and sash windows. The only institutional touch is to be found in the dark brown paint used for most of the woodwork; but in these days, when a sum of only £10 may be spent on repairs and redecoration of any one of the cottages, it is hardly possible to change this serviceable if depressing colour. All the sitting-rooms have gas fires, and the kitchens are equipped with gas-cookers; 'Ascot' gas water-heaters are now being put in.

Tenants of the cottages and flats pay no rent or rates; they move in with their own furniture, and live the same sort of life that they would do in any private house—catering for themselves, looking after their own garden borders, having visitors, and going away to stay with friends. If their income is too small for them to meet their bills for food, fuel, and light, the board of manage-nurses. Thirdly, concentration of attention upon the attainment of State registration induces in the nursing hierarchy an attitude of having little or no use for those who cannot make the grade; and this may underlie much of the tension between the trained staff and the student nurses. We cannot rule out the possibility that nursing has suffered, as Miss Nightingale predicted, from a tendency to exalt examinations at the expense of the fundamental things. Are we still getting the same proportion of able women of the right kind to take up nursing in their late twenties and early thirties—the women who can bring to nursing so much that it needs? And if not, has not the emphasis upon examinations a good deal to do with it?

These considerations, taken together with the gravity of the staffing problem of today, are sufficient to call in question the whole policy pursued since 1919.

AN ALTERNATIVE

An entirely different approach was surely possible—the encouragement by the State of the training schools by means of a system of grants in aid. This was the approach *adopted by the State (also in 1919) in its* attitude to the universities. By means of grants from the Exchequer, coupled with a system of visitation to ascertain their needs, the State has enabled the universities and the various colleges greatly to increase the number of graduates, while at the same time leaving them to select students for themselves, and to determine the standard required for the award of a degree.

Let us suppose for a moment that in 1919 central action in nursing had followed this analogy, and that instead of an examining body there had been set up a mechanism similar to that of the University Grants Committee, with substantial funds at its disposal to help all recognised training schools for nurses. Would it not have been immediately apparent that one of the most pressing needs was financial support for the training school, which would set it free from dependence upon the hard-pressed hospital budget? Miss Nightingale, it may be remembered, set great store by the financial independence of her school at St. Thomas's, and the obvious advantages of such a plan—adequacy of staff for teaching, and adequacy of accommodation—need no emphasis. A system of grants would have given such a central body a real control over standards, without the disadvantages which are attached to the present system of State examination; and it would have been a control of a positive rather than of a negative kind, progressive rather than static.

Faced with a sense that standards are slipping back rather than rising, the General Nursing Council of today turns to the imposition of test examinations for entrants, and the elimination of the smaller training schools—both steps which are likely further to embarrass the hospitals in their search for staff. In a similar situation a body such as we have envisaged, with funds at its disposal, would concentrate its attention upon the weaker schools, their needs and handicaps. Its first thought would be for the number and quality of their teaching staff, and it would not forget facilities for the training of the teachers. Has not nursing suffered from the failure to provide any adequate central funds for the training not only of sister tutors but of ward sisters, and all others whose work includes teaching? It may well be argued that the defect is traceable to the fact that recognition of nursing in 1919 took the form of the creation of a licensing body, rather than that of one possessing the financial and other powers necessary to transform a system of apprenticeship into a professional training.

RIGHT USE OF CENTRAL MACHINERY

The neglect in 1919 to provide the funds needed was a failure of imagination in regard to the real nature of the need. It is surely to this rather than to any other source that we must attribute the frustration in which we find ourselves.

What nursing needs today is relaxation of unifor There has been a divorce between training and sta The way to bring them together again is surely to the emphasis back on the individual hospital and training school, and to use the central machinery to and encourage, rather than to regulate and restrict.

Special Articles

GENERAL MEDICAL COUNCIL

PRESIDENT'S ADDRESS

OPENING the 171st session of the council on June Sir HERBERT EASON, the president, spoke with d regret of the death of Mr. Douglas Bartley, legal ass since 1927, and announced that Mr. Reginald Vaug K.C., had agreed to act as legal assessor during the pre session. Of those leaving the council Lord Hac had served as Crown nominee for fifteen years, be succeeded by Mr. J. J. Robertson, M.P. for Berwick Haddington. The ever-increasing burden cast u him by developments in the relations between medic and the State had made it impossible for Sir W Jameson any longer to give his time to the busine of the council. "In his short but memorable term office," said the president, "Sir Wilson proved hi a worthy successor to the several distinguished ch medical officers who have preceded him here. He h left an indelible impression on the rules for Diplomas Public Health which, as chairman of the Public Healt Committee, he presented to the council in 1945; and . . . on the recommendations as to the Medical Curriculum which the council adopted in February. We shall al miss Sir Wilson's great experience in all matters affecting our profession, his wisdom, and his sound political sense." His place as a Crown nominee was being taken by Dr G. A. Clark, representative of the University of Sheffiel since 1938, in which capacity Dr. Clark was succeeded by Dr. J. G. McCrie, who will shortly take office as full time dean of the Sheffield faculty of medicine. The vacancy caused by the death of Sir Kaye Le Fleming had been filled by the election of Dr. J. A. Brown, o Birmingham, as a direct representative of the medica profession in England. As an additional member of th council under the Dentists Act, 1921, Mr. Adam Cubi was followed by Mr. Duncan MacGregor.

Speaking of the Recommendations as to the Medica Curriculum,[1] over 2000 copies of which have bee circulated to the licensing bodies and medical schools the president remarked that these would no doub receive attentive consideration.

> "But I should like once again, on behalf of the council to emphasise that the last thing which the council woul wish to do, even if they had the power, which they have not would be to impose on bodies and schools either a uniform curriculum or a uniform method of teaching the subject which the curricula in the several schools include. On the contrary, as is pointed out in the introduction to the recommendations, all that the council are attempting to do is to indicate to bodies and schools what should be the minimum content of any curriculum designed primarily for students who intend to enter general practice, while leaving bodies and schools, subject to the observance o that minimum, to interpret the recommendations in thei own way and in accordance with their individual views and experience."

In conclusion the president expressed the thanks of the council to those who, as chairmen of the committees concerned, bore the brunt of the arduous task of preparing the recommendations. These were Prof. R. J. Brocklehurst, chairman of the Committee on Pre-medical Studies, who was also called to the chair at the meetings of the Education and Examination Committees at which the conclusions of the Curriculum Committees were adjusted for submission to the council; Prof. H. R. Dean, chairman of the Committee on Pre-clinical Studies; Sir Leonard Parsons, chairman of the Committee on Clinical Studies; and Sir Wilson Jameson, chairman of the Committee on Social Medicine and Public Health.

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[1] See *Lancet*, May 3, p. 599.

Reconstruction

THE NURSING CRISIS

State Examinations and the Training School

FROM A CORRESPONDENT

THE nursing world today presents a strange scene. There is a great crisis, beyond all question; many of our publicly provided hospitals are so short of nursing staff that a large proportion of beds have had to be closed. Contrariwise the great voluntary hospitals still have waiting-lists, and the total number of nurses qualifying has risen appreciably since pre-war days, from 9000 to 13,000 per annum.

A strange medley of remedies are proposed. The reinstitution of an examination for entrants, and control of the assistant nurse, is advocated by the General Nursing Council. The Ministry of Labour intensifies its publicity campaign inviting the help of all and sundry, and there is talk of a two years' basic training for everyone alike. Still the crisis remains and the Ministry of Health faces the difficult task of obtaining the staff required for the expansion of the hospital services. We have somehow, it seems, lost our way.

IN HISTORICAL PERSPECTIVE

As every schoolgirl knows, hospital nursing was until the middle of the last century undertaken by untrained women; some, perhaps most of them, with a natural aptitude for the work, but including also many who brought discredit upon their calling. Then came the training schools of the Nightingale era, which eventually brought the leading hospitals so many probationers that these outnumbered the trained staff and undertook the greater part of the actual bedside nursing. Once trained they went out to spread the Nightingale gospel up and down the hospitals of the land.

These schools were essentially for the training of leaders and pioneers; they developed a high standard of selection appropriate to the object they had in view; and their trained nurses earned, wherever they went in hospitals and in the world at large, a reputation that gave to hospital nursing a distinctive character and a high social status in the community. This in turn played its part in attracting others. As the years passed, more and more hospitals set up training schools, until at last it became an accepted practice that a hospital with pretensions to being a general hospital of any size maintained its training school and looked to the body of student nurses to undertake the greater part of the bedside nursing. The process was carried still further with the upgrading of many of the hospitals belonging to the guardians and (since 1930) to the local authorities.

In practice, however, as the training schools multiplied, changes inevitably occurred. Looking back it is only necessary to trace the course of events to see that the very process of multiplication of training schools should have dictated a modification of the object and therefore of the standards of selection and attainment. The primary object of the average training school was no longer to train leaders but to train the rank and file. Two alternatives were then open: either the general standard could be modified to meet the needs of the far larger proportion of the community passing through the training schools, and special additional courses could be devised for the future leaders; or provision could be made for a wide range of selection and achievement within a loosely organised system. In fact, however, the matrons of the principal hospitals in the last generation with great unanimity set their faces against anything which might be regarded as lowering the standard of nursing in which they had themselves been trained. They thought, perhaps naturally, of their own hospitals and of the effect of any changes upon them, and they were not provided with any adequate data regarding the staffing needs of the more backward institutions.

Training and staffing, although bound inextricably together by the apprenticeship system upon which our hospitals were conducted, became divorced at the top, and the problem of staffing was left in the air. It fell back upon the individual hospitals. Where the matron could not find students of the standard required for State registration, she was free to do her best with untrained staff—the modern equivalents of the nurses of the old pre-Nightingale days—and girls below the age limits required by the training schools.

STATE REGISTRATION

The stamp of official approval had in 1919 been conferred on these tendencies by State registration, and the establishment of the General Nursing Council and its examinations. Is it possible that we are today paying the penalty for something that went wrong in 1919?

The younger generation today take State registration for granted, and many are scarcely aware that it was preceded by some thirty years of controversy. It had been advocated as a means of improving the status of the profession, and of protecting the public from incompetent persons calling themselves nurses. Miss Nightingale's vote had been against it, and the project had caused her deep anxiety. But she had died in 1910; and when State registration was carried in 1919, opposition had weakened. At a time when there was a surge of feeling in favour of votes for women and all that went with the vote, it was generally felt that registration would help to establish nursing as a profession comparable to medicine. The example set in this country was widely followed abroad.

What actually happened? It was never practical politics to provide that all nursing should after a specified date be undertaken only by State-registered nurses. Since many hospitals and nursing-homes had to continue to rely on untrained nurses for their rank and file, one of the major objects, that of protecting the public from the untrained nurse, was at once lost sight of; and State registration became almost an end in itself.

An attempt to retrieve the omissions of 1919 has led in the last year or two to the Act now on the statute-book to control the untrained nurse by providing for a roll of existing assistant nurses, together with provision for a two-year practical training in future. No-one is to be allowed to use the title "nurse" who is not either a State-registered nurse or an assistant nurse. The conception is reminiscent of that of 1919. If we could be sure that the two categories of trained nurses would together provide enough nursing staff for all our needs, there would seem to be no cause for anxiety. Such is, however, far from being the case. The new two-year training for the assistant nurse is an experiment, and no-one knows whether the effect of the two Acts taken together will not be to keep out of nursing many women of a kind who have hitherto lent a useful hand, and whose help can ill be spared now.

CASE AGAINST PRESENT SYSTEM

Nobody will wish to deny that much has been achieved since 1919 in raising standards in backward training schools, and it is unnecessary to expatiate on the more obvious advantages that have followed. On the other hand, the case against the present machinery of State registration is very strong. First it is confronting the less fortunate hospitals with an impossible dilemma; either they must go short of staff, and so further aggravate their shortage, or they must employ for nursing work women called by some other name than nurse. Secondly, the imposition of a uniform standard prevents the individual training school from adapting its requirements to the type of woman available to it, and is thus a primary factor in the high wastage-rate of potential

Letters to the Editor

DENTAL CARIES

SIR,—Reduction of activity below a physiological minimum leads to atrophy in bones, muscles, peripheral nerves, and any organ physiologically connected with mechanical functions. The teeth being part of the bony skeleton, it is reasonable to suppose that they, like bone react to such disuse with demineralisation and atrophy. For various reasons these changes cannot readily be demonstrated in teeth, by either radiography or chemical analysis; but the effects of disuse can be estimated from a world-wide survey of different races living under different dietetic and other conditions. In making this survey several factors possibly responsible for caries have to be considered.

Mineral Deficiencies.—Poor teeth are found in parts of New Zealand with a low calcium level in the water, in parts of England with a medium calcium level, and in parts of South Africa with a high calcium level. Good teeth were found among natives in Alaska regardless of low or high calcium or phosphorus intake. There appears to be no correlation between calcium and phosphorus intake and immunity from caries.[1] [2]

Fluorine Deficiency.—In South Africa, Kenya, and Australia dental decay is prevalent among the white people, while the non-assimilated natives of the same places are hardly affected, though using the same drinking-water. Tea has a high fluorine content but does not prevent caries in the English.

Poor Mouth Hygiene.—Filthy mouths are often free from caries, and no relation is in fact apparent between oral hygiene and caries.[3] [4] The incidence of toothbrushes is often in inverse proportion to that of sound teeth.

Inadequate Sunshine.—In regions with much sunshine the teeth may be comparatively good (southern U.S.A.) or very poor (South Africa, Kenya, Australia), and in regions with little sunshine the teeth may be good (Eskimos, Maoris in southern New Zealand) or poor (England).

Hereditary Factors.—The countries with the worst dental conditions are all inhabited by people of British stock, but a racial influence is disproved by the fact that natives in any part of the globe who fully adopt British food habits acquire dental caries to the same degree as the British. It appears that all human races are equally susceptible to dental caries.

Vitamin Deficiencies.—In New Zealand, which has the highest caries incidence in the world, butter, milk, and fresh fruit are abundant, and the population has very good health apart from its teeth. Investigations in the Kangra district of Northern India, where severe malnutrition, rickets, and osteomalacia are extremely prevalent, showed that almost perfect teeth were compatible with severe rickets.[5] In American prisoners-of-war released from Japanese prison camps after suffering from long-continued multiple vitamin deficiencies and severe malnutrition the number of carious teeth was less than that of the same age-group living under normal conditions.[6]

Overuse of Refined Carbohydrates, especially starch.—In central and southern Europe, where the teeth are comparatively good, the food is rich in refined carbohydrates. In New Zealand, with the worst teeth in the world, proportionally more proteins and less starch are consumed than in most other countries, the diet consisting mainly of meat, eggs, milk, and cheese. On the other hand, protein cannot be held responsible for dental caries, because the Eskimos, who live almost entirely on meat, have sound teeth.

Too Much Sugar.—In central Europe, where meals ordinarily conclude with a cooked sweet dish, teeth are fairly good. Negroes in the West Indies, who habitually chew sugar-cane, have excellent teeth. The sugar sumption per head is higher in North America than England, yet American teeth are much sounder.

Dental Disuse.—In New Zealand dental disease rampant among the British population and among Maoris who have adopted a British diet, but is among Maoris keeping to their traditional diet. already indicated, the British diet in New Zealand no obvious deficiency, but a striking characteristic the food as eaten is its softness. Almost all of it can swallowed without mastication: the meat is thinly c and taken in small pieces that may or may not be chewed the breadcrust is usually removed and thrown away and proper use of the teeth is considered bad tabl manners.

Food eaten with the aid of cutlery rarely requires re mastication, and in civilised society the number of sol foods eaten without cutlery is small. By far the mo prominent of them is bread, and it is interesting compare the dental conditions in various countries relation to the customary thickness of slices and th types of crust:

Country	*Thickness of slices*	*Crust*	*Teeth*[7]
Australasia ..	1/8 in.	Soft	Very poor
England ..	1/8–1/4 in.	Soft	Poor
United States ..	1/3–1/2 in.	Mostly soft	Fair
Central and Eastern Europe ..	1/2–3/4 in.	Tough	Good
Italy	1 1/2–2 in.	Tough	Very good

Prevention of Caries.—In osteoporosis or bone atroph there is "abnormal porousness of the bones by th enlargement of the Haversian canals and by the formatic of cavities; the atrophic changes, in many instance are caused solely by disuse."[8] I suggest that the path logical condition underlying dental caries is similar— disuse odontoporosis. If so, the importance of tough foo for the teeth lies in the prevention of decalcification fro disuse, and not in its detergent action, which is limite to a fraction of the tooth surface and affects least th places where food lodges and ferments. In primitiv peoples with a low caries incidence the teeth are ofte very dirty; the incidence of salivary calculus and dental plaques may be high[5] and the bacterial flora the mouth abundant. Frequent and careful cleansing the teeth does not appreciably diminish caries: th toothbrush is ubiquitous and victorious, but carie flourishes more than ever.

The accepted modern nutritionally sound diet, wit well-balanced minerals, vitamins, and calculated ingre dients, seems to have no bearing on immunity to carie This is in line with the well-known fact that an increase supply of minerals and vitamins cannot remineralise bone decalcified from disuse; it can be done only b active use of the limb. Similarly, the prevention of dent caries requires the addition to the diet of tough matte The addition of some hard breadcrust (old Swedish c Italian type bread) to the daily diet would suffice t maintain fairly good teeth with a reasonably low carie incidence. Carrots, celery, apples, and fruit generall are of little use in this regard; biscuits, cracking har food, and toast are still less suitable; while chewing-gur is too elastic and soft. Chewing of sugar-cane has bee found useful in the treatment of odontoporosis, but grea care must be taken at first, because some of the atrophi teeth may break. If rice is the staple food the preventio of caries demands the consumption of undercooked rice leaving the grinding of the grains to the teeth. Wher this is the custom, as in parts of the Philippines, the teet are excellent; whereas in parts of China, where the ric is well cooked, the teeth are poor.

After a lifetime of chewing the teeth may be groun down and shortened, as in old horses, but are free fron caries. In fact attrition and dental caries occur in invers relationship; they usually exclude each other, excep when the attrition reaches the pulp cavity and furthe chewing becomes painful.

Conclusion.—Reviewing the factors commonly blame for endemic dental decay—such as mineral deficiencies fluorine deficiency, poor dental hygiene, inadequat

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7. Neumann, H. H. *J.R. Inst. publ. Hlth Hyg* 1940, 9, 373
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In England Now

Running Commentary by Peripatetic Correspondents

HAVING at last visited Eire I can now reveal that is a country of wide straight roads, ass-carts, and hawled women ; of bare-footed and undernourished ildren ; of humble indigence and evasive answers ; mingled friendliness and suspicion ; of teetotal bar-aids ; of single-track railways ; of abundance of food d drink for those with the means to pay for them, and lack of most other material comforts ; of dogs and iests ; of ruins, squalor, and desuetude ; of great tural beauty ; of too much peace ; of brooding sadness d listlessness. Mirabile dictu, we saw no rain in Eire. ither did we see a blood-horse, a foxhound, or a game rd.

* * *

The man who travels by air today will enjoy the part his journey that he spends in the air. He will find odern transport planes fast, safe, and comfortable, e pilots skilled, the crews attentive, the food excellent. he is undertaking a one-stage journey he will be unlikely suffer inconvenience. But if he is on a longer journey ich touches several countries in transit he will find a ry different state of things. For every hour that he ends in comfort in the air he will spend forty minutes the ground subjected to every discomfort and indigty. He will rise three hours before the plane is due to ke the air, and he will normally spend three hours ter it touches down before he enters his hotel room. ven though the day's flight is only four or five hours he ust still wake before dawn and wait about in the night r.

Further, he is made to realise that the purchase of air ticket in itself transforms him from a harmless tizen into an international suspect. For every country which his plane may possibly call, even for half an our to refuel, he must obtain a visa and pay for it, and ust fill up a questionnaire saying why he wishes to visit at country and when he was there before, and must give details of his past life and evidence of multiple inoculaons. Whenever on his journey he comes down in a esh country, he must stand with his fellows in a queue, d trickle slowly, very slowly, past a group of officials. he more backward and therefore aggressively nationalist e country, the more irritating will be the inquisition, ven to the entering longhand into a ledger of every etail of every passport down to the colour of eyes and air, the inquiry into his day-to-day movements for e previous fortnight, and the examination by a health fficial. If he is due to stop the night he must in addition ass through the Customs and have his money counted nd entered on his passport. Finally he is driven ten to wenty miles to a hotel, where he is billeted with one or wo other fellow-travellers in one of the less good rooms nd treated with all the civility that a non-paying guest sually receives. After a few hours' sleep he is roused gain at 4 A.M., to face the same long drive and pass hrough the same currency control before he resumes nce more his seat in the plane.

At every major stop he must, in addition, face the ncertainty as to whether he will, in fact, continue on is journey at all. To the humble traveller the word 'PRIORITY" looms large. Anyone on an important ission, anyone with political pull—in some countries nyone who has distributed backsheesh in the right uarters—may displace him, and he may be stranded t some out-of-the-way island or junctional airport, hort of money, unsuitably dressed, to wait for that ndefinite opportunity when a plane shall come along ith room to take him farther on his journey.

When his route involves a change from one air line o another his troubles increase. Competing services ake a delight in disclaiming all responsibility for the ookings made by other companies on their planes, and he unfortunate traveller may find himself faced with the choice of abandoning hope and travelling for a week by land or sea to his destination twelve flying hours away, or seeing his name go to the bottom of a list lready filled up for a week or two ahead. Those who re skilful in the use of bluff, threats, entreaty, or palm-oil may get into the air ; the meek inherit the earth.

This is all very wrong. What should be the pleasantest form of travel is now the most harassing, for reasons which are none of them inherent in flying and which could all be removed. Here are a few suggestions from one who is recovering from a series of journeys.

1. Priorities should be abolished altogether. Governments, services, businesses, and wealthy individuals who require air transport at short notice should hire special planes for the purpose.

2. There should be a firm liaison between all air lines, so that a traveller can book from the start to the finish of a complex journey and be sure of a connexion at each stage, and an allotted seat in a specified plane. The scramble for seats that is often seen at night stops could be avoided by giving passengers a seat for the duration of their trip, and allotting seats before emplaning to those who join at intermediate stops.

3. The time-table on the ground should be drastically revised to cut out delays. At present an average of three hours elapses between the summons and the start, much of it spent waiting because officials have not yet arrived, standing in interminable queues because they are not numerous enough or efficient enough, waiting for planes that are not yet fuelled or warmed up. A passenger should be able to drive up to the aerodrome half an hour before the advertised time of departure, get weighed, and go straight to his allotted seat.

4. An agreement should be reached between countries on the main air routes to cut out all formalities that are purely irritative, and to cut out many of them altogether. At one part on the route to the Far East the flying-boat stops for an hour, and while it is refuelled the passengers are taken to a raft moored on the river for a cup of coffee. They do not go ashore, but they must line up to have their passports examined and their inoculation certificates checked up. Such a formality has no appreciable purpose beyond that of bloody-mindedness.

5. Hotels should be established at all important transit aerodromes and treated as extra-national territory. If passengers are confined to the building and checked only if they leave it, the formalities which make air travel wearying and exasperating can be cut out without risk. The structure and furnishings could be of the simplest, but each passenger should have a room and a bath, and there should be facilities for writing and posting letters and sending telegrams, and a few shops. While adjacent to the aerodrome, the hotel should be away from the refuelling site and the main runway ; one otherwise excellent air hotel is made impossible because planes tune up their engines all night outside the bedroom windows.

6. In flight, some small improvements would add to the interest of the traveller. Every purchaser of a ticket on these long-distance routes should be sent a written résumé of the main parts of the itinerary, to enable him to shop and pack for the journey. He should be told what extremes of temperature will be encountered, and what facilities there are for having linen washed. He should be given advice about money—e.g., travellers' cheques are of little value during the journey and B.O.A.C. currency coupons are essential. He should be advised on drugs—e.g., attacks of "tropical tummy" are very common, for which sulphaguanidine is an immediate and the only useful remedy. He should be warned that a fountain-pen cannot be used during flight. The passengers are naturally interested in the performance of the plane and the country over which they are flying; so a large-scale map of the day's course should be on the wall of the cabin, and a compass and air-speed indicator should be on the forward bulkhead. Writing-paper with the ship's name should be provided. An illustrated travel book of the route should be on sale, explaining the geographical and historical features of the country below, the climate and agriculture that account for the land features and the buildings on the ground, and the weather and trading or fishing habits that have produced the rigs that are seen in the harbours.

* * *

If you can't call an unregistered nurse "nurse" (as you won't be able to after Dec. 31) what the dickens can you call her? "Miss Smith," perhaps? Surely not. But already the nursing-homes have solved this one. They call them all "sister," which to most of us indicates a very superior person indeed.

poikilocytosis. Red-cell fragility normal. Serum bilirubin normal. No abnormality in urine and fæces. Radiography of chest normal.

The patient received immediate blood-transfusion (total 6 pints) and was later treated with large doses of iron, a high-protein diet, and vitamins. Her condition gradually improved and she gained weight; eight weeks later the hæmoglobin was 68% and the red cells numbered 3,700,000 per c.mm.

This patient's condition was due to gross nutritional deficiency, and had been aggravated by two pregnancies and by protracted breast-feeding. It would be interesting to know whether such severe anæmia due to inadequate diet has been seen elsewhere.

S. B. Karani
St. Nicholas' Hospital, London, S.E.18. G. P. Szekulesz.

COAGULATION FACTORS

Sir,—In your annotation of April 12 you state that "the existence of an additional factor of the type postulated by Owren had already been suggested by the work of Frantl and Nance." As I am afraid that this statement might be misunderstood by those who did not study closely Dr. Owren's article (April 5), I want to draw attention to the fact that Owren quite independently —and as far back as in 1943[1]—not only discovered a fifth coagulation factor but also definitely proved its existence.

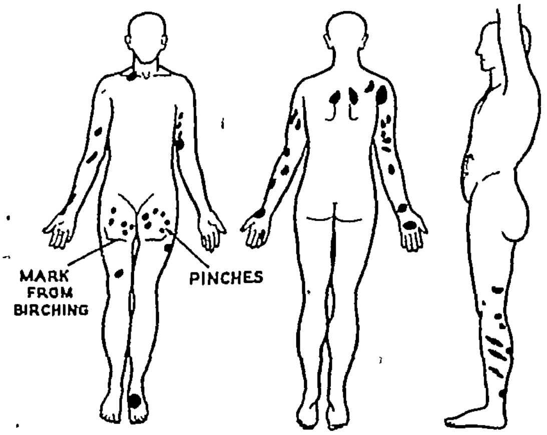
Central Laboratory, Aker Municipal Hospital, Ostre Aker, Norway. Karl Closs.

FEIGNED ERUPTIONS IN CHILDREN

Sir,—It has for long been recognised that hysterical women or malingerers may, with the object of obtaining sympathy or avoiding irksome duties, produce what have been called "feigned eruptions" or "dermatitis ficta," either by mechanical means or by the application of local irritants.

Such "eruptions" are to be distinguished from what may be called natural eruptions by their unusual shape and sharp outlines, and by the grouping and distribution of the lesions, which are found only upon easily accessible areas.

Eruptions of this sort have been usually regarded as very uncommon in children; as one writer has stated, "it would hardly be possible to think of deliberate self-mutilation in any but a very precocious child." Radcliffe Crocker, however, in his *Diseases of the Skin* mentioned the case of a girl of 7 who had longitudinal scabbed patches on the back of the phalanges, for which she had been sent several times to the seaside, which, as she confessed, she liked very much. Stopping the jaunts stopped the lesions, which were probably burns with a match. Moreover, many years ago, when I was a medical officer at Paddington Green Children's Hospital, there occurred a kind of epidemic of red streaks and excoriations upon the limbs of several children in a local school; it was discovered that these were produced by rubbing with a wet finger—a procedure probably accidentally discovered by one child and adopted by others from mere imitative naughtiness. These children had even found a title for their new and ex game—the mysterious name of "frog."



Rather more than thirty years ago there ap in a daily illustrated newspaper the diagram which reproduced here, with the following captions:

> "Alleged cruelty by dancing mistress to girl pupil doctor's diagram of alleged bruises."
>
> "When A.B., a dancing mistress, who totally d the allegation made against her, was summoned at the West London Police Court for ill-treating D.C., aged 1 *years, Dr. X,* in giving evidence, produced a chart illustrating the position of bruises on the child's body."

The girl was said to have run away from her teacher with another girl pupil, and in the witness-box to have stated that the dancing mistress had a cane and short stick when she was teaching.

The unfortunate dancing mistress was sentenced to several years' imprisonment—unfortunate because to any medical man with an expert knowledge of skin affections the shape, the grouping, and the distribution of the injuries as shown on the diagram would clearly indicate that they were self-inflicted, and with the object of avoiding an occupation which was uncongenial to the girl.

My reason for now calling attention to these somewhat rare examples of dermatitis ficta in children is to suggest the possibility that in some recent instances of supposed cruelty to children the injuries may have been due not to cruelty but to self-infliction; and that the opinion of a dermatologist would sometimes save unjust punishment of parents or of guardians of evacuees.

I am grateful to the *Daily Mirror* for allowing me to copy their illustration.

Bourne End, Bucks. H. G. Adamson.

STANDARDISATION OF SYRINGES

Sir,—The standardisation of syringes and needle-sockets is certainly much needed, but it seems a pity that certain points do not seem to have had the consideration they deserve. Thus it is proposed to abolish the 'Record' size and to standardise on a larger nozzle and needle-socket.

To many of us who use syringes and needles continually, this seems a retrograde step. The smaller nozzles afford in actual practice a much better fit, and there is no need to fix the needles so firmly on the syringe that they are difficult to remove. In many cases the larger glass nozzles never afford an airtight fit at all. For those of us whose work is concerned with the collection of specimens by aspiration, such a lack of fit is serious, as it leads often to frothing of the specimen and failure to obtain adequate amounts. I am aware that it may be answered that the collection of specimens is not the chief purpose of syringes, and that a small loss may not be of serious significance where an injection has to be made, though even here a bad leak may make much difference when such injections as those of insulin have to be given.

Furthermore, it may be said that two-piece glass syringes are to be encouraged as being easier to sterilise, and also that glass does not lend itself to making small-size nozzles. This is certainly the case, but the whole difficulty was avoided in the Jena glass syringes (obtainable before the war) in which a metal nozzle of similar coefficient of expansion to that of the glass was fused into the glass of the syringe. These were in every way excellent syringes—well-fitting and virtually indestructible. They could be sterilised by boiling, autoclaving, or dry heat (with the pistons in) up to temperatures of at least 150°C, and I have never known one to crack. In fact, I still have a number of them that have been in use for ten years; almost the only way to spoil them is to drop them in the sink.

It is surely not beyond the wit of man to make these syringes again, yet as far as I am aware they are not now available. There are several eminently suitable alloys for making such nozzles, with almost exactly the same coefficient of expansion as 'Pyrex' glass. Thus the alloys 'Fernico 2' and 'Kovar' have almost identical coefficients of expansion, and were actually invented to be fused into glass in this way. Some enterprising nshine, constitutional factors, vitamin deficiencies, and eruse of starch and sugar in the diet—I conclude that ey have little effect on endemic dental decay, and do t explain its peculiar geographical distribution. The nsistency of the food, the table-manners of the people, d the extent to which cutlery is used are far more portant.

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[1] *Proc. Norwegian Acad. Sci.* 1944, p. 21.

The disuse odontoporosis which leads to dental caries n be prevented—and to some extent treated—by storing to the teeth their proper work of chewing. iough there is little immediate hope of getting the iite man to eat tougher food generally, this major ficiency of modern diets can be largely corrected by ding sufficient "toughage" to what we eat.

St. Albans, New York. H. H. NEUMANN.

STORIES OF ENDOCRINE RESEARCH

SIR,—Important discoveries have often been fortuitous. his Addison lecture Professor Dodds said that inkowski revealed the relation of the pancreas to abetes when he successfully performed pancreatectomy assistant to von Mering, who was interested in protein gestion.

I had the good fortune to meet Minkowski in Wiesden, shortly before his death, and one night after nner he told me how it happened. It was Hoppeeyler (then professor of physiological chemistry at rasbourg) who made the remark that the man who uld remove the pancreas from an animal and keep it ve would learn much about digestion, but it had been ied many times and no-one could do it. There ensued brisk discussion among the junior members of the hool after Hoppe-Seyler had left on holiday, and inkowski said that he could do the operation. Therepon a bet of 20 marks was made that he could not. e did it, and it was while they were drinking beer ought with the 20 marks and contemplating the dog nning about the laboratory yard that he noticed how ften the animal urinated and how a cloud of flies settled n the urine. It was then that he tested the urine and und sugar. When I asked Minkowski what part on Mering had in all this he said: "Oh, it was his dog."

That I should not be charged with the encouragement of etting and the drinking of beer for the promotion of ientific discovery, I think it proper to remark that in y judgment neither a good bet nor beer is a necessary relude. Pasteur said that chance favoured the mind hat was prepared.

Of the truth of Minkowski's story I have no doubt, or Naunyn in his memoirs says that Minkowski and on Mering had an argument whether a dog would urvive extirpation of the pancreas and "Mering hroughout the time he was in Strasbourg never did a ancreatectomy or even attempted it."

Birmingham. A. P. THOMSON

SIR,—I have read with interest the account of the ddison lecture by Professor Dodds in your issue of ay 24.

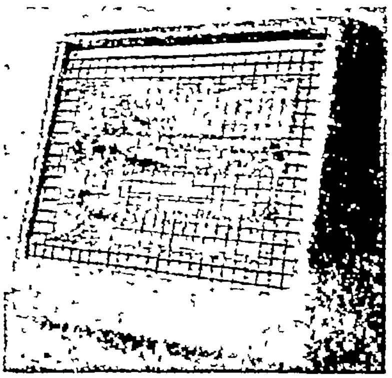
I was particularly interested in his description of the teps which led to the discovery of pancreatic diabetes y Mering and Minkowski. Both were at one time ssistants to Bernhard Naunyn, professor of medicine t Strasbourg, from whose account it appears that linkowski was mainly responsible for the discovery f the connexions between diabetes and the pancreatic land. The following is a translation from page 457 of Naunyn's Memoirs, published in 1925:

> "The experimental research on diabetes received a great impetus through the discovery of pancreatic diabetes by Mering and Minkowski. They had discussed pancreatectomy. Mering defended Claude Bernard's dogma that animals did not survive pancreatectomy. Minkowski, however, said that it was possible in dogs. I was asked my opinion I said, if one has been able to remove the liver, one should be able to remove the pancreas; and if geese can survive the former, dogs should survive the latter. The next day Minkowski carried out his first pancreatectomy, in my laboratory; Mering assisted and went on leave. When he re-entered the laboratory 24 hours later, Minkowski could already inform him that the dog had a severe diabetes with 5% sugar. By the way, Mering throughout the time he was in Strasbourg never did a pancreatectomy or even attempted it. He certainly never took part in the elaboration of the findings."

Leicester. F. E. ROSENTHAL.

DEATH IN THE FIREPLACE

SIR,—Dr. Leonard Colebrook in your issue of March 22 suggested an improvised grill guard fitted to the ordinary domestic electric heater, to reduce the possibility of clothing coming into contact with the heating element.



A guard of this type appears to be standard, if not compulsory, on all domestic heaters used in Germany. The illustration shows a typical heater used in the home. The wire grid is kept in position by being placed underneath a thin metal strip at the top and fitted loosely behind the front panel at the bottom. It is, therefore, easily removable to get at the elements, which are a good 2 in. behind the guard. Incidentally, the heater itself is constructed of cellulosed ply panels, and the reflector consists of aluminium foil on ply. As will be seen from the photograph there are no legs, and the shape of the heater is such that it is quite reasonably stable.

There appears to be no good reason why a heater of this design should not be made standard in this country and the provision of a guard be made compulsory for all heaters manufactured after a specified date. No doubt gas radiators could be designed on similar principles, with the distance between the guard and the heating elements adjusted accordingly.

V. FREEMAN
Town Hall, Islington, London, N.1. Medical Officer of Health.

***The *Islington Gazette* for May 16 records a St. Pancras inquest on a boy aged 5 years who was fatally burnt when his loose night-shirt was ignited by an electric fire. The fire was of the bowl type, and had "the usual guard as supplied by the makers with the mesh wire radiating from the central cone to the sides." The police witness said that this type of fire is not an open grate within the meaning of the Children's Fire Guard Act. Nevertheless, he added, they are "really dangerous things."—ED. L.

A RECORD LOW HÆMOGLOBIN?

SIR,—The following case is of interest as showing the very low hæmoglobin percentage that may be compatible with life.

A housewife, aged 32, was admitted to hospital with a history of weakness, increasing dyspnœa, palpitation, and tingling and numbness of the fingers and toes for the past 12 months. During this time she had also had ulcers on the edge of the tongue, which had prevented her from taking a normal diet. In the previous 2 years she had given birth to two children, both of whom were breast-fed. The last child was weaned at the age of 14 months, about 6 weeks before the patient's admission. There was no history of blood-loss.

On examination the patient was pale and emaciated, and her finger-nails were flat and brittle. Temp. 102°F, pulse-rate 110 per min., respirations 25 per min. The tongue was smooth, with pinpoint ulcers on the edges. Apart from a localised soft systolic murmur at the apex of the heart, no abnormal signs were found in the heart, chest, abdomen, or central nervous system. Blood-pressure 90/60 mm. Hg.

Blood picture: Hb 12% (1·7 g. per 100 c.cm.); red cells 607,000 per c.mm.; colour-index 1·0; packed-cell volume 5 c.cm. per 100 c.cm.; mean corpuscular volume 12 c.μ; mean corpuscular Hb concentration 34%; mean corpuscular diameter 8 μ; white cells 4100 per c.mm. (polymorphs 60%, lymphocytes 40%). A film showed gross anisocytosis and

One of his greatest contributions was his training and inspiration of younger men who came to him from all parts of this country and from abroad. There could be no better memorial than to continue this work which was so close to his heart: the training of young surgeons to build on the foundations he so securely laid.

It is proposed that a travelling scholarship shall be founded in Tudor Edwards's name, to enable suitable candidates to study thoracic surgery in special centres. This also will fulfil an urgent national need. For this purpose, a capital sum of at least £10,000 will be required. The Royal College of Surgeons and the Royal College of Physicians have agreed to administer the fund and carry out the conditions of the trust. Donations, and subscriptions under deed of covenant, should be sent to the hon. treasurer, Lord Courtauld-Thomson, at the Brompton Hospital, London, S.W.3.

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R. A. YOUNG
C. PRICE THOMAS } hon.
F. G. ROUVRAY } secretaries.

Public Health

MILK PRODUCTION AND GRADING

A South African View

SINCE returning to South Africa, E. J. Pullinger has specialised in milk-grading, first as a civilian and then as the officer of the South African Veterinary Corps responsible for the milk-supply of the army. His conclusions on the principles of grading and methods of improving the milk-supply [1] [2] are of general interest.

STANDARDS

He agrees with Wilson et al.[3] about the inaccuracy of the plate test and the value of the methylene-blue reduction test, and points out that in any event the plate test is too cumbersome to perform on a sufficient scale. The advantages of the Breed test are that it immediately provides information which will prevent bad milk being mixed with good milk, and that it reveals herd infection with mastitis.

A far clearer picture of "dairy hygiene" or "keeping quality" is obtained from an approximate test done frequently than from a very accurate test which, because of its complexity, can only be done occasionally. Pullinger therefore recommends that every herd should be tested five times a week, but points out that this leads to the accumulation of a mass of figures which are quite useless unless a satisfactory method of analysis can be devised. He concludes that any form of direct mathematical analysis of results is foredoomed to failure, because fundamentally it is a fallacy to weight good results too heavily with the bad ones. The consumer is concerned with the quality of the milk he receives each day, and he would judge the quality of his supply by comparing the number of times the supply was good with the number of times it was bad: put another way, his milk does not suddenly go sour in his porridge plate because he remembers that last Sunday the supply was badly tainted. Even the most careful and enthusiastic producers have some bad results, and testing authorities use their "discretion" before taking action; but to lay down a strict numerical standard and then to apply that standard upon a discretionary basis spells disaster to both the value of the standard itself and to any grading scheme.

In order to overcome these difficulties Pullinger advises the use of the "good-bad" ratio. He proposes, as an arbitrary division between good and bad, a Breed count of 1,000,000 and a methylene-blue reduction time of 3¾ hours: any test result better than these figures is classed as good and any worse than this as bad. In the winter there was a good correlation between results of the methylene-blue reduction test and Breed count, but in the summer this correlation b down. The fact is discussed in relation to the "lat defect" of milk and it is suggested that all milk sho be 8–12 hours old before being tested.

The highest standards likely to be obtained in So Africa are:

Summer (September to March) good-bad ratio .. 2:1
Winter (April to August) good-bad ratio 5:1

Though this standard may seem low, very few So African producers can maintain it.

In criticism of the good-bad ratio it may be argu that a producer who regularly gives a count of 900,0 is classed as always good, while another producer givi a count of 1,020,000 is always bad. This objection admitted, but it is one which cannot be escaped grading. Whatever grade or figure is chosen, th producer who just exceeds that figure is always unfair treated, compared to those who just make the grad As an objection, however, it is purely theoretical, becau in practice producers never do give results consistentl just above or just below any given level. Howeve good the producer, his results will fluctuate, and the good- bad ratio system shows whether the fluctuations pre dominate on the good or the bad side of the given lin The principle, it is suggested, might well be applied to a forms of milk grading.

INCENTIVES AND COERCION

It has been proposed in these columns [4] that a dairy licence should be granted on the farmer's ability to produce satisfactory milk, and not on an arbitrary building standard. Discussing this subject, Pullinger says that, broadly, the dairy farmer and dairyman require to be industrious, clean, honest, and intelligent, these characters being listed in order of importance.

> "The dairyman must be continually controlling the work in the stable, milk-room or shop and he must control it every day and every night. Dairying cannot be controlled from the stoep, nor can control be considered t exclude night and week-end duty, public holidays and a annual holiday at the coast. In other words, dairying i an unending grind which can only be relieved by a satisfactory partnership, in which case the business has t support two partners."

This remark applies equally to Great Britain, and should be read in conjunction with the recent pleas for increasing the financial rewards of food-producers.[5]

It has previously been pointed out [6] that without adequate recompense farmers and their men will no undertake the onerous work of milk-production. Standards of production in South Africa are tending t *fall rather than improve*, because the value of land, farms, and dairy stock has risen so much that genuine dairy farmers have tended to sell out, leaving the work o milk-production to the beginner.

Pullinger deprecates, for South Africa, the legal coercive method of improving the milk-supply. It is he says, largely ineffective, and it operates more effectively against the poor man than against the rich. The poor man has to accept the controlling authorities' laboratory findings as correct, and has to face convictio before a magistrate. The rich man can afford to have control tests done, and by employing skilled lega representation—and if necessary by appealing to a higher court—he may well escape conviction through some legal quibble. Ultimately the controlling authority ceases to prosecute such a person, because *it is a waste of time.*

The normal routine of efficient agricultural or commercial marketing is to price the product according to its quality (including nutritional value), and it is hard to see why milk should be placed in a different category. Pullinger suggests that the bonus-earning standards of cleanliness could be based on either the Breed count or (preferably) the methylene-blue reduction test.

The bonus grades nos. 1 and 2 would be based on good-bad ratios increasing in severity every two years. The highirm could certainly manufacture syringes from these ubstances.

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[1] Pullinger, E. J. *J. S. Afr. vet. med. Ass.* 1944, 15, 39; 1945, 16, 110; 1946, 17, 15, 113.

[2] Pullinger, E. J., Davidson, L., Hogg, E. S. *Ibid*, 1944, 15, 137.

[3] Wilson, G. S., et al. Bacteriological Grading of Milk. *Spec. Rep. Ser. med. Res. Coun., Lond.* no. 206, 1935.

[4] *Lancet*, Jan. 4, p. 30.

[5] *Ibid*, March 15, p. 340; May 17, p. 686.

[6] *Ibid*, 1943, ii, 805.

Apart from the question of fit, glass nozzles are lways very vulnerable to fracture, not only from actual reaking off of the nozzle, but also from minor trauma o the point, which causes a minute sliver of glass to detach itself from the side of the nozzle, thus destroying the fit of the needle.

I should like, therefore, to make a plea for the retention of the Record size of nozzle, which is adequate for any needle-bore in current use. If fused-in nozzles are used this does not prevent two-piece glass syringes from being made; and in this manner all difficulties of sterilisation will be avoided. That syringes capable of sterilisation at autoclave temperature are essential was underlined in the course of a recent law-case,[1] though personally I prefer dry sterilisation in a hot-air oven at 180°C, which calls for even greater care in construction.

It may be well to bear in mind that the Record size is at the present time by far the most commonly used; it should not be lightly discarded.

London, W.1. J. W. SHACKLE.

POSTOPERATIVE PROGRESSIVE BACTERIAL SYNERGISTIC GANGRENE

SIR,—In his paper of May 31 (p. 748), reporting a case of postoperative progressive bacterial synergistic gangrene successfully treated with penicillin, Mr. Clarke describes the micro-aerophilic non-hæmolytic streptococcus as derived from the intestinal or respiratory tract. I have found that, in a susceptible person, a surgically clean incision is all that is required to start the process; no connexion with the gut or respiratory apparatus is necessary. Mr. Clarke also writes: "Before the introduction of penicillin the only treatment was a radical excision of the affected area well beyond the spreading zone of hyperæmia. . . . The wound was then smeared with 'active' zinc-peroxide paste. . . . Many of the reported cases which recovered were treated without peroxide, which is probably unnecessary provided the excision is radical enough. . . ." Without attempting to depreciate the value of penicillin in these cases may I point out that there is another "oxidising agent" the local application of which has arrested the spreading process and enabled rapid healing to occur, without any necessity for skin-grafting, in one (unpublished) case in England and more than one case abroad? No excision is required with this remedy; I refer to potassium permanganate, applied as a dry powder and covered by a 'Vaseline' dressing.

St. Margaret's Hospital, Epping. FRANK MARSH.

PREVENTIVE OPERATION FOR POSTOPERATIVE THROMBOSIS

SIR,—To what lengths can prophylactic surgery be taken? When is it justifiable to operate to prevent a possible but uncertain complication? The recent literature on postoperative thrombosis suggests that across the Atlantic there is a more liberal attitude towards preventive operations than in this country.

Allen[2] reports on 458 prophylactic bilateral superficial femoral-vein interruptions done at the Massachusetts General Hospital in the period January to October, 1946. The vein is ligatured on both sides immediately distal to the profunda tributary. The operation is done under local anæsthesia, and the bilateral procedure takes about an hour. It was done in patients beyond the age of 65 at the time when, or within forty-eight hours after, bed rest became necessary. The author admits that not all his colleagues at the hospital have been convinced to date of the value of prophylactic bilateral femoral-vein ligation, but he demonstrates its value by analysing a comparable series of cases where no ligation was performed and where the incidence of phlebitis and fatal embolism was much higher.

This study cannot but amaze Allen's British colleagues. Few British surgeons can have seen so many cases over 65 during ten months of one year on whom they would consider ligating both femoral veins for what is a disastrous but not so very common complication. If Allen is to be interpreted correctly he includes this ligation as a part of the routine preoperative preparation of his elderly patients.

Another even more amazing study is by Thebaut and Ward,[3] who report on 36 patients treated by ligation of the inferior vena cava within the past three years. To prove the dangers of pulmonary embolism they quote McCartney's figures in which pulmonary embolism was found to account for 5·3% of 4070 postoperative deaths. In their series 4 patients died, 2 during the induction of anæsthesia and 2 within a few hours of the operation, a case-mortality of 11%. The severe complications included 1 incisional hernia and 2 intestinal obstructions. All these ligations were done after one or more non-fatal embolic episodes—a selected group of patients in whom it has been shown at the Mayo Clinic that there is a 20% risk of a fatal embolism following.

Here are two challenges. Are we to ligate both femoral veins in all elderly patients when they are confined to bed, and are we to ligate the inferior vena cava in all cases of non-fatal pulmonary embolism? The natural British conservatism is repelled by this enthusiasm for prophylactic surgery, but before condemning our colleagues' latest contributions it would be as well for large hospitals in this country to review *and publish* their morbidity and mortality figures for postoperative venous complications, so that it can be judged whether the problem is of the same magnitude as in America and whether it requires the same radical and dramatic solution.

Bath. S. GLASER.

CLIMATE AND RHEUMATISM

SIR,—In your issue of May 24 Dr. Kenneth Stone refers to the notorious effect of climatic changes in provoking rheumatic pains. Now why is it that this matter has not been more fully investigated? To me it seems of fundamental importance. We admit that such changes may induce pain, but I have yet to hear of any adequate scientific investigation which might not only make clear the ætiology but give a pointer to treatment.

At the risk of being tedious I would point out that such pains are presumably not due to changes of pressure alone, nor to changes of temperature alone, nor to changes of humidity alone. But these three together, perhaps with changes in atmospheric ionisation, appear able to upset the delicate balance of those who are susceptible. Surely experiment would not be difficult? Before the war I saw in Germany a testing chamber (used to assess the fitness of airmen for their work) which was provided with devices for changing pressure, temperature, humidity, and ionisation.

There is no doubt that cold is a factor. Vigorous young men, for the sake of money, take employment in the frozen-meat stores in the Argentine; many are crippled by rheumatism after a few years' work.

Colchester. G. C. PETHER.

TUDOR EDWARDS MEMORIAL

SIR,—The remarkable progress of chest surgery in this country is in large measure due to the work of Arthur Tudor Edwards, who died last August at the age of 56. His pioneering in this branch was in the main the chief stimulus to its expansion. His singleness of purpose, and the high standard which he set for himself and all those who worked with him, raised a small but important branch of surgery to its present position as one of the great surgical specialties. As the result of this development, men and women have been restored to life and health for whom previously medical science offered no effective aid.

Tudor Edwards literally devoted his life to his work. He was unsparing in his service to his patients in all walks of life, and many came to him from other countries. On the outbreak of war, in addition to his other work, he undertook the organisation of thoracic surgery for the Emergency Medical Service of the whole country and for the Army and Royal Air Force. He carried this heavy burden throughout the war, despite the gravest warnings and with the full knowledge that his life thereby would be shortened.

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[1] See *Lancet*, May 17, p. 677.

[2] Allen, A. W. *Surg. Gynec. Obstet.* 1947, 84, 519.

[3] Thebaut, B. R., Ward, C. S. *Ibid*, p. 385.

Diary of the Week

JUNE 8 TO 14

Monday, 9th

Royal College of Surgeons, Lincoln's Inn Fields, W.C.2
3.45 p.m. Mr. R. J. Last: Pectoral Girdle. (Arnott demonstration.)
5 p.m. Mr. T. Keith Lyle: Squint Surgery.

Medical Society of London, 11, Chandos Street, W.1
8 p.m. Clinical meeting.

Fellowship of Postgraduate Medicine
5 p.m. (Rheumatism Unit, St. Stephen's Hospital, Fulham Road, S.W.10.) Dr. Hugh Dunlop: Endocrine Factors in Relation to the Chronic Rheumatic Diseases.

Tuesday, 10th

Royal College of Surgeons
5 p.m. Dr. Alice Carleton: Skin Disease in Relation to Ophthalmology.

Royal Society of Medicine, 1, Wimpole Street, W.1
8 p.m. *Psychiatry.* Prof. L. S. Penrose: Importance of Statistics in Psychiatry.

Fellowship of Postgraduate Medicine
5 p.m. (St. Stephen's Hospital.) Dr. E. G. L. Bywaters: Joint Physiology and Pathology.

London School of Dermatology, 5, Lisle Street, W.C.2
5 p.m. Dr. I. Muende: Fungus Infections of the Skin.

Edinburgh Post-Graduate Board for Medicine
5 p.m. (Royal Infirmary.) Mr. C. P. Stewart, ph.d.: Biochemistry of Senescence.

Wednesday, 11th

Royal College of Surgeons
3.45 p.m. Mr. R. J. Last: The Larynx. (Arnott demonstration.)
5 p.m. Mr. F. A. Williamson-Noble: Glaucoma Surgery.

Fellowship of Postgraduate Medicine
5 p.m. (St. Stephen's Hospital.) Mr. Timbrell Fisher: Orthopædic Aspect of the Chronic Rheumatic Diseases.

Thursday, 12th

Royal College of Surgeons
5 p.m. Mr. J. Minton: Occupational Eye Diseases and Injuries. (Hunterian lecture.)

Royal Society of Medicine
4.30 p.m. *Ophthalmology.* Demonstration of methods of illumination.
5.15 p.m. Mr. J. G. D. Currie, Mr. H. C. Weston, Mr. J. W. T. Walsh, d.sc.: Illumination.

Fellowship of Postgraduate Medicine
5 p.m. (St. Stephen's Hospital.) Dr. David Shaw: Psychogenic Rheumatism.

London School of Dermatology
5 p.m. Dr. H. W. Barber: Prurigo.

Edinburgh Post-Graduate Board for Medicine
4.30 p.m. Dr. R. W. D. Turner: Judgment in Cardiology—a Study of Errors. (Honyman Gillespie lecture.)

Friday, 13th

Royal College of Surgeons
3.45 p.m. Mr. R. J. Last: Kidneys. (Arnott demonstration.)
5 p.m. Prof. W. J. B. Riddell: Hereditary Eye Disease.

Royal Society of Medicine
10 a.m. Pædiatrics. (Royal Victoria Infirmary, Newcastle.) Prof. J. C. Spence: Organisation of a Professorial Unit. Dr. Mary Taylor: Method of Recording Neonatal Infections in a Maternity Hospital. Dr. F. J. W. Miller: Prematurity in an Industrial Town.
2.15 p.m. Dr. Alan Ogilvie: Bronchiectasis. Dr. Donald Court: Acute Intussusception.

Fellowship of Postgraduate Medicine
5 p.m. (St. Stephen's Hospital.) Dr. Philip Ellman: General Medical Diagnosis in Relation to the Chronic Rheumatic Diseases.

Empire Rheumatism Council
4.30 p.m. (Apothecaries Hall, Blackfriars Lane, E.C.4.) Sir Adolphe Abrahams: Inaugural lecture.
5.30 p.m. Dr. Ernest Fletcher: Arthritis.

Saturday, 14th

Empire Rheumatism Council
10 a.m. (Apothecaries Hall.) Dr. R. E. Bonham-Carter: Juvenile Rheumatism and Still's Disease.
11.15 a.m. Dr. G. D. Kersley: Spondylitis.
2 p.m. Dr. George Graham: Gout.
3 p.m. Dr. W. S. C. Copeman: Non-articular Rheumatism and Sciatica.
4.30 p.m. Dr. Oswald Savage: Differential Diagnosis of Arthritis. (Course ends Sunday.)

For Doctors Only is a collection of twelve sketches of general practice by "Hugh Selwyn" which first appeared in the *London Hospital Gazette*. It entirely avoids the solemnity of Victorian studies on the same theme: but, like the characters, it "sobers down at times for clinical reasons," and readers with a high tolerance for exuberance, slang, and anecdote will find useful information among the fun. It is published by W. E. Harrison & Sons, Ltd., Ipswich, at 5*s*.

Notes and News

FOR NURSING CANDIDATES

Brochures from nurse training schools are now the fashion. St. George's Hospital has published a han and well-illustrated document describing the training of and the amenities of the two nurses' homes. Nurses spend a period of training in the Atkinson Morley Hospi a branch of St. George's, which, besides being used for valescence and reablement, also houses large neurosurgi and psychiatric departments.

The training schools of large voluntary hospitals are in position to select candidates, and it is noteworthy that th brochure begins by outlining qualifications which "candid must necessarily fulfil." They should be "of good educat health and physique, and they should have the nat *temperament which makes for the successful nurse.*" T slightly discouraging opening may be contrasted with t note on education found in a brochure issued by Brom and District Hospital: "There is full scope in the nur profession for girls of marked ability and high educatio standard, but the girl who has, for one reason or anoth not gained a school certificate need not feel that she is debarr from acceptance as a student nurse on this account."

Both brochures set out clearly the facts about nur examinations, and outline the careers and prospects op to the qualified nurse. Such publications should do mu to give prospective candidates a balanced view of the nur life, and to correct misgivings about conditions of work an living quarters in good modern training schools.

FOR PSYCHIATRIC SOCIAL WORKERS

The mental-health service depends much on the ability and initiative of psychiatric social workers. The London School of Economics, with the help of the Maudsley Hospital staff, have long undertaken the training of metropolitan social workers in this specialised branch; and the London County Council have just published a handbook[1] for the guidance of psychiatric and mental-deficiency workers in their public-health department.

This handbook, compiled by a special committee of experienced officers of the council, was largely in proof before the National Health Service Bill was introduced last year; and the committee had to decide whether to give up the book for the moment, or to proceed with it, delaying final publication until the Act was passed. The second course was chosen, and since the main effect of the Act has been to transfer the control of mental hospitals, mental-deficiency institutions, and psychiatric outpatient clinics to regional hospital boards, it has been possible to indicate the changes which will follow when the Act comes into force. The local health authorities remain responsible for the ascertainment of cases of mental deficiency and mental ill health, for statutory supervision and guardianship of mental defectives living in the community, and for aftercare. The handbook covers these and other aspects of work in which the psychiatric social worker shares, including the procedure for obtaining detention orders, guardianship, psychiatric social work in mental hospitals, mental-deficiency institutions, observation wards and outpatient clinics, and the special problems presented by old age and epilepsy.

The chapter on guardianship mentions a recent practice by which social workers on the council's staff have been made the statutory guardians of defectives. This is a specially satisfactory way of looking after mentally defective boys who have left a residential special school at the age of 16. The appointment of a social worker as guardian enables the council to supervise such boys more closely than would otherwise be possible; and though it entails serious responsibility for the social worker she usually finds it a satisfying piece of work giving scope to her best qualities. Her first task is to find suitable lodgings for the mentally defective boy, with a landlady who will take an interest in his personal care and welfare. It is found that a household with a man at the head usually suits this type of boy better than one in which the atmosphere is wholly maternal. The handbook advises on the kind of home to be chosen, and on the sort of life the boy should be encouraged to lead, as well as much other important information. It is marred only by a somewhat stilted choice of style and language.

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[1] Handbook on Mental Health Social Work. County Hall, Westminster Bridge, S.E.1. Pp. 111. 2*s*. 6*d*.

de bonus no. 3 would be comparable to the overseas rtified" grade. Milk to be classed as high-grade would ,à to comply with no. 3 standards in respect of cleanliness, ter-fat and solids-not-fat. Furthermore it would have to e from herds free from tuberculosis, contagious abortion l paratyphoid infection, and having a restricted allowable centage of mastitis-infected cows (it should be noted that is a higher standard than any imposed in Great Britain). is allowable percentage of chronic mastitis carriers might temporarily established between 5% and 10%, but the ition would probably have to be reviewed later.

A MILK CORPORATION

No system of grading can be effective unless all milk purchased by a single authority, comparable (but not essarily similar) to the British and Scottish milk rketing boards. A weakness of the British scheme is it, as it is primarily designed to protect the financial erests of the producer, it pays relatively less attention the safety and quality of milk. Moreover though the ard is responsible for the production end of the industry, ler authorities remain in control of pasteurisation d the manufacture and distribution of milk and milk oducts.[7] In other words an organisation similar to e British board would not be in a position to implement more than a few of the recommendations made Pullinger. In its stead, therefore, he suggests a blic-utility corporation which would establish collecting pots at strategic points in milk-producing areas, gether with processing depots, laboratories, and ministrative offices in the towns. The organisation uld have to be self-supporting and not dependent on vernment subsidy. It would collaborate with the alth authorities, and could do much to assist in the ntrol of animal diseases.

Pullinger emphasises the importance of proper grading milk before pasteurisation. He concludes that the actice of distributing pasteurised milk in bulk is highly ngerous; it should be bottled, sealed, and stored under frigeration.

This Year's Smallpox

From the beginning of the year up to June 3 the inistry of Health has been informed of 59 confirmed ses of variola major. This compares with 56 for the hole of 1946, which was the highest incidence since '34 (179 cases, mainly variola minor). The 1947 cases ve arisen from two distinct sources. The first, which as not identified, resulted in 15 cases in two generations a common lodging-house and public-assistance hospital Grimsby, Lincs, their dates of onset being between eb. 16 and March 2. The second source was a highly odified attack in a soldier flown home from India compassionate leave. He developed the disease at lston, Staffs, on March 2, having landed in England Feb. 23.

Cases in direct succession to these two sources are still ising. The present outbreak at Barnsley, in the West iding of Yorkshire, is almost certainly related to the rimsby episode. The infection introduced from India ntinues to produce cases in Bilston and in the adjacent istrict of Coseley.

Associated with the Grimsby source there have been ci at Stepney (2 cases in two generations), Scunthorpe, incs (7 cases in two generations), and Doncaster, Yorks case); but these appear to have been eradicated. In onnexion with the Bilston source a single case occurred Birmingham on May 1. Three cases in two generations t Sheffield may also have been associated with Bilston. atients were removed during the week ending May 31 t Barnsley, Bilston, and Coseley.

Barnsley.—The first generation numbered 5 cases (3 eaths) at Barnsley and 1 at Bermondsey. There has been o spread from this latter case, undoubtedly because f the prompt action taken by a practitioner who diagosed the disease at sight on the first day of rash. The econd generation at Barnsley so far numbers 4 detected nce May 29. They are in the line of contact either at he common lodging-house (24A, Doncaster Road) or t. Helens Hospital and do not indicate that the disease is out of control. The only alarming feature is that some of the common lodging-house contacts have not been traced and may give rise to other foci, particularly along the tramp routes across England through Lincolnshire, West Riding of Yorkshire, Derbyshire, Cheshire, and Lancashire.

Bilston and Coseley.—The mother and sister of an unvaccinated girl who died on May 16, four days after onset, were removed to a smallpox hospital on May 31 (onsets May 29 and 30). The mother of a kitchen-maid at Moxley Infectious Diseases Hospital, removed from her home in Coseley on May 19, has now developed the disease (onset May 28, rash and removal May 30).

Infectious Disease in England and Wales

WEEK ENDED MAY 24

Notifications.—Smallpox, 8; scarlet fever, 782; whooping-cough, 1879; diphtheria, 197; paratyphoid, 6; typhoid, 3; measles (excluding rubella), 12,830; pneumonia (primary or influenzal), 557; cerebrospinal fever, 65; poliomyelitis, 11; polioencephalitis, 2; encephalitis lethargica, 0; dysentery, 47; puerperal pyrexia, 135; ophthalmia neonatorum, 61. No case of cholera, plague, or typhus was notified during the week.

Of the 8 cases of smallpox 3 were reported at Barnsley, 2 at Grimsby, 1 at Sheffield, 1 at Bilston, and 1 at Coseley.

Deaths.—In 126 great towns there were no deaths from enteric fever or scarlet fever, 5 (1) from diphtheria, 6 (0) from measles, 15 (2) from whooping-cough, 76 (12) from diarrhœa and enteritis under two years, and 9 (0) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 261 (corresponding to a rate of 25 per thousand total births), including 32 in London.

Obituary

CARL BRUCK

M.D. MUNICH

NEWS has now been received of the death three years ago of Prof. Carl Bruck, who, with Wassermann and Neisser, in 1906, described the specific diagnostic blood-test for syphilis. He was born in 1879 at Glatz, in Silesia, and after graduating in 1902 he spent four years as an assistant at the Robert Koch Institute in Berlin. In 1906 he joined the German expedition for the investigation of syphilis in Java. On his return to Germany in 1908 he was appointed to the university dermatological clinic at Breslau under Neisser, and three years later received an associate professorship. Later he became director of the dermatological department of the municipal hospital in Altona, and he held this position until he was removed by the Nazis in 1933. He died by his own hand on June 12, 1944, when he was about to be arrested by the Gestapo, and his wife (née Olga Jebsen) followed him two days later.

Births, Marriages, and Deaths

BIRTHS

GRAY.—On May 26, in London, the wife of Dr. J. D. Gray—a son.

KING.—On May 13, the wife of Dr. R. E. King—a daughter.

LUMB.—On May 31, in London, the wife of Dr. George Lumb—a son.

MILLER.—On May 28, at Newcastle-upon-Tyne, to Dr. Eileen Miller (née Baird), wife of Dr. Henry Miller—a daughter.

RODGERS.—On May 27, the wife of Mr. Harold Rodgers, O.B.E., F.R.C.S.—a son.

STROTHER-STEWART.—On May 24, at Edinburgh, the wife of Dr. C. R. Strother-Stewart—a son.

TOOMEY.—On May 25, at Arbroath, the wife of Surgeon Lieut.-Commander A. Toomey, R.N.—a daughter.

MARRIAGES

PATUCK—MAYHALL.—On May 24, at Luton, Framjee Patuck, M.R.C.S., to Margaret Mayhall.

DEATHS

DOCKRAY.—On May 27, at Bournemouth, John Smalley Dockray, M.D. Manc., B.Sc. Lond., aged 76.

LITT.—On May 25, at Lytham St. Annes, John Percy Litt, M.D. Edin., D.P.H., D.T.M. & H., colonel R.A.M.C.

MACDONALD.—On May 28, at Edinburgh, Angus Graham Macdonald, O.B.E., M.D. Edin.

WHELAN.—On May 27, at Plymouth, Hamlet Mark Whelan, M.R.C.S., surgeon rear-admiral R.N.

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[7] Similar criticisms have been made by Astor and Rowntree. British Agriculture. Penguin Books Ltd. 1939

University of Oxford

On July 26 the honorary degree of D.SC. will be conferred on Dr. A. E. Barclay.

Royal College of Physicians of London

On Tuesday and Thursday, July 15 and 17, Prof. P. C. P. Cloake will deliver the Humphry Davy Rolleston lectures at the college, Pall Mall East, S.W.1. He will speak on the Treatment of Disseminated Sclerosis by Artificial Pyrexia and Prolonged Administration of Arsenic.

London Blood Transfusion Service

The headquarters of the Greater London Blood Transfusion Service are now at 10, Collingham Road, S.W.5 (Frobisher 6477).

Research Defence Society

On Tuesday, June 17, at 3.15 P.M., at 26, Portland Place, London, W.1, Prof. G. H. Wooldridge, F.R.C.V.S., will deliver the Stephen Paget lecture on What Animals Owe to Experimental Research.

Passano Foundation Award

On June 12 in Atlantic City this award for 1947 will be presented to Mr. Selman A. Waksman, microbiologist at the New Jersey Agricultural Experiment Station, by Mr. Robert S. Gill, president of the Williams & Wilkins Company and of the foundation. Mr. Waksman will afterwards give an address on Antibiotics and Tuberculosis—a Microbiological Approach.

Royal Medical Foundation of Epsom College

Henry Duncalfe annuities of £30 p.a. each for spinsters in need of help will shortly be awarded by the council. Candidates must be daughters of registered medical practitioners and must have attained the age of 50. Pensions for impecunious doctors or their widows, and scholarships for their sons, are also available from the funds of the foundation. Forms of application may be had from the secretary, Epsom College, Surrey.

Hospital for Sick Children, Great Ormond Street

Members of the consulting staff of the hospital will in future see outpatients only by appointment. Appointments, which should be made by the patient's own doctor, preferably in writing, may be made for any time between 9.30 A.M. and 12.30 P.M. except on Sundays. Patients who attend without an introduction from a doctor will be examined in the receiving-room, and only when necessary referred to a consultant.

Society for Relief of Widows and Orphans of Medical Men

The annual general meeting of the society was held on May 21, with Dr. R. A. Young, the president, in the chair. The resignation of Dr. Blackett was received, and in appreciation of his services as secretary for over 40 years he was elected a vice-president. During 1946 £4950 was distributed to the 52 widows who are beneficiaries. The membership of the society is now 281, of whom 160 are life members and 121 are ordinary members. Further particulars may be had *from the secretary, 11, Chandos Street, London, W.1.*

Central Drugs Laboratory for India

Under the Drugs Act the Biochemical Standardisation Laboratory at 10, Chittaranjan Avenue, Calcutta, has been constituted as the Central Drugs Laboratory. Its functions will include: (1) the analysis of samples submitted by customs collectors and courts of law, and (2) the granting of certificates of registration for patent and proprietary medicines with undisclosed formulæ. The Drugs Act and rules came into force on April 1, except the provisions for the registration of patent and proprietary medicines, which are to take effect on April 1, 1948.

British Empire Leprosy Relief Association

Dr. Gordon Ryrie has been appointed medical secretary of the association in succession to Dr. Ernest Muir who has retired.

Dr. Ryrie, who graduated M.B. at the University of Edinburgh in 1926, joined the Colonial Medical Service in Malaya two years later. He was appointed superintendent of Sungei Buloh Leper Hospital in 1930, where he remained until the end of 1945. During the Japanese occupation Dr. Ryrie organised his settlement as a base for aiding our troops, guiding them in the jungle and sending food and medical supplies. In January, 1944, the Japs became suspicious, and they put him in prison, later sending him to a labour camp where he remained until the liberation. Immediately after VJ-day, though in poor health, he resumed his work at the Sungei Buloh Hospital until the autumn of 1945 when he returned to England.

Society for Endocrinology

The following officers of this society have been chairman, Mr. A. S. Parkes, SC.D., F.R.S.; secretary, Mr. Folley, PH.D.; treasurer, Mr. C. W. Emmens, PH.D.; of the *Proceedings*, Prof. S. Zuckerman, F.R.S.; members committee, Dr. P. M. F. Bishop, Dr. C. H. Gray, Mr. P. Williams, Prof. F. G. Young, D.SC.

Return to Practice

The Central Medical War Committee announces that Harold Park, F.R.C.S., has resumed civilian practice 40, Wilbury Road, Hove, 3, Sussex.

Foreign Awards

The following decorations have been conferred on R.A.M.C. officers in recognition of distinguished services in the cause the Allies:

UNITED STATES

Legion of Merit.—Major-General W. C. Hartgill, C.B., M.C., K.H.S. (commander); Brigadier D. B. McGrigor, O.B.E. (officer).

Bronze Star Medal.—Lieut.-Colonel A. J. King, Major H. G. McQuade.

BELGIUM

Croix de Guerre 1940 *with Palms.*—Captain R. L. Rees.

CZECHOSLOVAKIA

Order of the White Lion (3rd Class).—Major-General Sir Henry Tidy, K.B.E.

Medal for Merit (1st Class).—Lieut.-Colonel Henry Ross, C.I.E., I.M.S.

Appointments

BALL, MARGARET, M.B. Camb., M.R.C.P.: asst. physician, the Elizabeth Garrett Anderson Hospital, London.

BRASH, DAVID, M.B. Glasg., D.M.R.: radiologist, Bolton Royal Infirmary.

BURT, H. A., M.B. Camb., M.R.C.P.: director of department of physical medicine, University College Hospital, London.

BYARS, J. R., M.B. Aberd., D.P.H.: senior asst. county and school M.O., Leicestershire.

DAVIES, I. G., M.D. Lond., M.R.C.P., D.P.H.: M.O.H. and school M.O., Leeds.

DOYLE, W. J., M.B. N.U.I., D.P.H.: deputy county M.O.H., Devon.

GEOHEGAN, V. P., M.B. Leeds, D.P.H.: deputy M.O.H., Weston-super-Mare.

HEWITT, SELWYN, M.B. Durh., B.HY., D.P.H.: senior asst. county M.O. and school M.O., Herefordshire.

KATZ, JACOB, M.D. Bratislava, D.P.H.: deputy M.O.H., Accrington.

LOUIS, FRANCIS, M.B. Lond., F.R.C.S.: accident and orthopædic surgeon, Great Western Hospital, Swindon.

PURDIE, A. W., M.B. Glasg., F.R.F.P.S., M.R.C.O.G.: obstetrician, North Middlesex County Hospital, Edmonton.

ROSE, MURIEL, M.B. Lond., M.R.C.O.G.: obstetrician, Redhill County Hospital, Edgware.

SHAW, C. H., M.B. Lond.: asst. M.O.H., Rotherham.

THORBURN, A. L., M.D. Belf., D.P.H.: senior asst. M.O., East Riding, Yorks.

TURNEY, H. F., D.M. Oxfd, M.R.C.P.: physician i.c. department of physical medicine, Southend-on-Sea General Hospital.

London County Council Mental Health Service:

Asst. medical officers:

- **AMINOFF, JACK**, M.R.C.S.: Friern Hospital, New Southgate.
- **ANNEAR, M. W.**, M.R.C.S.: Cane Hill Hospital, Coulsdon.
- **JONES, R. M.**, M.B. Camb.: Banstead Hospital, Sutton.
- **MAY, P. R. A.**, M.B. Camb.: Bexley Hospital, Bexley.

Royal Berkshire Hospital, Reading:

- **EVANS, W. G.**, M.B. Lond., D.M.R.T.: director of radiotherapy department.
- **HOOPER, A. N.**, M.B. Camb., F.R.C.S.: obstetrician and gynæcologist.
- **WILLIAMS, R. H. H.**, M.B. Camb., F.R.C.S.E.: aural surgeon.

Royal Victoria Infirmary, Newcastle-upon-Tyne:

- **BLACK, J. I. M.**, M.D. Durh., F.R.C.S.: asst. surgeon to throat, nose, and ear department.
- **BRUMWELL, JOHN**, M.B. Durh., F.R.C.S.: surgeon.
- **DAVISON, GEORGE**, M.D. Durh., M.R.C.P., D.C.H.: associate physician, children's department.
- **DEWAR, H. A.**, M.D. Durh., M.R.C.P.: asst. physician.
- **GREEN, C. A.**, M.D., PH.D. Edin., D.P.H.: clinical bacteriologist.
- **HOUSTON, B. D.**, M.B. Durh., D.M.R.: asst. radiologist.
- **HUNTER, WILLIAM**, M.D. Durh., M.R.C.O.G.: associate surgeon, gynæcological department.
- **JONES, J. D. T.**, M.S. Durh., F.R.C.S.: asst. surgeon.
- **LAKE, L. H.**, M.B. Durh., D.O.M.S.: asst. surgeon, ophthalmic department.
- **MILLER, H. G.**, M.D. Durh., M.R.C.P., D.P.M.: asst. physician.
- **MILLER, J. F. W.**, M.D. Durh., M.R.C.P., D.C.H.: associate physician, children's department.
- **PASK, E. A.**, O.B.E., M.B. Camb., D.A.: head of department of anæsthetics.
- **RANKEN, MARGARET**, M.B. Durh.: associate surgeon, ophthalmic department.
- **REID, J. L.**, B.M. Oxfd, D.L.O.: asst surgeon, throat, nose, and ear department.
- **ROSE, J. D.**, M.B. Durh., F.R.C.S.: asst. surgeon.
- **STABLER, F. E.**, M.D. Durh., F.R.C.S., F.R.C.O.G.: asst. surgeon, gynæcological department.
- **WAY, S. A.**, M.R.C.S., M.R.C.O.G.: associate surgeon, gynæcological department.
- **WRIGHT, ELSIE**, M.D. Lond.: associate physician, children's department.

MEDICAL DIRECTORY

This invaluable work[1] has undergone an operation in its 3rd year. It had become so unwieldy that it has been eatly bisected to produce two volumes of equal size. Part I ntains London and the Provinces as far as most of the ay through S. One wonders what the arguments were gainst two volumes of unequal size, part I to contain London nd the whole of the Provinces. For ready reference one ill have to memorise either the name at the end of part I r that at the beginning of part II. All the usual helpful atures of this directory are still present.

ART IN MEDICINE

To achieve a faithful record of what he sees, the artist eeds a keen eye and unflagging self-discipline; for the atural impulse is to emphasise and interpret, thus clouding ctuality—for better or worse. This temptation has been hunned by Miss Anna Zinkeisen in most of her medical ictures, which are being exhibited at Foyle's bookshop in haring Cross Road. The exhibition, which remains open ill June 19, shows how ably Miss Zinkeisen has fulfilled her ask as artist to St. Mary's Hospital, Paddington. Whether howing the brave improvisation of the first-aid station, the ustle of the casualty department, or the surgical team at ork in the theatre, Miss Zinkeisen paints with restraint and cute observation. Despite good use of colour, these might ot be comfortable works to live with—the precision of detail nd the artist's personal unobtrusiveness make for a rather rittle coldness—but they should not be lost to the record. Less formal drawings of air-raid casualties are alive with the ictims' sense of bewilderment and shock; and, in lighter ein, some outpatient studies are good entertainment. The xhibition includes pathological drawings lent by the Royal ollege of Surgeons. These prove that, whatever the merits f photography, the artist retains a place in this field. The everal hospitals which are said to be toying with the idea of ppointing artists will find fresh impetus in Miss Zinkeisen's ork; but whether they will find artists with Miss Zinkeisen's are qualities is another matter.

"FAMILY"

As a topic, family life has never been exhausted; and a new magazine,[2] edited by Crystal Herbert in consultation with the Family Relations Group, confidently undertakes to talk of nothing else. The first issue, prefaced by the good wishes of Lord Horder, as chairman of the group, merely opens the windows on the limitless prospect. It tells of home life in a prefabricated house, of the management of adolescence (both by the sufferer and those about him), of home life in Russia, of education weeks when fathers can visit the schools of their children and see what goes on, of music for children, of keeping the doctor away, of the Coventry Health Club and their plan for a family colony, of broadcasting in the children's hour, and of Parliament and the family. There are also some good pages on household equipment, new books for parents and likely books for children, and a journal of the editor's own family living in a Kentish village. Plenty of line drawings and some pleasant photographs lead the reader on, to his profit.

DUTIES OF THE PRACTICAL NURSE

Some weeks ago we referred to an analysis[3] made in America of the duties of the practical nurse. It showed that this type of nurse—who corresponds in many ways to our assistant nurse—can relieve the fully trained nurse of a great number of duties which call for common sense, kindness, and good manners rather than great technical knowledge. We have since received a much more comprehensive analysis[4] of practical nursing, with suggestions for training programmes. This has been drawn up by a working committee made up of representatives of interested bodies in the fields of education, nursing, and the health services. The analysis is exceedingly detailed, covering 120 pages of the stout report; it represents the best American professional judgment on the duties which may be fittingly undertaken by practical nurses, and is recommended in the foreword as an authoritative source of information for the development of an acceptable curriculum.

Though American hospital conditions differ in many ways from ours, in all important respects they are similar, and a study of this analysis will interest all who have to plan training courses for either assistant or State-registered nurses. Besides showing how much a fully qualified nurse could safely leave to a properly trained assistant, it enumerates as practical nursing duties some tasks which are at present ignored in our hospitals or may be undertaken at random by the sister, nurse, student, or orderly, or in some instances by the ward-maid. These include such things as regulation of light, ward temperature, and ventilation, care of ward cleaning equipment and its use, care of refrigerators, care of hearing-aids, prostheses, and colostomy belts, and the arrangement of menus and preparation of various types of food—such as cooked and uncooked fruit, hot and cold drinks, fresh and frozen vegetables, salads, and salad dressings.

At the technical end of her scale of duties, the practical nurse is expected to be able to give various types of enema, to apply first aid, to look after the patient's mouth, bowels, fingernails and toenails, and corns and callouses, to apply poultices and insert suppositories, to take temperatures and examine urines, look after the incontinent patient, give baths, give injections, prepare special diets, feed infants, and apply bandages. Evidently the committee see the practical nurse as an all-round capable woman willing to do anything within her scope to make the patient comfortable.

It is interesting that the report, though it includes some thoughts on planning the curriculum, gives no outline of a theoretical course designed to accompany this practical training. Clearly the committee put practice a long way ahead of theory in the training of this type of nurse.

ALL ABOUT THE CANTEEN

The Industrial Welfare Society have published a 6th edition of their best-seller, *Canteens in Industry*.[1] This guide to planning, management, and service has proved its worth. Well illustrated, with plenty of facts and figures, it should supply all the information needed by firms setting up new canteens or determined to improve old ones. The facts given are based on the practical experience of canteen managers and others. Besides new plans of canteens of different sizes, the book contains much about premises, methods of service, finance, staff, food and diet, and legal aspects.

VITAMIN SUPPLEMENTS

The Ministry of Food now issues three vitamin preparations for children and expectant mothers in quantities which will provide the following supplements:

Preparation	*Issued to*	*Daily supplement*
Concentrated orange juice	Expectant mothers ..	Vitamin C 40 mg.
	Infants under 6 months	„ 13 mg.
	Children between 6 months and school age	„ 26 mg.
Cod-liver oil compound	Preschool children and expectant mothers	Vitamin A 4000 I.U. Vitamin D 700 I.U.
Chocolate-coated vitamin A and D tablets	Expectant mothers ..	Vitamin A 4000 I.U. Vitamin D 800 I.U. Calc. phosph. *B.P.* 250 mg. Pot. iodide 0·13 mg.

A charge of 5*d*. per bottle is made for the orange juice when the applicant can afford this; otherwise all the preparations are free. The Ministry's announcement in our advertisement columns gives further particulars.

Woman Health Minister

Miss Mabel Howard, the new minister of health for New Zealand, is the first woman to be appointed to the New Zealand cabinet.

Civic Honour for Dr. C. W. Buckley

On May 30 the freedom of the borough of Buxton was conferred on Dr. C. W. Buckley in recognition of his services to the town for more than 40 years. Dr. Buckley, who became physician to the Devonshire Royal Hospital in 1912, is an alderman of the borough.

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[1] *The Medical Directory 1947.* London: J. & A. Churchill. 1947. Pp. c + 2590. 63*s*.

[2] Family. Published (for the present) quarterly from 1, Dorset Buildings, Salisbury Square, London, E.C.4. 1*s*. 3*d*. per copy. 5*s*. per year.

[3] *Lancet*, March 29, p. 410.

[4] Practical Nursing. Federal Security Agency Office of Education. U.S. Government Printing Office, Washington, D.C. Pp. 144. 55 cents.

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[1] Published by the society, 14, Hobart Place, Westminster, S.W.1. Pp. 90. 4*s*. 6*d*.

University of Oxford

On July 26 the honorary degree of D.SC. will be conferred on Dr. A. E. Barclay.

Royal College of Physicians of London

On Tuesday and Thursday, July 15 and 17, Prof. P. C. P. Cloake will deliver the Humphry Davy Rolleston lectures at the college, Pall Mall East, S.W.1. He will speak on the Treatment of Disseminated Sclerosis by Artificial Pyrexia and Prolonged Administration of Arsenic.

London Blood Transfusion Service

The headquarters of the Greater London Blood Transfusion Service are now at 10, Collingham Road, S.W.5 (Frobisher 6477).

Research Defence Society

On Tuesday, June 17, at 3.15 P.M., at 26, Portland Place, London, W.1, Prof. G. H. Wooldridge, F.R.C.V.S., will deliver the Stephen Paget lecture on What Animals Owe to Experimental Research.

Passano Foundation Award

On June 12 in Atlantic City this award for 1947 will be presented to Mr. Selman A. Waksman, microbiologist at the New Jersey Agricultural Experiment Station, by Mr. Robert S. Gill, president of the Williams & Wilkins Company and of the foundation. Mr. Waksman will afterwards give an address on Antibiotics and Tuberculosis—a Microbiological Approach.

Royal Medical Foundation of Epsom College

Henry Duncalfe annuities of £30 p.a. each for spinsters in need of help will shortly be awarded by the council. Candidates must be daughters of registered medical practitioners and must have attained the age of 50. Pensions for impecunious doctors or their widows, and scholarships for their sons, are also available from the funds of the foundation. Forms of application may be had from the secretary, Epsom College, Surrey.

Hospital for Sick Children, Great Ormond Street

Members of the consulting staff of the hospital will in future see outpatients only by appointment. Appointments, which should be made by the patient's own doctor, preferably in writing, may be made for any time between 9.30 A.M. and 12.30 P.M. except on Sundays. Patients who attend without an introduction from a doctor will be examined in the receiving-room and only when necessary referred to a consultant.

Society for Relief of Widows and Orphans of Medical Men

The annual general meeting of the society was held on May 21, with Dr. R. A. Young, the president, in the chair. The resignation of Dr. Blackett was received, and in appreciation of his services as secretary for over 40 years he was elected a vice-president. During 1946 £4950 was distributed to the 52 widows who are beneficiaries. The membership of the society is now 281, of whom 160 are life members and 121 are ordinary members. Further particulars may be had from the secretary, 11, Chandos Street, London, W.1.

Central Drugs Laboratory for India

Under the Drugs Act the Biochemical Standardisation Laboratory at 10, Chittaranjan Avenue, Calcutta, has been constituted as the Central Drugs Laboratory. Its functions will include: (1) the analysis of samples submitted by customs collectors and courts of law, and (2) the granting of certificates of registration for patent and proprietary medicines with undisclosed formulæ. The Drugs Act and rules came into force on April 1, except the provisions for the registration of patent and proprietary medicines, which are to take effect on April 1, 1948.

British Empire Leprosy Relief Association

Dr. Gordon Ryrie has been appointed medical secretary of the association in succession to Dr. Ernest Muir who has retired.

Dr. Ryrie, who graduated M.B. at the University of Edinburgh in 1926, joined the Colonial Medical Service in Malaya two years later. He was appointed superintendent of Sungei Buloh Leper Hospital in 1930, where he remained until the end of 1945. During the Japanese occupation Dr. Ryrie organised his settlement as a base for aiding our troops, guiding them in the jungle and sending food and medical supplies. In January, 1944, the Japs became suspicious, and they put him in prison, later sending him to a labour camp where he remained until the liberation. Immediately after VJ-day, though in poor health, he resumed his work at the Sungei Buloh Hospital until the autumn of 1945 when he returned to England.

Society for Endocrinology

The following officers of this society have been el chairman, Mr. A. S. Parkes, SC.D., F.R.S.; secretary, Mr. S. Folley, PH.D.; treasurer, Mr. C. W. Emmens, PH.D.; of the *Proceedings*, Prof. S. Zuckerman, F.R.S.; members committee, Dr. P. M. F. Bishop, Dr. C. H. Gray, Mr. P. Williams, Prof. F. G. Young, D.SC.

Return to Practice

The Central Medical War Committee announces that Harold Park, F.R.C.S., has resumed civilian practice 40, Wilbury Road, Hove, 3, Sussex.

Foreign Awards

The following decorations have been conferred on R.A.M.C. officers in recognition of distinguished services in the cause of the Allies:

UNITED STATES

Legion of Merit.—Major-General W. C. Hartgill, C.B., M.C., K.H.S. (commander); Brigadier D. B. McGrigor, O.B.E. (officer).

Bronze Star Medal.—Lieut.-Colonel A. J. King, Major H. G. McQuade.

BELGIUM

Croix de Guerre 1940 *with Palms.*—Captain R. L. Rees.

CZECHOSLOVAKIA

Order of the White Lion (*3rd Class*).—Major-General Sir Henry Tidy, K.B.E.

Medal for Merit (*1st Class*).—Lieut.-Colonel Henry Ross, C.I.E., I.M.S.

Appointments

BALL, MARGARET, M.B. Camb., M.R.C.P.: asst. physician, the Elizabeth Garrett Anderson Hospital, London.

BRASH, DAVID, M.B. Glasg., D.M.R.: radiologist, Bolton Royal Infirmary.

BURT, H. A., M.B. Camb., M.R.C.P.: director of department of physical medicine, University College Hospital, London.

BYARS, J. R., M.B. Aberd., D.P.H.: senior asst. county and school M.O., Leicestershire.

DAVIES, I. G., M.D. Lond., M.R.C.P., D.P.H.: M.O.H. and school M.O., Leeds.

DOYLE, W. J., M.B. N.U.I., D.P.H.: deputy county M.O.H., Devon.

GEOHEGAN, V. P., M.B. Leeds, D.P.H.: deputy M.O.H., Weston-super-Mare.

HEWITT, SELWYN, M.B. Durh., B.HY., D.P.H.: senior asst. county M.O. and school M.O., Herefordshire.

KATZ, JACOB, M.D. Bratislava, D.P.H.: deputy M.O.H., Accrington.

LOUIS, FRANCIS, M.B. Lond., F.R.C.S.: accident and orthopædic surgeon, Great Western Hospital, Swindon.

PURDIE, A. W., M.B. Glasg., F.R.F.P.S., M.R.C.O.G.: obstetrician, North Middlesex County Hospital, Edmonton.

ROSE, MURIEL, M.B. Lond., M.R.C.O.G.: obstetrician, Redhill County Hospital, Edgware.

SHAW, C. H., M.B. Lond.: asst. M.O.H., Rotherham.

THORBURN, A. L., M.D. Belf., D.P.H.: senior asst. M.O., East Riding, Yorks.

TURNEY, H. F., D.M. Oxfd, M.R.C.P.: physician i.c. department of physical medicine, Southend-on-Sea General Hospital.

London County Council Mental Health Service:

Asst. medical officers:

AMINOFF, JACK, M.R.C.S.: Friern Hospital, New Southgate.

ANNEAR, M. W., M.R.C.S.: Cane Hill Hospital, Coulsdon.

JONES, R. M., M.B. Camb.: Banstead Hospital, Sutton.

MAY, P. R. A., M.B. Camb.: Bexley Hospital, Bexley.

Royal Berkshire Hospital, Reading:

EVANS, W. G., M.B. Lond., D.M.R.T.: director of radiotherapy department.

HOOPER, A. N., M.B. Camb., F.R.C.S.: obstetrician and gynæcologist.

WILLIAMS, R. H. H., M.B. Camb., F.R.C.S.E.: aural surgeon.

Royal Victoria Infirmary, Newcastle-upon-Tyne:

BLACK, J. I. M., M.D. Durh., F.R.C.S.: asst. surgeon to throat, nose, and ear department.

BRUMWELL, JOHN, M.B. Durh., F.R.C.S.: surgeon.

DAVISON, GEORGE, M.D. Durh., M.R.C.P., D.C.H.: associate physician, children's department.

DEWAR, H. A., M.D. Durh., M.R.C.P.: asst. physician.

GREEN, C. A., M.D., PH.D. Edin., D.P.H.: clinical bacteriologist.

HOUSTON, B. D., M.B. Durh., D.M.R.: asst. radiologist.

HUNTER, WILLIAM, M.D. Durh., M.R.C.O.G.: associate surgeon, gynæcological department.

JONES, J. D. T., M.S. Durh., F.R.C.S.: asst. surgeon.

LAKE, L. H., M.B. Durh., D.O.M.S.: asst. surgeon, ophthalmic department.

MILLER, H. G., M.D. Durh., M.R.C.P., D.P.M.: asst. physician.

MILLER, J. F. W., M.D. Durh., M.R.C.P., D.C.H.: associate physician, children's department.

PASK, E. A., O.B.E., M.B. Camb., D.A.: head of department of anæsthetics.

RANKEN, MARGARET, M.B. Durh.: associate surgeon, ophthalmic department.

REID, J. L., B.M. Oxfd, D.L.O.: asst. surgeon, throat, nose, and ear department.

ROSE, J. D., M.B. Durh., F.R.C.S.: asst. surgeon.

STABLER, F. E., M.D. Durh., F.R.C.S., F.R.C.O.G.: asst. surgeon, gynæcological department.

WAY, S. A., M.R.C.S., M.R.C.O.G.: associate surgeon, gynæcological department.

WRIGHT, ELSIE, M.D. Lond.: associate physician, children's department.

THE CLINICIAN AND THE RH FACTOR*

Sir Leonard Parsons
M.D. Lond., F.R.C.P., F.R.C.O.G.
EMERITUS PROFESSOR OF PÆDIATRICS IN THE UNIVERSITY OF BIRMINGHAM

During the last five or six years research into the genetics and serology of the Rh factor has so completely monopolised the stage that there has been a tendency to overlook the important contributions which clinicians have made to our knowledge of the disorders due to it. Moreover, even when their work is acknowledged, little credit is given to British pædiatricians. Thus, in his lecture to this faculty on "The significance of the Rh factor in medicine and obstetrics," in 1944, Prof. D. F. Cappell did not give a single reference to the work of a British clinician. The present lecture is therefore, in great part, a plea for the recognition of the work of British pædiatricians, particularly that of some of my colleagues. My thesis is that the conception and proof that "erythroblastosis" is a hæmolytic disease was chiefly the work of the Birmingham school of pædiatrics; a fact which has been generously recognised by Professor Cappell (1946) in his most recent papers. The actual factor causing the hæmolysis—the Rh antibody—was demonstrated by American workers in a series of brilliant observations, and the demonstration of the various subgroups of the Rh factor and the explanation of seeming inconsistencies in its action have been the work of British and American serologists.

HISTORY OF HÆMOLYTIC DISEASE

In view of my claim for the Birmingham school of pædiatrics it is not without interest that the first description of icterus gravis was in a report published in 1902 on "A family series of fatal and dangerous cases of icterus neonatorum—fourteen cases in one family with four survivors," by Dr. J. A. Arkwright, who practised at Halesowen within five miles of the Children's Hospital, Birmingham. A description of another "Series of cases of jaundice in the fœtus" was published in the same year, but in 1905 a contribution appeared which was even more interesting than Arkwright's paper, since it was written by Dr. G. A. Auden, who later became physician in charge of the psychiatric department of the Birmingham Children's Hospital. This paper bore the title "A series of fatal cases of jaundice in the newborn occurring in successive pregnancies," and the description of the clinical characteristics of the condition is so accurate that it might have been written yesterday. He summed them up as follows:

(1) The appearance of the disease in successive children of the same parents.

(2) The rapid development within a few hours of birth of a jaundice which quickly became profound.

(3) The occurrence of a generally drowsy condition which usually ended in convulsions, terminating fatally.

(4) The severe anæmia, which became more and more marked as the colour of the jaundice waned, and which persisted for a lengthy period in those affected children who survived.

(5) The "hepatogenous" characteristics of the jaundice and absence of any form of hæmorrhage.

He even thought it probable that a stillborn child and two abortions in the same family were due to the same cause which produced the jaundice in the children born alive. This remarkable little paper is indeed a veritable clinical cameo. A paper by Dienst, of historical interest, was also published in 1905 in which he stated that "eclampsia is nothing but a transfusion of incompatible blood of the child into the mother's circulation as a result of a communication between the two," and suggested that the same process might take place in the child if the mother's blood gained access to it.

Pfannenstiel first used the term icterus gravis in 1908, and a year later Buchan and Comrie described extramedullary hæmopoiesis in association with it, a combination to which in 1912 Rautmann gave the name of erythroblastosis. There was no further paper of importance until 1920, when the late Sir Humphry Rolleston, who thought that the disease was due to "fœtal toxæmia of maternal origin," reviewed 130 cases of "grave familial jaundice of the newly born" with a case-mortality of 77%. In 1923 Ottenberg, recalling Dienst's paper on eclampsia, said that it seemed possible that jaundice of the newborn "may be due to the same cause, accidental placental transfusion of incompatible blood," but produced no evidence in support of his theory.

Six years later Hampson propounded a view which was a complete reversal of this theory. He thought that the hæmolysis which, since red blood-cells are not immortal, constantly occurs in intra- and extra-uterine life was kept in check during fœtal life by something produced by the mother and passed on to the fœtus, and after birth produced by the baby. This "something" limited the hæmolysis at birth to the production of physiological jaundice; but, if it were absent or diminished before or after birth, hæmolysis proceeded unchecked, producing severe jaundice and anæmia. Further, he maintained that this hæmolysis could be prevented by the injection of blood-serum into the baby because, whereas before the adoption of this treatment 75 out of 90 cases in the families of his patients died, after its adoption 17 out of 18 recovered. In the same year Goldbloom and Gottlieb showed that the hæmolysis at birth, which always produced bilirubinæmia and sometimes also physiological jaundice, was due to the postnatal readjustment from an environment which required polycythæmia for adequate oxygenation to one in which polycythæmia was not necessary.

Stimulated by Hampson's work and by the researches on nutritional anæmia of Elvejhem in America and Helen Mackay in England, we began in 1930 investigations into the anæmias of infancy and childhood which are still in progress, and in 1933 I was able to write as follows:

> "Sometimes in the newborn child hæmolysis is severe and unchecked and a profound anæmia of the hæmolytic type develops within a few days of birth. This form of hæmolysis occurs in familial icterus gravis. As a result the bone-marrow is stimulated and the extramedullary centres of the erythron recalled into activity, and a form of erythroblastosis of the newborn is produced."

Two years previously Burnham and Sanford in America had again put forward the view that the grave familial jaundice of newborn infants was due to the persistence of a phenomenon of fœtal life—erythroblastosis—and in 1932 this theory was elaborated by Diamond, Blackfan, and Baty, of the Boston school, with the result that icterus gravis became widely known as erythroblastosis.

The next important advance in our knowledge was the almost simultaneous demonstration by workers in Boston and in Birmingham that hydrops fœtalis, icterus gravis, and hæmolytic anæmia of the newborn were different manifestations of the same underlying condition. The Boston school believed that this underlying condition was a primary erythroblastosis, whereas my colleagues and I (1933) were convinced that the primary factor in the disease was hæmolysis and that the erythroblastosis was a compensatory mechanism, being in fact an attempt, by reverting to a fœtal type of erythropoiesis, to elaborate more red cells to take the place of those destroyed. Moreover, we maintained that the agent which destroyed the red cells often also affected the hæmopoietic centres—i.e., the whole of the erythron—and that the resulting

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* A lecture delivered before the Royal Faculty of Physicians and [illegible] 19, 1947.

recovery stages; moreover it may be found in other conditions, such as syphilis and sepsis, or even in the ormal full-time baby at birth. Syphilis and sepsis may fact present every clinical and hæmatological sign icterus gravis, even indeed kernicterus.

PROGNOSIS

Death is the inevitable outcome of hydrops, whereas fter appropriate treatment complete recovery usually ccurs in hæmolytic anæmia of the newborn, except on hese extremely rare occasions when after the acute hase a hypoblastic anæmia develops which may last any months. In icterus gravis recovery may now be xpected in about 70% of patients, but some of these, ariously estimated at 5–15%, will develop severe cerebral ymptoms, and a smaller proportion cirrhosis of the liver. t is usually impossible to say in any given case of icterus ravis that cerebral symptoms will develop; this is nfortunate because, were it possible, it would surely e justifiable to withhold treatment in the hope that the hild would die. Rarely in those babies who have ernicterus there is rigidity and even opisthotonos, and should be afraid that a baby who had convulsions would ater show cerebral symptoms. I also think a high-itched cry suggests kernicterus. Rigidity may be first oticed at the age of six months, especially if the baby as an intercurrent infection.

PATHOGENESIS

At one time we thought that biliary obstruction by viscid bile produced by a rapid hæmolysis was the cause of the guinea-gold obstructive type of jaundice seen in icterus gravis, which differed so much in appearance from the lemon tint usually seen in hæmolytic anæmia, though it seemed obvious that sometimes also another factor was present which produced the necrosis of the liver which we found at necropsy. We did not pay sufficient attention to the fact that in hæmolytic anæmia of the newborn there was only a minimal amount of jaundice, though the degree of hæmolysis was much greater than in icterus gravis. We now know that, though mechanical obstruction may play a small part, the jaundice is in the main due to the pathological action of the Rh antibodies on the liver cells. Wiener (1946a) maintains that the liver damage is due to the plugging of the smaller arterioles by agglutination thrombi produced by the combination of maternal Rh agglutinins (bivalent antibodies) with the Rh-positive red cells of the fœtus. He also holds that the plugging of terminal vessels in the brain produces ischæmic infarcts and kernicterus, and that a similar process in the marrow acts as an irritant to the marrow and causes erythroblastæmia. Whether Wiener's views or ours are correct, two facts in addition to necrosis of the liver cells show that the injury to these cells is the primary cause of the jaundice: (1) my colleagues Dr. A. R. Meyer and Dr. E. M. Hickmans (1945) have shown that the cholesterol partition in the liver in icterus gravis is abnormal; and (2) biliary cirrhosis sometimes appears as a late sequel to icterus gravis in exactly the same way as it occurs at times after an attack of infective hepatitis. Henderson (1942) has reported biliary cirrhosis in macerated fœtuses the subjects of icterus gravis, but we have only occasionally found an increase in reticulin fibres, and the appearance within the lobules of fibres staining with van Gieson's stain, in children who have died before the 8th day, though cirrhotic changes have not been uncommon in children dying at a later stage.

The staining of the nuclear masses in the brain in association with neonatal jaundice was first described by Orth in 1875 and called kernicterus by Schmorl in 1904. These cerebral changes are thought by some observers to be due to fixation of antibody in the nerve-cells similar to the process which I have described in the liver, but probably neither this nor ischæmic infarction is the correct explanation. In our view the changes are the result of liver damage—a hepatic encephalopathy not unlike that which occurs in progressive lenticular degeneration, though there is probably no connexion between the Rh factor and Wilson's disease. The evidence in favour of our theory is as follows:

(1) After careful search my colleague Dr. Baar has never found occlusion of blood-vessels by agglutination thrombi in kernicterus, though hyaline thrombi such as occur in a variety of diseases have been found occasionally.

(2) We have observed kernicterus in two jaundiced babies in whom iso-immunisation by the Rh factor was excluded by serological tests.

(3) The occurrence of miliary necrosis in the liver in an infant associated with histological changes in the brain similar to those in kernicterus but without any bile staining (Baar 1946).

In our view the sequence of events in kernicterus is an antigen-antibody reaction between the liver cells and the Rh antibody, resulting in necrosis of the liver cells, which is followed by necrosis of the brain cells, and these necrosed cells then become stained by the bile pigment. Kernicterus,. therefore, is not due to hæmolysis, and we have never found any parallelism between, on the one hand, the degree of hæmolysis and, on the other, the severity of the jaundice and the presence of kernicterus.

In this connexion, the differing manifestations of hæmolytic disease of the newborn in what were apparently identical twin boys are interesting. Since at birth their weights were almost equal it is reasonable to suppose they received an equal share of antibodies, yet one was more severely jaundiced but less anæmic than the other, had a mild degree of kernicterus, and when his incisor teeth erupted the enamel was coloured green, whereas his brother had neither of these conditions. Staining of the temporary teeth, usually the incisors, is one of the rare sequels of icterus gravis, its incidence being considerably less than that of biliary cirrhosis. There is no evidence of the premature death of the enamel cells, and the condition is probably linked with the severity of the jaundice, comparable with extensive staining of the bones by bile which I have seen in a severe case of icterus gravis.

Wiener states that plugging of the vessels in the liver and brain does not occur in hæmolytic anæmia of the newborn or in hydrops fœtalis, but that the changes in those conditions are due to blocking antibodies or glutinins. Thus, if the maternal serum contains these blocking antibodies in small amounts, the child is either born anæmic or develops anæmia shortly after birth; but, when larger quantities are present, the process progresses further in utero until the anæmia is so severe that œdema develops through anoxæmia of the capillary wall (hydrops).

Now, as we have seen, he has said that erythroblastæmia is caused by agglutination thrombi in the smaller arterioles in the bone-marrow which have been formed by the action of bivalent antibodies on the red cells; yet erythroblastæmia may occur in the normal newborn baby and is often present in hæmolytic anæmia of the newborn in which, according to him, this plugging of vessels does not take place.

Though his explanation of erythroblastæmia therefore appears illogical, Wiener's theories are of considerable importance in explaining certain diagnostic tests and because of the treatment based on them. He assumes that the bivalent agglutinins combine with the antigens on the surface of the red cell and form a lattice, each agglutinin binding two cells together, and therefore clumping occurs in any medium, saline or serum. Blocking antibodies or glutinins are presumed to be smaller and therefore able to traverse the placenta more readily than bivalent antibodies and to be univalent, since they

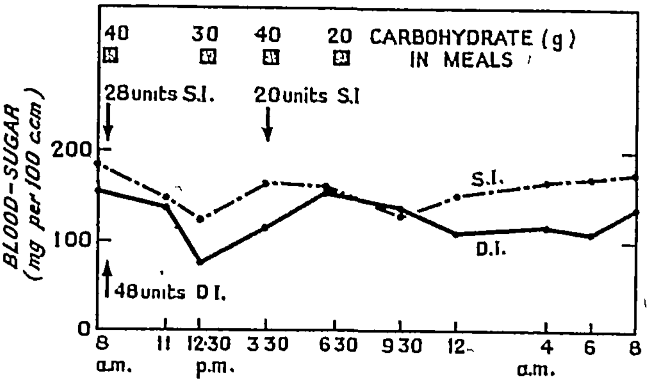

Fig. 3—Blood-sugar responses to a single dose of D.I. 48 units and to two doses of S.I. (28 and 20 units) in case 1.

Case 2.—A man, aged 44 years, weight 9 st. 7 lb., diabetic for 16 years. S.I. 24 units twice daily covered diet of carbohydrate 140 g., protein 80 g., and fat 100 g. Fasting blood-sugar 88–143 mg. per 100 c.cm.; urinary sugar 0–6 g. in 24 hours. Single dose of D.I. 48 units before breakfast for 4 weeks gave a variable response; fasting blood-sugar 180–268 mg. per 100 c.cm.; urinary sugar 7–35 g. in 24 hours. Returned to S.I.

The remaining 6 patients, who were given single doses of D.I. ranging from 50 to 108 units, all showed consistently a similar type of response. The blood-sugar level fell to reach hypoglycæmic levels 3–8 hours after the injection. Despite lunch and tea, low or normal levels were maintained until about the 11th hour, when supper was given. Thereafter, in all but 2 patients, a progressive hyperglycæmia ensued, to give a high fasting value next morning (fig. 4). In 2 patients the insulin action was sufficiently prolonged to deal with the carbohydrate at supper, and seemed to last for 16 hours (fig. 5, single-dose curve).

It is thus obvious that D.I., in single doses of 50 units or more, acts too strongly 3–8 hours after injection, often cannot deal with the carbohydrate at supper (11 hours after injection), and cannot prevent nocturnal hyperglycæmia.

Subsequently, in 4 of these patients and in 1 other who was not tried on a single dose, we divided the dose of D.I., giving 50–75% before breakfast and the remainder before supper. The blood-sugar was estimated 24-hourly for 2–3 days. The effect was satisfactory in 4 cases as regards the 24-hour excretion of sugar and the absence of hypoglycæmia; but the blood-sugar, though well controlled during the day and part of the night, rose in the hours before breakfast (fig. 5, two-dose curve). An attempt to obtain a fasting blood-sugar of 100–200 mg. per 100 c.cm. by giving a sufficiently large evening dose caused hypoglycæmia during the night, despite extra carbohydrate given at 10 P.M. Case 3 illustrates the improved control obtained by dividing the large dose of D.I.

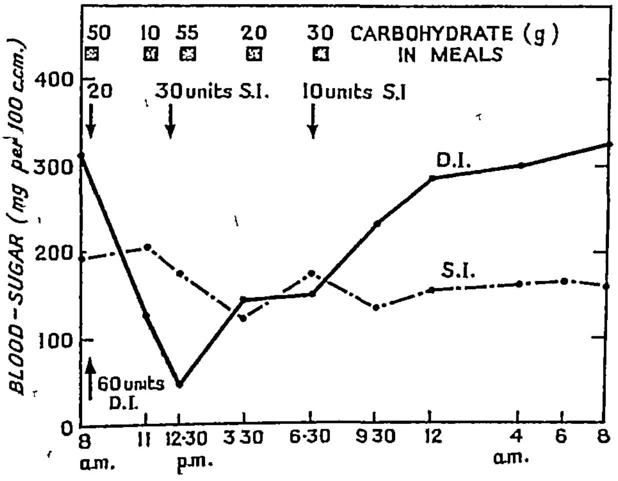

Fig. 4—Blood-sugar responses to repeated injections of S.I. and to a single injection of D.I. Note hypoglycæmia at 12.30 p.m. and lack of control from 6.30 p.m. onwards. Urinary sugar on S.I., 0·5 g. daily; on D.I., 12–21 g. daily.

Case 3.—A man, aged 65 years, weight 9 st. 2 lb., diabetic for 4 years. Diet: carbohydrate 140 g., protein 90 g., and fat 100 g. Three doses of S.I. (20, 10, and 20 units) gave fasting blood-sugar levels of 182–234 mg. per 100 c.cm.; urinary sugar 3–8 g. in 24 hours.

On a single dose of D.I. 50 units before breakfast: fasting blood-sugar 250–324 mg. per 100 c.cm.; urinary sugar 10–21 g. in 24 hours; hypoglycæmia between lunch and tea.

On two doses of D.I., 36 units before breakfast and 20 units before supper: fasting blood-sugar 193–290 mg. per 100 c.cm.; urinary sugar 1–6 g. in 24 hours (fig. 5).

In the patient who did not do well on D.I., each dose of 50 units (before breakfast and tea) acted well for 6 hours but was spent by 8 hours. On substituting S.I. for D.I. a similar duration of action was obtained.

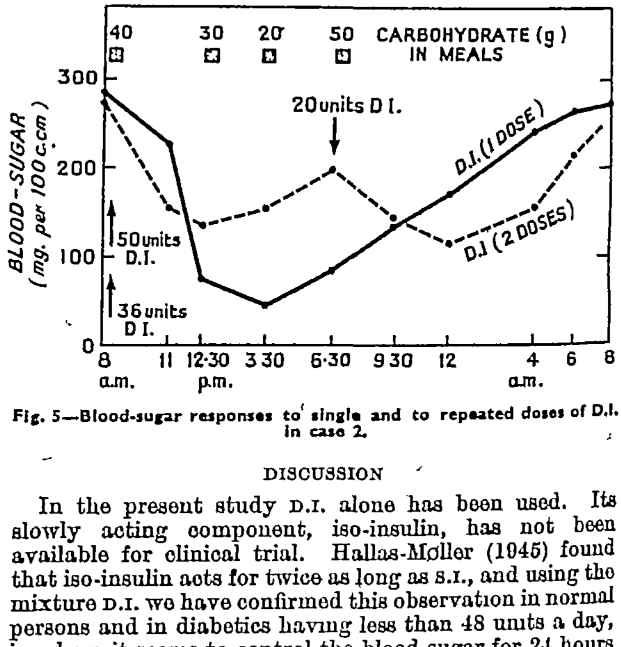

Fig. 5—Blood-sugar responses to single and to repeated doses of D.I. in case 2.

DISCUSSION

In the present study D.I. alone has been used. Its slowly acting component, iso-insulin, has not been available for clinical trial. Hallas-Møller (1945) found that iso-insulin acts for twice as long as S.I., and using the mixture D.I. we have confirmed this observation in normal persons and in diabetics having less than 48 units a day, in whom it seems to control the blood-sugar for 24 hours (fig. 3). But with doses of D.I. larger than 48 units the prolonged action of the iso-insulin component is not always seen (fig. 4). Indeed in some instances the duration of action of D.I. seems to be little greater than that of S.I. Of 7 patients having 50 units or more, in 2 only did the effect last for 16 hours; in the others, 8–12 hours.

This unexpectedly short action of D.I. in large doses is often, though not always, associated with symptoms of hypoglycæmia 3–8 hours after injection. Possibly the compensatory glycogenolysis plus the carbohydrate of the later meals may produce a hyperglycæmia which cannot be dealt with by the iso-insulin component. This may explain most cases where the long action of iso-insulin is not evident; and it indicates, we think, a fault in the D.I. mixture—i.e., that the S.I. content is too high. In some patients, however, who had neither clinical nor biochemical hypoglycæmia with large doses, the duration of action was still much less than was expected. In his experiments on rabbits Hallas-Møller (1945) found certain animals which showed a S.I.-like effect when given iso-insulin, but in depancreatised dogs and in human diabetics iso-insulin showed only a protracted effect, save in some cases, when hypoglycæmia was induced; the reactionary hyperglycæmia then masked the prolonged action of iso-insulin. *This requires further* lucidation, since some of his results and some of ours ould be interpreted as showing that iso-insulin sometimes as a S.I.-like effect.

As stated above, the proportion of S.I. in D.I. seems nnecessarily high. Since iso-insulin is acting strongly hours after injection, only sufficient S.I. need be present n the mixture to deal with the hyperglycæmia following reakfast. This would diminish the tendency of D.I. to nduce hypoglycæmia 3–8 hours after injection. MacBryde and Roberts (1943) have found 25% S.I. activity in a Z.P.I.-S.I. mixture to be adequate; and, in a short linical trial of a similar mixture which had 23% rapid ction, we obtained satisfactory control of the blood-ugar during the early part of the day in the 4 diabetics who were given the mixture (unpublished work). The difficulty of having such mixtures prepared commercially in this country precluded a more extensive trial.

It thus seems clear that D.I. in its present form is not a satisfactory single-injection preparation for severe diabetes. Single doses of 50 units or more act too strongly 3–8 hours after injection, and too feebly thereafter. These defects may be partly overcome, as Hey (1945) has shown, by dividing the total requirements into two doses. Even with this scheme, in our experience, there is a risk of hypoglycæmia during the night, if the evening dose is sufficiently large to give a satisfactory blood-sugar level before breakfast.

No local or general reactions (save hypoglycæmia) have occurred from D.I. in our patients who have been on D.I. for 2–6 months. At present 6 patients are doing well: 4 are having single doses of 12, 20, 20, and 48 units; the others two daily doses, 40 and 30, followed by 36 and 20 units.

SUMMARY

The effect of di-insulin, which consists of equal parts of soluble insulin and a slowly acting derivative, phenyl-ureido-insulin (iso-insulin), has been tested in 5 normal persons and 12 diabetics.

The protracted effect of the iso-insulin component was demonstrable in the normals and in diabetics requiring less than 50 units of insulin. In the latter a single injection of di-insulin controlled the blood-sugar throughout the 24 hours; but in those requiring 50 units or more one injection of di-insulin was unsatisfactory, producing hypoglycæmia 3–8 hours after injection, and not controlling the blood-sugar in the late evening and during the night. Possible explanations for this are discussed.

The soluble-insulin content in the di-insulin mixture is thought to be too high.

We are greatly indebted to the subjects, both normal and diabetic, who willingly submitted to the frequent blood sampling; to Sisters McNeill, Davidson, Pyper, Ross, and Watson for their coöperation: to Mr. A. McCutcheon for technical assistance; and to the late Prof. Noah Morris for his stimulation and guidance. Our thanks are also due to Novo Terapeutisk Laboratorium, Copenhagen, for ample supplies of di-insulin, which were made available to us through Mr. C. L. Bencard, of London, and Mr. S. Home, of the Corporation Central Drug Store, Glasgow; and to Mr. W. A. Broom, of Boots Pure Drug Co., Ltd., who in 1943 supplied us with special batches of Z.P.I. and S.I., which when mixed gave a known excess of S.I. Part of the expense of this investigation was met by a grant from the Medical Research Council.

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TYPING OF TYPHOID BACILLI WITH Vi BACTERIOPHAGE

SUGGESTIONS FOR ITS STANDARDISATION

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IN 1938 Craigie and Yen reported that different types of *Salmonella typhi* could be identified by means of certain specific Vi-phage preparations. They concluded that the types were stable, and suggested that the phage-typing method might be of value as an epidemiological tool. Subsequent experience has established the value of this method beyond any doubt (for references see Felix 1944, Buckle 1946). So far 24 types or subtypes of *S. typhi* have been identified. The method of Vi-phage typing has been extended by Felix and Callow (1943) to *S. paratyphi B* and *S. typhi-murium*.

The phage-typing method reveals strain differences which cannot be demonstrated by any serological method. Because these strain differences remain unaltered on human passage and, with certain exceptions, on subculture in the laboratory, they provide a means of identification whereby transmission in man may be traced. A carrier may be absolved from responsibility for a given outbreak if he is excreting a strain of *S. typhi* which differs in Vi-phage type from those isolated from the cases. The phage-typing method permits the epidemiologist to trace the connexions between sporadic cases of typhoid, a task that cannot be accomplished without this new laboratory technique. The typing of carrier strains and the recording of carriers and of the Vi-type which each excretes are of obvious value. In all its aspects the phage-typing method conserves time, effort, and expense in epidemiological investigation and the tracing of sources of infection. In the experience of one of us (A. F.) during seven years this method was an indispensable aid to the control of typhoid fever.

Though the practical value of the phage-typing method has been established, all its possibilities have not yet been explored. Any typing scheme recommended at present must be designed to accommodate new types that may be found later in different parts of the world. In this era of quick transport typhoid patients and carriers are constantly moving from one country to another, establishing new foci of infection. Because of the adaptability of the agent used for typing, serious confusion may arise if supposed new types or subtypes are added without complete characterisation of phage preparations prepared locally and used for routine typing purposes.

Obviously provision will have to be made by an authoritative international body, so that reference standards, both cultures of Vi-type strains of *S. typhi* and standard typing-phage preparations, should be available to all using the method. Preparations of Vi-phage II have been preserved in a fluid state for over eight years without detectable alteration or deterioration in activity. This stability provides a potent argument in favour of the adoption of Vi-phage preparations as the ultimate standards of reference. Observations on many strains of *S. typhi*, maintained for years on the best medium available—i.e., Dorset egg medium—have shown that strains of some types may become sensitive to heterologous phage preparations. Examples of this loss of specificity are referred to below. It is clear that preparations of Vi-phage II, not cultures of the type-strains of *S. typhi*, should be selected as the basic reference materials to achieve standardisation of typhoid phage-typing over a maximum of time. Meanwhile a typing scheme is suggested to ensure uniformity of technique and to enable workers in different parts of the world to exchange cultures and phage preparations.†

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* Now a member of the staff of the Imperial Cancer Research Fund, London.

Some aspects of the phage host-cell relationships are of great theoretical interest, but they are far from being completely understood at present. In view of the well-established value of phage-typing, the design and acceptance of a working scheme permitting full use of the method cannot be deferred until the various mechanisms involved have been clarified. Since the practical value of the method lies in its epidemiological application, a scheme for practical use must be based on practical, not theoretical, considerations. The purpose of the method is to determine whether or not any two or more cases of typhoid infection are derived from a common source. Obviously, differences in phage susceptibility which do not represent stable characteristics cannot be accepted for the purposes of a practical epidemiological scheme, though they may be of academic interest. The scheme must be so designed, on the basis of existing knowledge, that the user can interpret type similarities or dissimilarities without hesitation. In other words, a scheme which is to be used as an epidemiological guide must be based primarily on epidemiological evidence.

The epidemiological information which has been accumulated in various countries to date has been carefully considered before proposing the present scheme and making the recommendations which follow. This scheme will have to be extended as new types or subtypes are discovered. The test for the validity of the scheme or any part thereof is its conformity with epidemiological data. Final acceptance of the types and subtypes of the scheme, or of any new types that may be added, must rest on epidemiological evidence.

All the phage preparations used for the identification of the types and subtypes listed in the proposed scheme have been derived from one strain of specific typhoid Vi bacteriophage—i.e., the Vi-phage II (strain 6) described by Craigie and Yen in 1937 and 1938. Though the same scheme might result from the use of another strain of serologically similar adapted Vi-phage, this cannot be assumed a priori. Until extensive comparative investigations have been made, the routine typing of strains of *S. typhi* should be carried out exclusively with the preparations of Vi-phage II giving the reactions specified in the scheme. All these preparations have been subjected to neutralisation tests with serum prepared from the original Vi-phage II, and all were serologically identical.

Even the use for routine purposes of typing preparations made independently by propagation of the type phages received from us should be avoided because of the known risk of accidental contamination of the original Vi-phage II with other strains of bacteriophage. Such an accident may result from airborne contamination in a laboratory where other phage preparations are being handled, or by propagation of Vi-phage II on phage-carrying strains of *S. typhi* that have not been recognised as such. There is also the danger that propagation of Vi-phage II on cultures of certain Vi-types *may lead to* a permanent change in the characteristics and affinity of the phage. For these reasons, new batches of Vi-phage II preparations should be subjected to appropriate tests before being employed in routine typing. Any new lot of phage preparation must meet the minimal requirement that it will produce the reactions specified in the scheme summarised in table II. More extensive tests, based on certain cross-reactions obtained with concentrations of phage greater than the routine test concentration, are necessary if a phage preparation is to be completely defined or a change in differential activity is to be detected. Further, as a safeguard against unsuspected contamination with another bacteriophage, it is recommended that every new preparation of Vi-phage II should be neutralised with specific antiserum

NOTES ON INDIVIDUAL TYPES

The following types and subtypes merit special comment:

Type A.—This occupies an exceptional position in the phage-typing scheme in that it is fully sensitive to all Vi-phage II preparations. Epidemiological observations on numerous groups of cases and related carriers infected with such strains appear to warrant the retention of Type A in the scheme. However, laboratory observations extending over seven years suggest that Type A should be regarded as an infrequent variant of some of the other Vi-types of *S. typhi.*

Type A has been isolated from cultures of strains of Types B_1, C, D_1, F_1, N, O, and T (Craigie 1940, Felix unpublished observations). *Most of these observations have been made on* strains maintained in the laboratory a long time, though occasionally the appearance of Type A has also been noted shortly after isolation.

Of even greater importance, from the point of view of the epidemiologist, is evidence that such a dissociation may occur in chronic carriers of long standing. In one instance

TABLE I—Vi-PHAGE TYPES OF *S. typhi*

Vi-type strain	Date of isolation	Place	References
A B_1 B_2	1937	Prov. of Quebec, Canada	Craigie and Yen (1938)
B_3	1938	Hawick, Scotland	Craigie (1940, 1941)
B_4	..	(now designated Type K)	..
C D_1	1937	Prov. of Quebec, Canada	Craigie and Yen (1938
D_2	1936	Middlesex, England	Craigie and Yen (1938)
D_3	..	(withdrawn; see notes on Types D_3 and N)	..
D_4	1941	Buckinghamshire, England	Felix (1943)
D_5	1942	England (probably imported from India)	Felix (1943)
D_6	1946	England (imported from Middle East)	Felix (unpublished)
E_1	1918	Cherson, Russia	Felix and Pitt (1934) (strain Ty 2); Craigie and Yen (1938)
E_2	1938	Ontario, Canada	Craigie (1939)
F_1	1900	England (probably imported from S. Africa)	Leishman (1905) (Rawlings strain); Craigie and Yen (1938)
F_2	1938	Alberta, Canada	Craigie (1939)
G H	1937	Vancouver, Canada	Craigie and Yen (1938)
J	1937	Ontario, Canada	Craigie and Yen (1938)
K L_1	1938	Peiping, China	Yen (1939) (strain P 15) Yen (1939) (strain P 10)
L_2	1940	Oxfordshire, England	Felix (1943)
M	1939	Vancouver, Canada	Craigie (1940, 1941)
N	1943	Richmond, England	Felix (unpublished)
O	1941	Devonshire, England	Felix (1943) (Type 91)
T	1943	Cornwall, England (imported from S. Africa)	Felix (1944) (Type T)

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† Cultures of the Vi-type strains of *S. typhi* and corresponding phage preparations listed in table II may be obtained from Dr. A. Felix, Central Enteric Reference Laboratory, Public Health Laboratory Service, Colindale Avenue, London, N.W.9, or from the Connaught Medical Research Laboratories, University of Toronto, Toronto 4, Ontario, Canada.

TABLE II—REACTIONS OF Vi-TYPE STRAINS OF *Salmonella typhi* TO ROUTINE TEST CONCENTRATIONS OF TYPING PHAGE PREPARATIONS

Vi-type strains	Vi-phage preparations																							
	A	B_1	B_2	B_3	C	D_1	D_2	D_4	D_5	D_6	E_1	E_2	F_1	F_2	G	H	J	K	L_1	L_2	M	N	O	T
A	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL
B_1	2 + s	CL	2 + s	+ s	+ s	–	–	–	+ s	+ m	+ s	+ s	+ s	+ s	+ s	+ s	–	+ s	+ s	+ s	+ s	+ s	2 + s	+ s
B_2	+ s	–	CL	–	–	–	–	+ m	–	–	+ m	–	+ m	–	+ m	+ m	+ m	–	–	± m	± m	+ s	–	+ s
B_3	3 + s	–	3 + s	CL	3 + s	3 + m	2 + m	–	–	–	3 + s	3 + s	3 + s	2 + m	3 + m	3 + m	3 + m	3 + s	3 + s	3 + s	3 + s	3 + s	3 + m	3 + s
C	± n	± n	± n	± n	CL	± m	± m	± m	± m	± n	± n	± n	± n	± n	± n	± n	± n	± n	± n	± n	± n	± n	± n	± n
D_1	–	–	–	–	–	CL	CL	CL	2 + m	2 + m	–	–	–	–	–	–	–	–	–	–	–	–	–	–
D_2	–	–	–	–	–	–	CL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
D_4	–	–	–	–	–	–	–	CL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
D_5	–	–	–	–	–	–	–	–	CL	CL	–	–	–	–	–	–	–	–	–	–	–	–	–	–
D_6	–	–	–	–	–	–	–	–	–	CL	–	–	–	–	–	–	–	–	–	–	–	–	–	–
E_1	–	–	–	–	–	–	–	–	–	–	CL	CL	–	–	–	–	–	–	–	–	–	–	–	–
E_2	–	–	–	–	–	–	–	–	–	–	–	CL	–	–	–	–	–	–	–	–	–	–	–	–
F_1	–	–	–	–	–	–	–	–	–	–	–	–	CL	CL	–	–	–	–	–	–	–	–	–	–
F_2	–	–	–	–	–	–	–	–	–	–	–	–	± n	CL	–	–	–	–	–	–	–	–	–	–
G	–	–	–	–	± n	–	–	–	–	–	–	–	± n	–	CL	–	–	–	–	–	–	–	–	–
H	–	–	–	–	–	–	–	–	–	–	± s	–	± n	± n	–	CL	–	–	–	–	–	± n	± s	± m
J	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	CL	–	–	–	–	–	–	–
K	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	CL	–	–	± m	–	–	–
L_1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	CL	CL	–	–	–	–
L_2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	± m	CL	–	–	–	–
M	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	CL	–	–	–
N	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	CL	–	± m
O	–	–	–	–	–	–	–	–	–	–	–	–	–	± m	–	–	–	–	–	–	–	–	CL	–
T	–	–	–	–	–	–	–	–	–	± m	–	–	–	–	–	–	–	–	–	–	–	–	–	CL

CL = Confluent lysis. – = No plaques. ± = A few plaques usually present. +, 2 +, 3 + = Increasingly numerous plaques. n = Normal plaques. s = Small plaques, visible to the naked eye. m = Minute plaques, visible only by means of magnifying lens (×10).

Type A was isolated from a primary plating from a Type O carrier, and in another instance from a Type T carrier. Possibly environmental changes involved in transfer of the organisms to laboratory media may have provided the necessary conditions for the emergence of Type A.

These facts must, therefore, be borne in mind when an infection with Type A is encountered in apparent association with infections due to one of the other types. A single source of infection cannot be absolutely excluded when one of the types concerned is Type A.

Some strains of other Vi-phage types have become less specific after prolonged subculture, a few plaques of subnormal size being obtained with the routine test dilution of all or some of the heterologous phage preparations. This may possibly be a partial change in the direction of acquisition of Type A characteristics, but the phenomenon requires further investigation.

Type B_1.—The merging of Types A and B_1 in the temporary simplified scheme suggested by Craigie (1942) was based on the view that B_1 might be a variant of Type A, standing in the same relationship to Type A as E_2 does to E_1, or F_2 to F_1. Since, as mentioned before, Type A has appeared on several occasions in cultures of other types, it seems better for practical purposes to retain Type B_1 as an independent subtype of the B group.

Type D_3.—In view of the evidence now available, subtype D_3 is regarded as a degraded strain of Type N and is therefore withdrawn from the scheme. The original D_3 type-strain was isolated in 1938 at Chatham, England, and was classified as one of the D subtypes because it showed cross-reactions only with phage D_1 and phage D_2 (Craigie 1941).

More recently, discrepant results in London and Toronto led to the discovery that cross-reactions of this strain depend, to a remarkable extent, on temperature and medium. As observed by one of us (J. C.), the Chatham strain is resistant to all heterologous phages if tested on 'Difco'-broth agar at a temperature exceeding 38°C, but cross-reactions are well marked between 33°C and 37°C. Moreover, the addition of certain supplements to the medium alters this critical temperature. Cross-reactions are suppressed in the presence of dextrose, but are greatly enhanced by the addition of 5% glycerol with 0·05% phenol to the medium.

Type D_5.—So far only one strain of this type has been encountered, and it is uncertain whether the patient had been infected in Britain, India, or elsewhere (Felix 1943). Type D_5 gives very strong cross-reactions with all phage preparations for Type D_4. This unusually marked cross-reaction requires further investigation. It may be due to the fact that the available cultures of D_5 have undergone degradation since the strain was isolated in 1942.

Types F_1 and F_2.—The isolation of subtypes F_1 and F_2 by Helmer et al. (1940) from the same patient indicates that they are closely related, and that their differentiation may not be of epidemiological significance. However, further observations on this point are desirable.

Type K.—This is the former subtype B_4. It was originally allocated to the B group because the cultures exhibited well-marked cross-reactions. A recent study of the original B_4 type-strain on Difco-broth agar confirms that it is a specific independent type.

On tryptic-digest agar, however, this strain now gives numerous cross-reactions, whereas less than a year ago it gave the specific reactions shown in table II. This change cannot be attributed solely to differences in medium, because in recent tests on tryptic-digest agar, carried out with the original B_4 type-strain and another B_4 strain isolated in 1943 in England, the latter strain gives the specific Type K reactions previously obtained with the old B_4 strain, which now gives many cross-reactions.

Type N.—Phage preparations for Type N (hitherto known in England as Type Richmond) and the Chatham strain (formerly called subtype D_3) are indistinguishable. Type N strains, however, differ considerably in their resistance to heterologous preparations of Vi-phage II. Some are sensitive only to phage N; others, like the Chatham strain, may show well-marked cross-reactions.

Since phage N and phage D_3 are similar, the strains of *S. typhi* producing these phages must be regarded as essentially similar.

The reasons for the differences in resistance of Type N strains to heterologous preparations are unknown. The loss of specificity does not appear to be a progressive change solely related to long subculture. A few Type N strains reacted with most of the heterologous phages immediately after isolation from the patients, whereas strains isolated in other localities gave a pure Type N reaction and maintained this characteristic almost indefinitely on subculture.

Type O.—This type, which had been provisionally labelled Type 91 (Felix 1943), is common in Britain and has been encountered in many countries.

Some strains of Type O develop plaques of normal size, and with these strains complete lysis is readily obtained with the homologous phage after incubation for about eight hours. At the same time single plaques may also develop with the test dilutions of several other type phages, similar to the readings on a Type C strain.

On the other hand, many Type O strains support only minute plaques, which can be seen only when the plates are inspected with a magnifying lens and strong transmitted light. This peculiarity is not due to degradation, since strains freshly isolated by blood-culture from very severe or fatal cases may yield minute plaques, whereas other strains which have been maintained in the laboratory for several years still develop large plaques.

Strains yielding minute plaques with Type O phage usually do not give any overlapping reaction with any of the other type phages. It is therefore essential to take a first reading after incubation for about eight hours at 38°C, and another after incubation for twenty-four hours.

According to conditions depending on the composition of the agar medium the minute plaques may sometimes be overgrown and ill-defined after incubation for twenty-four hours. In other instances a doubtful result obtained at the first reading may change into a clear-cut positive result after further incubation.

Type T.—This was referred to in a previous paper (Felix 1944) under the letter T. It has not been considered desirable to alter this designation, though letters P, Q, R, and S remain unallocated.

UNTYPABLE Vi STRAINS

About 5% of strains of *S. typhi* encountered in Great Britain cannot be typed. Such untypable strains fall into two groups: (1) strains resistant to existing phage preparations; and (2) strains exhibiting anomalous and partial sensitivity to several phage preparations.

(1) It now seems desirable to use the term "untypable Vi strain" in preference to the original term "imperfect V form," which was applied to phage-resistant strains. Such strains may include Vi-phage types to which Vi-phage II has not yet been adapted.

Countries in which phage typing has not been used may be expected to provide, initially, a higher ratio of untypable strains in proportion to the presence of hitherto unknown types.

In attempts to adapt Vi-phage II to resistant strains, phage preparations of the B and D groups should not be used until repeated tests have shown that adaptation cannot be accomplished with a concentrated preparation of the standard phage A or, if this fails, with repeated attempts with all the other standard phage preparations.

It appears desirable that further new types which, undoubtedly, will be encountered in various parts of the world should receive some temporary form of designation other than that used in the scheme given in table II. Extension and modification of this scheme and the incorporation of new types are obviously a matter for consideration by some international body.

Some untypable Vi strains carry a potential lytic agent or bacteriophage, termed "gamma agent" by Craigie (1942). The resistance of these strains to Vi-phage II appears to be a phenomenon analogous to the interference effect known to occur between certain plant or mammalian viruses.

(2) Reference has already been made to strains which acquire a decreased specificity after prolonged subculture. Strains may be encountered which behave in a similar way on initial test, yielding plaques of subnormal size with all or some of the available series of Vi-phage preparations.

The method of indirect phage typing may be of value in the further investigation of such strains, provided that Vi-phage II can be adapted to them. Phage so obtained is tested, in its critical test concentration for Type A, on all the known Vi-types of *S. typhi* and on the homologous strain.

MATERIALS AND METHODS

The method of typing typhoid bacilli with Vi bacteriophage has been described in previous publications (Craigie and Yen 1938, Craigie 1941). On the basis of practical experience of the method of one of us (A. F.) during seven years it is recommended, for the routine typing of strains, that the details of the technique originally described be followed as closely as possible. The points that require comment here are those which, in the light of experience and special studies, appear to be of especial importance in connexion with standardisation.

Agar Medium for Typing.—It must be borne in mind that one essential prerequisite, on which the lytic activity and multiplication of Vi-phage II depends completely, is active metabolism of Vi antigen by the culture of *S. typhi* to which the phage is added.

The number and size of plaques obtained with homologous and heterologous phage preparations vary from type to type, and each type exhibits a characteristic pattern of susceptibility (table II).

Extraneous factors, such as medium and temperature, influence the extent of plaque development and may affect the specificity of the reactions obtained with some of the types and subtypes. The former Type D_3, for example, yields highly specific reactions under some conditions and exhibits well-marked cross-reactions under others. It is therefore obvious that the composition of the medium used for typing is of the greatest importance in any attempt at standardisation of the typing technique.

The ideal to be aimed at is a synthetic standard medium, but this is not likely to be realised in the near future. A satisfactory and readily prepared medium, devised and extensively used by one of us (J. C.), has the following composition:

'Bacto' nutrient broth (dehydrated) ‡ ..	20 0 g.
Sodium chloride	7·5 g.
'Bacto' agar	20·0 g.
Distilled water to	1000 ml.

The final hydrogen-ion concentration of this medium is about pH 6·8 and should not be adjusted with alkali.

Alternatively, any good tryptic meat-digest agar may be used, provided that the phage reactions stated in table II are reproduced in every detail. Each batch of agar medium should be compared with the previous batch by testing the type-strains N, O, and T against the whole series of typing phages. If the agar medium permits of full development of the small-size plaques that characterise these Vi-phage types the batch can be accepted for use in routine typing. Papain agar has been found unsatisfactory and should not be used.

The tryptic meat-digest should be made from 500 g. of fresh meat to 1000 ml. of water. Neutralisation with excessive amounts of NaOH must be avoided; otherwise the alkaline change which accompanies growth of *S. typhi* may be accelerated and exaggerated.

Excessive amounts of phosphate tend to inhibit lysis, and care should be taken to precipitate and remove these so far as possible. The final hydrogen-ion concentration of the trypsin-digest agar should be about pH 7·4.

The cultures are first grown in Difco broth or trypsin-digest broth to which has been added 1% peptone. After two or three hours' incubation at 38°C the broth cultures have usually grown sufficiently to be transferred to agar plates, which should contain a fairly thick layer of agar medium, about 25–30 ml. per Petri dish of 9 cm. diameter.

Occasionally a strain belonging to any one of the various Vi-phage types may be encountered which consistently yields dwarf colonies on Difco agar or trypsin-digest agar. These strains cannot be typed on plain agar, but normal growth and susceptibility to Vi-phage II are restored by the addition of 0·2% sodium thiosulphate to the medium (Kauffmann 1935, Wilson 1938).

The addition of certain substances to the medium may much influence plaque development. Glycerol, for example, as originally shown by Desranleau (personal communication) significantly enhances plaque size. The mechanisms whereby various supplements affect plaque size are obscure, but the subject merits further study with a view to the ultimate development of a standard medium.

Temperature of Incubation.—The lower temperature limit to the lytic activity of Vi-phage II is about 33°C. This does not mean, however, that a considerable departure from 37°C in plate temperature can be tolerated. It is recommended that a minimal temperature of 37–38°C should be maintained throughout the whole period of incubation, because lower temperatures tend to favour the development of cross-reactions.

Interrupted incubation of phage tests, as originally suggested by Craigie and Yen (1938), may be chosen to suit laboratory routine, but continuous incubation, with readings at eight hours and twenty-four hours, appears to be preferable.

Reading of Tests.—Phage tests should be read against a dark background with suitable oblique lighting. All areas which appear doubtful or negative to the naked eye should be inspected with a × 7 to × 10 hand lens.

Some of the later Vi-types of *S. typhi* now included in the typing scheme yield only minute plaques or micro-plaques with homologous phage. Micro-plaques are also found in certain cross-reactions. Plaques of subnormal size are sometimes encountered in atypical strains belonging to those Vi-phage types that usually yield plaques of normal size. Since the routine test concentrations of the phage preparations are adjusted for the development of plaques of normal size, such atypical strains will show only imperfect clearing in the area covered by homologous phage.

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‡ Beef extract and peptone mixture supplied by Difco Laboratories, Detroit, Mich., U.S.A.

In an extreme case, where interpretation is doubtful, it will be necessary to resort to indirect typing by growing Vi-phage II on the strain and testing the phage preparations on cultures of the reference type-strains.

Preservation and Maintenance of Type Cultures.—There is ample evidence that environmental conditions prevailing during long-term preservation of strains of *S. typhi* may influence their degree of susceptibility to Vi-phage II. Reference has been made to the appearance of Type A in cultures of strains belonging to different Vi-phage types, and to a change in the direction of decreased specificity on the part of others.

The relationship of such variations to medium used for the maintenance of stock cultures requires long-term study. Some strains may have a greater inherent capacity to vary than other strains. It is also possible that undesirable variants may selectively grow and survive in the presence of certain metabolites or at certain final hydrogen-ion concentrations which do not necessarily bear any relationship to that of the uninoculated medium.

Meanwhile it is recommended that cultures of the Vi-type strains be maintained on Dorset egg medium, being stored in a dark and cool place, preferably at 4°C, after a minimum of incubation at 37–38°C.

Fresh stock cultures should always be prepared from the oldest viable stock culture available. The following procedure has proved to be satisfactory: transfer from old Dorset egg slant to fresh Dorset egg slant and incubate overnight; plate on agar plate and incubate overnight; select about a dozen of the best-looking opaque smooth colonies and seed together on slants of Dorset egg medium for storage.

Preservation by special procedures, such as drying, is to be avoided for the time being.

Preservation of Phage Preparations.—Concentrated fluid preparations of Vi-phage II, if free from living bacteria, retain their potency unaltered for years at 4°C. The high dilutions used for typing also keep well, at least for several months, but it is desirable to keep the volume of these to a convenient minimum, replacing them at intervals from suitable intermediate concentrations.

VI-PHAGE TYPING OF OTHER MEMBERS OF THE SALMONELLA GROUP

The arrangement of types and subtypes of *S. paratyphi B* in the typing scheme suggested by Felix and Callow (1943) has also been based on the principles recommended here. The same applies to a typing scheme of *S. typhi-murium*, devised by Felix and Callow but not yet published, which has been used in the epidemiological investigation of outbreaks of food-poisoning in Britain during the past few years. For the sake of uniformity it is highly desirable that the same procedure should be followed in any future attempt at phage typing of *S. paratyphi A* or other member of the salmonella family.

Our thanks are due to Miss B. R. Callow, of London, and Miss E. M. Clark, of Toronto, for their help in preparing and testing some of the bacteriophages and in maintaining the cultures.

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FOLIC ACID IN AGRANULOCYTOSIS

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It has been known for some time that folic acid is effective in correcting nutritional cytopenia in monkeys (Wilson et al. 1942): and the granulopenia produced in rats by sulphonamides can also be prevented by folic acid. In human beings, Menten and Graff (1946) found that sulphonamide granulopenia gave no very definite response to pyridoxine and folic acid, but their daily dosage of folic acid was less than 0·2 mg. Watson et al. (1945) reported improvement in irradiation leucopenia with folic acid.

In the two cases of agranulocytosis reported below the granulocytes returned to the blood-stream within forty-eight hours of giving adequate doses of folic acid.

Case 1.—A woman, aged 51, was admitted to a surgical ward on Jan. 18, 1947, for operative treatment of toxic goitre.

A month earlier she had had a sore throat and skin rash following barbiturate medication; no blood-count had been done and she had recovered after the barbiturate had been stopped.

On Jan. 18 she was given gr. $1^1/_2$ of 'Dial.' Next day she became severely ill, with fever and sore throat. A blood-count on the 20th confirmed the diagnosis of agranulocytosis—white cells 1600 per c.mm. (0·5% polymorphs).

Treatment with penicillin 30,000 units three-hourly and 'Pentnucleotide' 40 ml. daily was begun on the 20th; and on the 21st she began to have pyridoxine 200 mg. daily. She remained febrile, and her blood-count did not improve.

On the 24th treatment with folic acid 20 mg. daily was started. Within forty-eight hours her temperature had fallen to normal, granulocytes had returned to the blood-stream, and she was clinically much better.

A marrow smear done by Dr. H. Lempert on the 21st had shown a striking lack of granulocytes. On the 27th granulocytes, from the promyelocyte stage to fully mature polymorphs, had reappeared in the marrow.

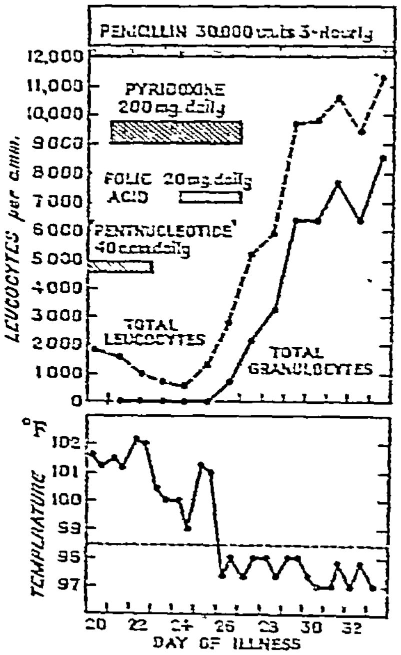

Fig. 1—Treatment, temperature, and white-cell counts in case 1.

The time-relations of treatment and improvement in the temperature and blood-count are shown in fig. 1.

Case 2.—A woman, aged 53, was admitted to hospital on April 5, 1947, with a history that, three weeks earlier, she had developed a vague febrile illness diagnosed as influenza. Convalescence had been slow, and on March 23 she had become acutely ill, with sore throat, headache, and fever.

On this and several subsequent days she had been given an amidopyrine hypnotic for control of headache (she had also had amidopyrine in 1945 for migrainous headache).

A throat swab had been negative, and she had been given penicillin 200,000 units b.d. for four days. She had remained ill and febrile, and on April 1 she had been given penicillin again, 400,000 units b.d.

A blood smear taken on March 31 had been reported as suggesting leucopenia, with lymphocytes predominating, and retrospective inquiry showed that no polymorphs were seen. A firm diagnosis of agranulocytosis was not, however, made until April 5, when her total white cells numbered 900 per c.mm.

After admission to hospital on April 5 treatment was with penicillin 62,500 units three-hourly; intravenous pyridoxine 300 mg. within the first twenty-four hours and folic acid 100 mg. followed by 20 mg. daily.

Within forty-eight hours her temperature had settled and granulocytes had returned to the blood-stream.

A bone-marrow smear, taken ten to twelve hours after the start of therapy, showed maturation arrest at the promyelocyte level; no mature granulocytes were seen. A further marrow smear, taken just over twenty-four hours later, showed granulocyte development along normal lines.

Fig. 2 shows the time-relation between treatment and improvement.

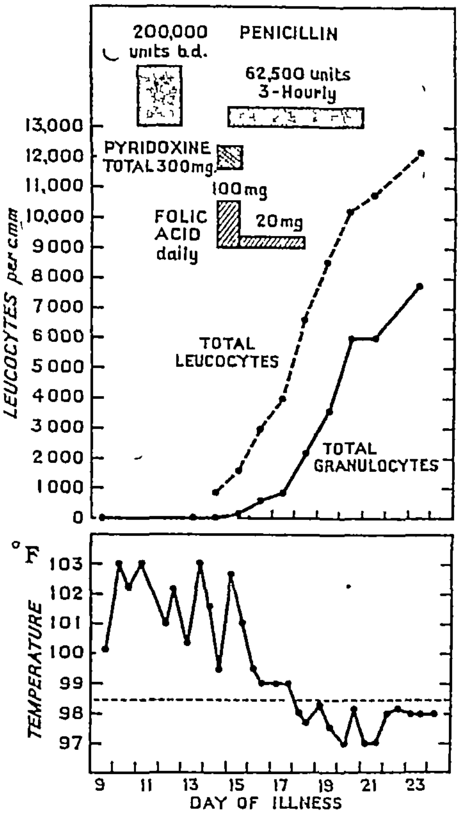

Fig. 2—Treatment, temperature, and white-cell counts in case 2.

COMMENTS

These two cases illustrate the value of penicillin in maintaining life during the period of agranulocytosis. Pyrexia, however, continues despite penicillin and does not settle until polymorphs reappear in the circulating blood. There is, no a-priori reason to suspect that penicillin has any stimulant action on leucopoiesis, and in both patients granulocytes had not returned after five days' penicillin therapy. Apart from penicillin, the only drug other than folic acid given to both patients was pyridoxine; in the first patient pyridoxine had been given, without response, for three days before folic acid was added. We realise that spontaneous remission may occur at any time in this disease, and that the appearance of granulocytes within forty-eight hours of giving folic acid to these two patients may have been merely a coincidence. We propose to treat subsequent patients with folic acid and penicillin alone; but, since agranulocytosis is comparatively rare, others may have an opportunity of testing the value of folic acid before another case is available to us.

We are indebted to Messrs. Lederle, Inc., New York, for supply of 'Folvite.'

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TRAUMATIC NEURITIS OF THE DEEP PALMAR BRANCH OF THE ULNAR NERVE

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THE correct diagnosis of the cause of wasting of the muscles of the hand is clearly a matter of practical importance, and in this connexion Russell Brain et al. (1947) have recently clarified the causes of median neuritis. We draw attention here to another cause of wasting of the hand which is in our experience specially liable to faulty diagnosis.

Traumatic, occupational, or pressure neuritis of the ulnar nerve is a relatively common cause of such wasting. In most cases the neural injury occurs either at the elbow or at the wrist, and injury at these sites can be distinguished by studying the muscles paralysed and the extent of the sensory loss.

Injury to the deep palmar branch of the ulnar nerve may, however, provide a clinical picture quite unlike that generally associated with ulnar paralysis. When it occurs without any obvious injury to the hand, the nature of the lesion is apt to be overlooked by the clinician, and indeed there is a danger that motor-neurone disease may be diagnosed.

Anatomy.—The anatomy of the nerve in the palm is given in Cunningham's (1937) textbook as follows:

> "The ulnar nerve in the hand divides under cover of the palmaris brevis muscle into its two terminal branches—superficial and deep. The deep palmar branch is almost purely motor. It passes deeply between the flexor and abductor minimi digiti; it supplies these muscles and the opponens digiti minimi, then turning laterally along the line of the deep palmar arch, and under cover of the deep flexor tendons, it supplies branches to the following muscles: interossei, third and fourth lumbricals, the adductor pollicis, and the deep part of flexor pollicis brevis."

This is its usual anatomy, but it should be borne in mind that there may be variations. The nerve occasionally supplies opponens and abductor pollicis brevis; flexor pollicis rarely has an entirely median supply (Highet 1943); and the first two palmar interossei are sometimes innervated by the median (Pollock 1919). This may cause some difficulty in interpreting the clinical signs of injury.

When the deep palmar branch is injured at its origin without involvement of the superficial branch, the muscles supplied by the ulnar nerve are paralysed without sensory loss. Hunt (1914) quotes six cases observed by him in which this occurred. When, however, the deep palmar nerve is injured after its branches to the hypothenar muscles have been given off, and while running laterally with the deep palmar arch, the interossei and adductor pollicis are paralysed but the hypothenar muscles are unaffected. This isolated muscular paralysis without sensory loss constitutes the essential clinical feature of the cases here recorded.

Case 1.—An R.A.S.C. sergeant, aged 24, reported weakness of the right hand, with difficulty in writing, which had been present for about 15 days. Some 3 weeks previously he had ridden a motor-cycle with a defective *twist-grip throttle* from Algiers to Sousse, at times over rough and difficult roads. For 24 hours after completion of this journey he had noticed paræsthesia in the little and ring fingers of the right hand. This had cleared spontaneously. During the ensuing 3 weeks he had been employed on routine short motor-cycle journeys. He had noted the weakness when trying to write a letter about a week after his long journey. It appeared to be increasing.

On examination he appeared a healthy rather thick-set man. The only abnormality in the central nervous system was weakness and slight wasting in the interossei and adductor pollicis of the right hand; the hypothenar muscles were ntact, and there was no objective sensory loss.

He was put off cycling duties and told to rest the hand as much as possible. He was seen again some 3 months later. He had only stayed off cycling for about 3 weeks, by which time he thought his hand so much better that he resumed full duty. He now had no disability and no detectable weakness, though there was still a slight reduction in the muscle mass of the first interosseus space.

Case 2.—A Pioneer Corps private, aged 32, reported weakness of the left hand for about 1 month. He dated the symptoms from a time when he had been preparing the site for a tented camp. For about a week his chief occupation had been putting tent-pegs into clay soil, pushing them in by hand and then hammering them home. Since then he had been employed on digging.

On examination he had evident wasting of first interosseus and adductor pollicis, and weakness of all interossei, third and fourth lumbricals, and adductor and flexor pollicis brevis of the left hand. There was no involvement of the hypothenar muscles and no sensory loss.

He was put on light duty and instructed to rest the hand as much as possible. He did not report again, but his medical officer stated 6 weeks later that he had made no further complaints.

Case 3.—A retired civil engineer, aged 61, complained of weakness of the right hand and difficulty in holding a pen for writing for about 2 months. One evening after a heavy day's gardening he had noticed painless swelling of the right hand. This had subsided gradually in a few days, and he had begun to note the weakness which had remained stationary since then. His gardening activities at the time of onset had consisted of breaking up hard clods of earth with a spade, which he held in his right hand and crashed down on the earth.

On examination there was weakness, with some wasting, of all interossei, third and fourth lumbricals, and adductor pollicis of the right hand. The hypothenar muscles were normal, and there was no sensory loss. No other abnormality.

He was advised to rest his hand and to wear a thick glove to prevent trauma to the palm. A follow-up 4 months later showed improvement in the weakness and wasting. The patient, who was an accurate observer, gave a good description of the recovery he noted. At first full power returned to the little finger (the disability here had been of adduction due to interosseus weakness); next it returned to the middle and index fingers; and improvement in thumb movements was slowest. Difficulty in holding a pen for writing had decreased considerably.

Case 4.—A pressed-steel worker, aged 33, complained of weakness of the left hand for 6 weeks, with wasting for about 2 weeks. For the past 2 months his work had involved straightening dents in various pieces of pressed steel. For this he had rested a block of wood on the palm of his left hand, while with his right hand he hammered the dent out against the block.

On examination there was marked weakness of all interossei, third and fourth lumbricals, and adductor pollicis, with obvious wasting of first interosseus and adductor pollicis. The hypothenar muscles were unaffected, and there was no subjective or objective sensory disturbance.

He was advised to change his work. When seen again 7 weeks later there was much improvement in weakness and wasting. He no longer noted any subjective disability, and had changed his job to that of milk roundsman.

Case 5.—An insurance agent, aged 48, reported weakness of the right hand and difficulty in writing, of gradual onset, over the past 3 months. He had a Dupuytren's contracture of the palm which had been slowly increasing for years but had not interfered with his work. During the past 3 months he had noticed a gradually increasing weakness of the right hand, showing itself particularly in difficulty in holding a pen for writing. There had also been some wasting of the hand.

On examination a Dupuytren's contracture could be felt and seen centred mainly over the flexor tendons of the fourth finger. There was evident wasting of the interossei and adductor pollicis, and weakness of interossei, third and fourth lumbricals, adductor and flexor pollicis brevis. The hypothenar muscles were not involved, and there was no subjective or objective sensory loss.

In view of a possible constriction of the nerve by fibrous tissue, surgical exploration was undertaken by Prof. H. J. Seddon. However, no mechanical obstruction was found to a seeker passed across the palm in the course of the nerve. Electrical stimulation gave a normal response in branches to the hypothenar muscles, but none beyond this. Electromyograms from the muscles affected showed no evidence of fibrillation.

DISCUSSION

There are few published reports of this traumatic or pressure palsy of the deep palmar branch. Ramsay Hunt (1914) does not describe this particular condition, but Harris (1929) gives details of two such cases, one in a bootmaker and one in a cyclist. In the further cases here described, the connexion between trauma to the palm of the hand and the onset of the paralysis was quite definite, but it must be emphasised that careful inquiry is often needed to elicit the cause of the injury, as the patient is usually unaware that he has damaged his hand in any way.

The deep palmar branch of the nerve, after turning laterally in the hand, lies in close relation to the proximal end of the metacarpal bones, and these no doubt provide a hard surface against which the nerve can be compressed.

The obvious treatment, which consists in avoiding the causes of trauma, is usually successful in allowing recovery to occur spontaneously.

SUMMARY

Pressure on the deep palmar branch of the ulnar nerve may cause a neuritis. Various occupations can inflict trauma of this kind.

The result is paralysis and wasting of the interossei and adductor pollicis muscles. There is no sensory loss, and the hypothenar muscles may be unaffected.

Recovery usually follows discontinuance of trauma to the hand.

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A CASE OF HICCUP

REVIVAL OF AN OLD REMEDY

R. C. NAIRN
M.B. Lpool
LATE SURGEON LIEUTENANT R.N.V.R.

THIS case is recorded mainly because of the treatment adopted, but the ætiology is also worthy of discussion.

During operational minesweeping off Malaya a request was received from another ship for medical attention for a naval stoker who had had hiccup for forty-eight hours. Treatment was prescribed, to be carried out in the rating's ship till he could be transferred. He did not respond to the remedies suggested—all old and well-tried methods, such as breath-holding, breathing in and out of a paper bag, traction on the tongue, and eating or drinking such things as sugar and eucalyptus oil (we had no cajuput) or sugar and vinegar.

He was transferred for treatment on the same evening, Sept. 6, when he was found to be truly suffering from hiccup of an unbelievable forcefulness. He had vomited twice during the day, and this was not surprising, from the mechanical effect of his spasms alone. He had diarrhœa on this day only. There were no other symptoms, no domestic or other worries, and no relevant past illnesses. He gave a history of a normal pulmogram earlier in the year. His wife had had a pleural effusion but was recovering rapidly, and he was not concerned about her. The patient was 30 years old.

On examination he was well built, reasonably cheerful in spite of having been hiccupping for the past two and a half days, and looked very fit. There was violent frequent hiccup, with a periodicity of about 30 sec. (This was later noted to persist while he slept.) No pyrexia, pulse normal, tongue clean and moist. No abnormal abdominal, respiratory, or cardiac signs; blood-pressure normal.

Central nervous system (C.N.S.): slight nystagmus, maximal on looking to the right; right knee-jerk absent, left sluggish; slight but definite unsteadiness of gait but no true rombergism.

The clinical picture was ascribed at the time to some organic lesion of the C.N.S. yet to be determined; meanwhile treatment was directed to stopping the hiccup.

Treatment.—A mixture of oxygen and 7% carbon dioxide was administered with a 'Novox' apparatus for long periods, but without effect. Phenobarbitone gr. 3 statim and gr. 2 b.i.d. was given to allay his growing anxiety. He was put to bed. An hour later he was still hiccupping as badly as ever. *Mist. kaolin et morph.* (*N.W.F.*) $^1/_2$ oz. was given to relieve any possible gastric irritation, and he fell asleep, still hiccupping.

He stopped hiccupping in the early hours of the morning, much to everyone's relief, and on waking remained free from hiccup until he drank a little fluid about half an hour later. This started him off again. (Solid food was withheld until there was no doubt about his complete recovery.) Hyoscine hydrobromide gr. $^1/_{75}$ was then given by mouth to reduce parasympathetic activity, and he was put on an antacid powder, again directed against possible gastric irritation.

In the afternoon of this day the patient was still hiccupping and had become a little less cheerful. Again the novox apparatus was tried, this time for periods of 15 minutes, alternating with 15-minute periods of abdominal compression produced by flexing his thighs (Hutchison and Sherren 1925). This was given up after an hour as being too exhausting in the heat of the afternoon and singularly ineffective. Various "tricks" were then resorted to, such as holding down the cricoid cartilage, and traction on his tongue—without effect.

The only treatments left seemed to be the administration of a general anæsthetic, either ether or 'Pentothal' (the only ones available), and, if that failed, phrenic-nerve paralysis either by procaine injection or avulsion. Before seriously contemplating these heroic procedures, a mental survey was made of the drugs supplied to small ships. One antispasmodic, amyl nitrite, was available, and this had not yet been tried.

Inhalation of the vapour from one ampoule of amyl nitrite worked like a charm, and in less than a minute his hiccup had stopped. A slight recurrence three hours later was treated in the same way, and this time he remained quite free from hiccup.

Progress.—Next day he was allowed some semi-solids by mouth, but he complained that the food stuck at the level of the lower end of his sternum. On re-examination his C.N.S. signs were unchanged, apart from the addition of slight intention tremor. Œsophageal spasm was diagnosed and attributed to the same general C.N.S. lesion which had caused the hiccup. A mixture of belladonna, kaolin, and morphine was given for the next week to assist his swallowing.

On Sept. 10 he was free from symptoms, though the signs were unchanged, and he was regarded as fit for light duty until he could be transferred to hospital for a complete neurological investigation. He was seen regularly until Oct. 27, when he was discharged to the Royal Naval Auxiliary Hospital, St. Peter's, Colombo. The physical signs had become less pronounced but were still qualitatively unchanged on Oct. 23. In St. Peter's a full investigation was made, but by this time he was practically clear of abnormal physical signs and was quite symptomless. Apart from sluggish tendon jerks and an absent lower left abdominal reflex, nothing of importance was recorded. His optic disks were normal and visual fields full; a slight choroiditis was regarded as being inactive and not significant. There was no abnormality in the cerebrospinal fluid (C.S.F.): the Kahn test was negative, as was the blood Kahn. Nothing abnormal was discovered in the urine. A barium swallow revealed no œsophageal or periœsophageal lesion.

DISCUSSION

Diagnosis.—It is unfortunate that hospital investigations could not be undertaken before the clinical condition had cleared. The diagnosis remains uncertain. Bellingham Smith (1938) gives the following differential diagnosis:

(1) Hiccup due to peripheral nervous causes—irritation of either the phrenic or vagus nerves.

(2) Hiccup due to central nervous causes: brain tumour; meningitis; hydrocephalus; encephalitis lethargica (either epidemic or sporadic, with or without other symptoms and signs); epilepsy; hysteria; toxæmia (e.g., of specific infections, metabolic disorders, and uræmia); reflex causes.

Besides these causes, on theoretical grounds at least, such central nervous lesions as neurosyphilis and disseminated sclerosis should also be included.

In the present case peripheral lesions were excluded by the presence of C.N.S. signs, and the short duration and recovery ruled out brain tumour and hydrocephalus. The absence of meningism ruled out meningitis. There was no evidence of epilepsy. Reflex causes and hysteria were ruled out by the positive signs of organic nervous disease and the continuance of the hiccup during sleep. There was no evidence of toxæmia. Negative Kahn blood-test and C.S.F. findings excluded neurosyphilis. The remaining possibilities appear to be sporadic epidemic encephalitis (for no other cases occurred in the area) and disseminated sclerosis. French and Douthwaite (1945) state that such sporadic cases of encephalitis do occur, and occasionally without pyrexia, with a normal C.S.F., and with little if anything to distinguish them from neurosis or hysteria, unless there have been other similar cases in the neighbourhood about the same time. In the present case other signs of central nervous disease were present, all compatible with such a diagnosis. Against a diagnosis of disseminated sclerosis is the fact that "intractable" hiccup appears never to have heralded an attack of this disease before. An attack of encephalitis lethargica, with the principal lesion in the medulla, is proposed as the most likely diagnosis in this case.

Treatment.—At the time I could find no record of amyl nitrite having been used in hiccup before, and I tried it on purely theoretical grounds. Since then, however, I have found that its use is mentioned by Osler (1942), Comrie (1937), and Bellingham Smith (1938). I have since employed it in a few other cases of hiccup, including alcoholic hiccup, with unequivocal success.

SUMMARY

A case of hiccup of nearly four days' duration and of doubtful ætiology is described.

The most likely cause seems to be encephalitis lethargica.

Inhalation of amyl nitrite was used with immediate success after most of the better recognised methods of treatment had proved unsuccessful.

Acknowledgments are due to the Medical Director-General of the Navy and the Medical Officer-in-Charge, R.N.A.H., St. Peter's, Colombo, for permission to publish this case.

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". . . Here, then, is an affirmative answer to the question: Do we have the natural resources to meet world food goals by 1960? This answer is a challenge to all men, not to scientists only, for it raises immediately an even more critical question: Can we mobilize these resources to produce the needed food? This question begs many answers, because it involves the whole field of human relationships. Science may discover and point the way, but it cannot dictate. The full measure of success in economic, social, and political action comes only with the will of the majority—not from the desires of one group. If the people of the world really have the determination to give battle to the problem of hunger, if they are willing to expend a small part of the energy and capital poured into World War II, only then can we see hope of victory."—ROBERT M. SALTER, chief of the Bureau of Plant Industry, Soils, and Agricultural Engineering, U.S. Department of Agriculture, Beltsville, Maryland, *Science*, May 23, p. 533.

Medical Societies

BRITISH ORTHOPÆDIC ASSOCIATION

A MEETING of this association was held at Exeter, April 25 and 26, under the presidency of Mr. GEORGE RKINS.

Tuberculosis of Bones and Joints

Mr. G. R. GIRDLESTONE spoke of the rarity of dissemina- on of tuberculous infection by operation on bones and nts provided this was well timed and preceded and lowed by immobilisation. He condemned concern th the local lesion to the exclusion of the tuberculous tient as a whole, and emphasised the importance of ng-continued care after discharge from hospital. He garded serial estimations of the erythrocyte-sedimenta- on rate as valuable in assessing progress.

Mr. NORMAN CAPENER reviewed tuberculous disease the *spine* in 351 cases, laying stress on the difference the disease, and its response to treatment, in children d adults. In the first fifteen years lower thoracic orsal) disease predominated; afterwards, lumbar. 7 cases were treated by arthrodesis, with no mortality the first nine months; the tibia providing the graft actured but once, in contrast with the experience in aumatic cases. He thought the key to the treatment thoracic spinal disease might be treatment of the scess.

Mr. M. C. WILKINSON, speaking on tuberculous sease of the *hip*, had found an unstable joint in 22 out 50 cases treated conservatively alone. The value of peration was measured by its success in securing ability and in preventing recurrence. His operative mortality in 75 cases was: early 2, late 2. He had articularly practised osteotomy, with medial displacement of the distal fragment, but lately he had supplemented this by an extra-articular femoral graft slid long the upper border of the neck. Operation was erformed in the presence of active disease after the atient's resistance had been raised by conservative reatment; and the reossification which ensued might e ascribed perhaps to auto-inoculation or to the decompression of tuberculous foci. Bony ankylosis might ake as long as two years, though the hip usually became quite stable before this. Many radiograms were shown f patients so treated.

Mr. Wilkinson's view that displacement osteotomy was often of great value in the treatment of tuberculous hip-joints was supported by Mr. D. WAINWRIGHT, who showed how a combination of osteotomy and ischiofemoral graft produced rapid bony ankylosis; and he showed also the result of supplementing long oblique osteotomy by traction, so that not only was apparent lengthening produced by angulation but also real lengthening by distraction. Dr. J. DELCHEF advocated early arthrodesis while the disease was still active. Mr. H. A. BRITTAIN held that the hip demanded different treatment from the other joints of the lower limb, because it could be short-circuited from weight-bearing by ischiofemoral arthrodesis.

Mr. J. P. CAMPBELL reviewed 89 cases of tuberculosis of the *knee* treated at Harlow Wood Orthopædic Hospital and found a quarter of them purely synovial. Some with osseous lesions developed a serviceable range of movement. Intra-articular arthrodesis resulted in bony fusion much more quickly in those of more than three years' standing than in more recent cases similarly treated. Bone-grafting operations were reserved for adults, in whom they supplemented intra-articular arthrodesis or were used to promote bony fusion where resection of the joint alone had failed.

Dr. J. MORTENS, reviewing 76 cases, concluded that arthrodesis should be postponed to the age of thirteen or fourteen if an epiphysis was involved, but that otherwise nine was not too early an age for the operation.

In considering 118 cases of tuberculosis of the *foot and ankle*, Mr. B. L. MCFARLAND contrasted the very good, though slow, response in children to conservative treatment with the frequently poor result in adults in whom dissemination or sinus formation often led to amputation. Conservative treatment, with or without arthrodesis, might be indicated in some younger adults, but in the older patient with tuberculosis of ankle or tarsus amputation was not merely justifiable but often imperative.

Mr. J. A. CHOLMELEY reviewed 94 of 100 cases of tuberculosis of bones and joints of the *upper limb* treated in the Royal National Orthopædic Hospital (country branch) in the years 1924–46. The parts affected were: shoulder (36 cases), elbow (25), wrist (22), metacarpals and phalanges (10), and humeral shaft alone (1). All received conservative treatment, supplemented in a few by operation—namely, arthrodesis of 8 shoulders in adults; excision of an elbow, and partial excision of another with drainage for secondary infection; local excision of the local humeral lesion. Arthrodesis of the shoulder—often determined by occupation—gave good results in adults, with bony fusion in every case, whereas recurrence took place in 3 of the shoulders not operated on. Two elbows, including that excised, showed recurrence. There was none in the wrist, metacarpal, phalangeal, or humeral cases.

Sir REGINALD WATSON-JONES concluded that tuberculosis of bones and joints presented, from the viewpoint of treatment, two diseases—that in children and that in adults. Both demanded conservative treatment; in children this sufficed, but in adults it should often be supplemented by surgical fusion after quiescence of the disease. The position was reversed in the case of the spine, which should be arthrodesed more often in children and more rarely in adults, because in children conservative treatment of dorsal disease left an unstable spine with increasing deformity, whereas in adults lumbar disease nearly always led to spontaneous ankylosis.

Cup Arthroplasty of the Hip

Dr. M. N. SMITH-PETERSEN (Boston, Mass.), who was elected an honorary fellow of the association, described his operation of cup arthroplasty. The restoration of shapely, smooth, cartilaginous articular surfaces was demonstrated by slides and films.

Mr. W. ALEXANDER LAW had found that some 80% of Smith-Petersen's cup arthroplasty operations gave a result satisfying to patient and surgeon; but the former must coöperate actively with exercises for two years.

Communications and Cases

Mr. H. G. S. KORVIN concluded, from radiological evidence, that the pathological changes in *pseudocoxalgia* are those of ordinary aseptic necrosis, and that destructive changes are the biological consequences of the mechanical damage of weight-bearing.

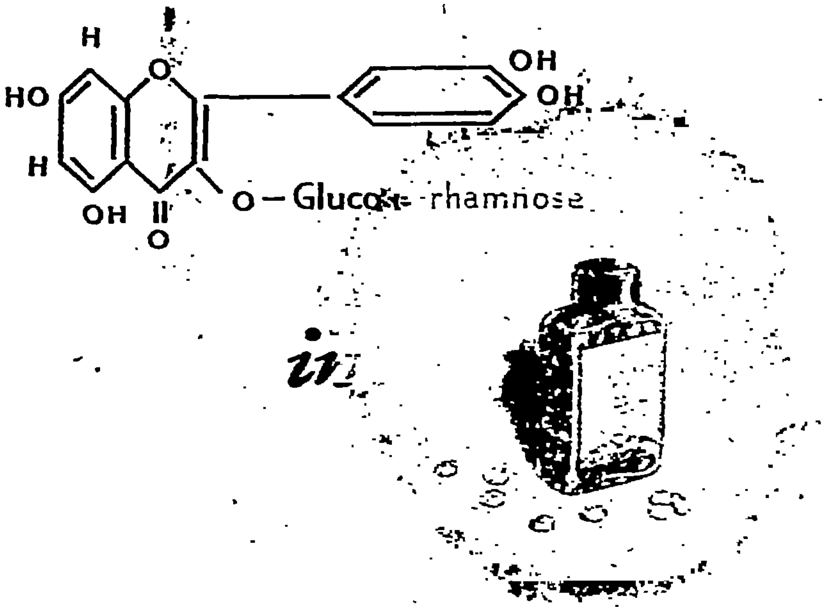
Mr. F. C. DURBIN had followed up 525 cases of *sciatica* and selected 147 cases with neurological signs, treated without operation. Of 123 patients receiving plaster jackets, 79 were relieved or cured.

Mr. G. BLUNDELL JONES had investigated the *penicillin content of the synovial fluid of knees with open war wounds* forty-eight hours after a single instillation of 100,000 units. He found retention, in adequate concentration, provided the effusion was not diminishing. Absorption of fluid led to more rapid disappearance of intra-articular penicillin, but at this stage penicillin was no longer needed in the joint. Penicillin given intramuscularly did not appear in adequate concentration in the synovial fluid of the joint if this was completely immobilised.

Mr. A. L. EYRE-BROOK showed a patient with bilateral cineplastic *forearm stumps* and 2 patients with Krukenberg forearm stumps. The success of the operations (performed by German surgeons) was undoubted, and function appeared particularly good in the Krukenberg stumps because sensation was preserved.

CLINICAL MEETING

Clinical cases were demonstrated at the Princess Elizabeth Orthopædic Hospital by its staff and that of the Mount Gold Orthopædic Hospital, Plymouth. Mr. CAPENER showed cases of lateral rhachotomy for Pott's paraplegia, and his modification of Neufeld nail-plate fixation of pertrochanteric fractures. Mr. G. J. LILLIE showed cases of osteoclastoma and enchondroma treated by radical excision and grafting. Mr. DURBIN presented examples of arthrodesis of the shoulder, showing short tri-fin nail fixation, and of the elbow, showing the value of excision of the radial head. Mr. BLUNDELL



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References: Shortage of space precludes list of references, but full documentation may be obtained on application to Clinical Research Dept. 14B.

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THE LANCET

LONDON: SATURDAY, JUNE 14, 1947

Distribution of Streptomycin

THE frequent appeals by the B.B.C. for streptomycin, sometimes followed next day by notes in the press saying that they produced supplies within an hour or two, have raised doubts whether the drug is being distributed fairly and scientifically or whether ingenuity, luck, a knowledge of the ropes, and even wealth or influence are playing a significant part in the selection of cases. It is unlikely that a single life has been saved in Great Britain by streptomycin obtained from unofficial sources; but it is an unfortunate result of the secrecy imposed on the clinical trials of this drug that no-one can set such doubts at rest. A frank official statement on the supply position, with an explanation of exactly how the cases for treatment are chosen, is needed to clear the air.

Since January, 1944, when SCHATZ, BUGIE, and WAKSMAN[1] first suggested that this antibiotic obtained from *Actinomyces griseus* might be effective against infections which are resistant to penicillin and the sulphonamides, the pharmacology and therapeutics of streptomycin have been studied, mostly but not wholly in the United States, as thoroughly as limited supplies would allow. Its most striking successes have been in *Hæmophilus influenzæ* meningitis; tularæmia; infections of the urinary tract with gram-negative bacilli; and various other gram-negative infections, including meningitis, bacteræmia, and infective endocarditis. There is evidence that it may be effective in plague. But what has raised the greatest hopes, more especially among the public, is its action on the tubercle bacillus. Both in vitro and in animals it was found to be the most powerful drug yet tried, and it was natural that the results of clinical trials received much publicity in the lay press. When it became known that a few cases of tuberculous meningitis were responding to this treatment it was too readily assumed that the long-sought cure for this fatal disease had been found. Since then the parents of every child known or suspected to have tuberculous meningitis have based all their hopes on obtaining streptomycin treatment—and not without reason, since no other remedy holds out any hope at all. On both sides of the Atlantic, therefore, all possible sources of supply have been besieged by the relatives of patients, and their doctors, though there was and is nothing like enough to go round. Unfortunately streptomycin is much more difficult as well as expensive to make than penicillin. In this country three large firms—Boots, Glaxo Laboratories, and the Distillers Co.—have all set up plants for deep culture, but so far the only production estimate published has been one of 250 grammes a month by next June; and the treatment of tuberculous meningitis may require doses of 1–3 g. a day for three to six months; according to HINSHAW et al.[2] the total requirement for a single case may well be 360 g. For the present, therefore, the home product will be useful only for research and the treatment of short illnesses, and we must look to the United States for our main supplies. In America all the streptomycin produced is allocated by a division of the Civilian Production Administration; like other countries, we have been granted a share, but it is unlikely to be enough to treat more than a few hundred cases of tuberculous meningitis, even assuming that most of what we receive is used in that disease. An unknown, but probably much smaller, quantity is imported unofficially, whether in travellers' pockets or through the post; provided the duty is paid there is nothing illegal in this.

The Ministry of Supply has decided that all the streptomycin produced at home or officially imported shall go to the Medical Research Council for distribution, and the council has instituted clinical trials of the drug in six hospitals throughout the country—the Hospital for Sick Children, Great Ormond Street; Hammersmith Hospital; Guy's; the National Hospital for Nervous Diseases, Queen Square; the Alder Hey Hospital, Liverpool; and the Royal Hospital for Sick Children, Glasgow. Other big hospitals have small supplies. The trials, which are apparently confined to children, have now been in progress for several months, and some interim results should soon be forthcoming. Presumably the cases chosen have reached the hospitals concerned through their own outpatient departments or have been sent up in the usual way by outside doctors. The whereabouts of the M.R.C. units have only lately been published, so there are grounds for the suggestion that selection has been largely a matter of luck. Until some way is found to increase supplies only a small proportion of the cases of tuberculous meningitis in the United Kingdom (according to the Registrar-General's returns some 2000 a year) can be treated with streptomycin, but it would do much to satisfy doctors and parents if the claims of each patient could somehow be considered by the research units, so that whether or not a case was chosen for streptomycin treatment would depend solely on its suitability for the trial. The present plan is similar to that adopted by the M.R.C. in its trial of penicillin in infective endocarditis, and there is a close parallel between that disease and tuberculous meningitis in their fatality-rates without specific treatment; but hospitals outside the trial could obtain penicillin for their cases of endocarditis, and sulphonamides also offered some hope of relief. This time the Medical Research Council carries a heavier responsibility, because it has a virtual monopoly of supplies and there is no alternative treatment whatever. As the *Times* of June 6 suggested, it would be a convenience to doctors if there was a central bureau or bureaux to which they could apply when they had a case requiring streptomycin; in London this task could perhaps be undertaken by the Emergency Bed Service of the King's Fund, and outside London by offices connected with the two units at Liverpool and Glasgow. But there is also a need for permanent information bureaux which will know or find out where any scarce drug or piece of apparatus can be found. These would be a useful addition to the National Health Service.

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2. Hinshaw, H. C., Feldman, W. H., Pfuetze, K. H. *J. Amer. med. Ass.* 1946, 132, 778.

clear relation between predisposition to neurosis nd the stress sustained before breakdown. The nduly high incidence among pilots and air-gunners ould therefore be explained both by the extra esponsibilities they bore, and, particularly in the atter instance, by unsatisfactory initial selection. The latter part of the war saw a renewed interest n selection methods, either by psychological tests or by psychiatric interviews, and the development of objective measures of the effects of operational stress on efficiency and health. The psychiatric interview as a selection procedure was the subject of a large study whose methods and preliminary results are described in detail by SYMONDS and WILLIAMS. Field research in Bomber Command by Squadron-Leader D. D. REID showed the feasibility of using objective criteria—e.g., efficiency in action, incidence of disease, and physical measures such as loss of weight—in assessing the results of exposure to operational strain. Further developments along both these lines were cut short by the end of the war, but enough was learnt for the record to be of interest, not only to the Service doctor but to all concerned with problems of mind and morale.

Responsibility of the Nursing Profession

BY proposing to lengthen the course for State registration from three years to four, and by closing some of the smaller training schools, the General Nursing Council have laid themselves open to much criticism. Their wish to safeguard standards of British nursing is wholly admirable; but the method they have chosen cannot be justified if it entails continued neglect of patients. A leading article in the *Nursing Times* of May 31 says:

> "If the interests of the patients become the sole and even the chief consideration in determining points concerning the training and education of the nurse, the patient's interests will ultimately suffer."

But this argument seems to have been carried too far. The fact that patients are already suffering severely—some, even, to the point of dying, completely untended—is equally cogent.

Admittedly the General Nursing Council are in an awkward position. They have power to dictate a curriculum, but no powers to improve training schools, and no responsibility for the final outcome of their decrees. In face of the present acute shortage of nurses three main courses were open to them: (1) to raise the standard of training in the hope of raising the status of nursing; (2) to lower the standard in the hope of attracting more candidates (a course which no-one would recommend); or (3) to do nothing at all. Of these three alternatives it is not perhaps astonishing that they chose the first. But the pity is that they decided to raise the standard of the theoretical instead of the practical side of the training. Our nursing service, like our Fighting Services, needs a limited number of expert senior officers, and a very large body of capable other ranks, drawn from all parts of the community and properly trained in their craft. The new syllabus would put the State course beyond the scope of the average girl now entering nursing, and since training and staffing are bound up together, the immediate result of the change would be to increase greatly the staffing difficulties of the small hospitals. This seeming disregard of the plight of such hospitals may be due to lack of direct experience of their difficulties among members of the council: of the 25 members 17 are women, and 9 of these are matrons or retired matrons of large training schools, 3 have special interests (mental nursing, the British Red Cross and the Civil Nursing Reserve, the Ministry of Health), 3 are sister tutors, 1 is a health visitor, and 1 is not a nurse. Small hospitals seem to have little voice in the council.

A correspondent in our columns last week made two suggestions which might greatly change the position. With the first of these—that nursing education, like medical education, should have the financial support of the State—few will disagree. If the training school was financed separately from the hospital, and if backward and poorly equipped schools could be helped to improve their level of teaching by well-placed grants, there is little doubt that nursing education would benefit greatly. His second suggestion, however, was more debatable. He holds that the State examination has proved a complete failure, and that the time has come to allow every training school, like every university, to develop its own curriculum and give its own certificate, which should entitle the successful candidate to call herself a State-registered nurse. The chief objection to such a plan is that it might intensify the snob differences which—though the common State examination has done much to dispel them—still linger between different schools. The nurse whose certificate for State registration was granted by St. Pontiff's, the famous London voluntary hospital, would have a much better standing, when it came to applying for a senior post, than the S.R.N. of St. Jude's-the-Obscure in Flintshire. Moreover, nurses' training schools, unlike universities, are exceedingly numerous, and already differ widely—far too widely—in their standards. Any measure that increased that diversity would be unfair to the public, who deserve to know that a S.R.N. has carried out a given set of duties, just as they deserve to know that a doctor has had to cover certain well-recognised ground before he is allowed to register. State registration for nurses has on the whole been a qualified success rather than an unqualified failure. Its weakness has been that it has tried to cater for two types of girl—the one who is fitted to study for a senior post and the one who is not. While there is an excellent case for offering a wide choice of opportunities to girls who take a senior course of study—some, possibly, of university standard—there is equally good reason for making sure that all candidates entering the profession get a thorough and uniform grounding in bedside nursing. It is often asserted that educated and intelligent girls entering nursing would be bored and restless if required to attend such a practical basic course; but a group of senior public-school girls recently questioned took the opposite view: since their school work was almost entirely theoretical, they believed they would find it stimulating, they said, to do something practical for a change. They were also strongly convinced that all who entered must have an equal opportunity of attaining senior posts—in short that all should begin in the ranks and be selected for further training on their merits, as now happens in the Army.

Our correspondent suggested that training schools should receive grants from the State by the same sort of mechanism as universities receive grants from the University Grants Committee. Who then should be responsible for allocating these grants? Given such a duty, the General Nursing Council, from being an academic dictatorship, working in a vacuum, might become truly responsible for nursing education, and able to back their requirements with adequate financial help. If the council carried representatives of all types of hospital they might, indeed, become the body responsible for hospital staffing throughout the country. Power is said to corrupt, but coupled with responsibility it often sobers and strengthens. In any event the task of regenerating nursing must be left largely in the hands of the nursing profession itself.

Sterilisation of Instruments

In our leading article of May 17 we argued that autoclaving and dry heat are not always applicable to glass-metal syringes, and that boiling is perfectly satisfactory if certain precautions are taken. Correspondents have pointed out that some spore-bearing organisms are not killed by boiling, and many doctors are evidently worried on this score. In fact, infection of the meninges by spore-bearing organisms, other than *Bacillus subtilis*, have not, so far as we know, been recorded, and the vast majority of these infections have occurred where the most elementary lapses of aseptic technique have crept in. It is probably true to say that, except in serious emergency, spinal anæsthesia should not be attempted unless the operator has access to a syringe which has either been autoclaved or sterilised by dry heat, so that he can be certain that no viable organisms or spores are present. Yet it is clear that for all other forms of injection the risk from spore-bearing organisms is exceedingly small. Boiling for 10 minutes, especially if sodium bicarbonate is added, does in fact kill the vast majority of spores; and boiling is the only method within the scope of the general practitioner. The sodium bicarbonate, however, must be removed before the syringe is used, since it reacts with many solutions.

A correspondent this week suggests that solutions other than water may be used. Sucking up hot oil is widely employed for this purpose, but it has been criticised on the ground that the oil does not penetrate between the barrel and the cylinder, and that tests have shown this method to be unsafe. Boiling methylated spirit has also been suggested, but with this method there is obvious danger of fire. Hypertonic solutions with a boiling-point above 100°C have also been used, but with these it is necessary to remove all vestige of the solution from the syringe, and autoclaved water would probably not be available.

However, the most important point is that the vast majority of infections following injections are due, as we have said, to organisms which can readily be killed by boiling. If doctors in general would finally discard antiseptic solutions of any kind and rely on boiling for all injections, other than those into the theca, very little would be heard of syringe or needle infection.

Annotations

CONSCRIPTION AND VENEREAL DISEASE

In the House of Lords on June 3 Lord Moran gave a disquieting account of the prevalence of venereal disease among our soldiers abroad. As will be seen from the report on another page, he quoted annual new-infection rates of 228 per 1000 for Japan, 185 for Germany, 168 for Austria and Italy, and 141 for Burma and Malaya. These figures contrast very unfavourably with the rate for the Army at home, which is itself none too low at 33. They recall the high incidence of venereal disease in our Army of the Rhine in 1919.

Lord Moran was speaking on the National Service Bill, and he suggested that, since conscription as now contemplated will apparently do little or nothing to give this country security in time of war, it is really being proposed as a means of providing armies of occupation. Yet the use of conscripts overseas was, he said, a policy which no democratic European government had ever countenanced; and he was profoundly concerned at its effect on health and morale. Absence from home was the vital factor in the high incidence of venereal disease now reported: too often, moreover, "the men have no healthy means of distraction. They lead a mechanical life, they have not enough to do, and they are just waiting for the time to get out." The figures lent no support to the idea of the Army as a people's university, teaching men citizenship:

> "The most friendly critic of the Army must feel that these figures mean that during the conscript's time abroad his experience in the Army is a demoralising experience. To segregate young men at the beginning of their life, under these conditions, is a very poor preparation for the more serious view of life which is so sadly needed at the present time."

The alternative which Lord Moran preferred to conscription was voluntary recruitment for the Army—which in his opinion has not yet really been tried. Hitherto the soldier leaving the Army has had no guarantee of getting regular work, though Lord Moran was glad to learn that provision was in future to be made for fitting such men into civil life.

On the immediate problem of the young soldier serving abroad, Lord Nathan, replying for the Government, agreed that the incidence of venereal disease is serious and demands proper and prompt action. Intense thought was being given to it by the military authorities, and admirable work had been done by the chaplains, by the educational and welfare services, and by commanding and regimental officers. "But on the whole," added Lord Nathan, "we must rely upon the reflection in conduct abroad of what these young men learn at home"; and he put his faith, in the final instance, in a "correct upbringing." To this it may be answered that no Service which in time of peace compulsorily removes boys of 18 to an unfavourable environment can divest itself of a grave responsibility.

TUBERCULOSIS CONTROL IN MINNEAPOLIS

A sanatorium of 750 beds has today 150–200 of them vacant. Such a statement makes us automatically despair of the ever-present shortage of staff; but, when we read further that these 150 beds, fully occupied twelve years ago, are empty for lack of anyone to put in them, despair gives way to astonishment. Such a state of affairs has arisen in Minneapolis, and is attributed to a tuberculosis control programme started there in 1920.

According to Myers[1] a mortality of 120 per 100,000 in 1920 fell to 27·1 by 1945. The decrease in the incidence of infection is reflected by extensive tuberculin-testing, on which the control scheme is mainly based. For ample, in 1926 a representative group of children oduced 47·3% positive reactors; in 1936 a similar oup showed 18·9% positive; and by 1944 a further oup had only 7·7% of reactors. Undoubtedly several ctors are responsible for such reduction in infection. yers believes the most important to be (1) prevention cases of the reinfection type of disease from becoming fectious, by early treatment; (2) isolation of the fectious in institutions or at home; and (3) eradication tuberculosis in cattle.

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[1] Myers, J. A. *Publ. Hlth Rep., Wash.* 1946, 61, 1563.

After extensive tuberculin-testing, all positive reactors er the age of 12–14 years are radiographed yearly. his is feasible because of the comparatively small oportion of positive tests. In adults radiography ery six months is recommended. Radiography of ildren under 12–14 years so rarely revealed serious sease that its routine use has been discontinued.

In dealing with primary infections all forms of therapy ve been abandoned, and the funds thereby saved are plied to more extensive tuberculin surveys, search for urces of infection, and radiography of adult reactors tuberculin. Very different is the attitude to the infection type of disease. Minimal lesions, apparently nsidered non-infective, are treated by ambulatory eumothorax. In this way it is hoped to prevent ore serious disease and its associated infectivity. hould such therapy for any reason be contra-indicated, ese cases are treated in common with the frankly open" cases in hospital. Though primary tubercusis has been seen to develop in over 1000 adults, such te first infections are believed to be no more hazardous han those occurring in childhood. Further, such dults do not develop the reinfection type of disease more han do others of the same age.

It is an interesting and successful demonstration of uberculosis control by lowering the incidence of infection, s distinct from raising the resistance by vaccination. yers holds that such a low incidence is safe and esirable. This control programme is not as a whole pplicable to centres in this country, but there are essons to be learnt, and it remains a fact that in inneapolis there are 150 beds begging for patients.

THE SOUTH AFRICAN FOSSIL "APE-MEN"

OVER twenty years ago Prof. Raymond Dart, of the Witwatersrand University, described the fossil skull of an extinct ape-like creature discovered in limestone deposits at Taungs in Bechuanaland. Pointing to certain strikingly human characters of the skull and dentition, he gave the name Australopithecus to the fossil. Later, more remains of the same type of creature were discovered by Dr. R. Broom, F.R.S., in limestone deposits not far from Johannesburg, and these are now all regarded as representatives of a common subfamily, the Australopithecinæ. Quite recently these fossils have once more come prominently into the news. There are three reasons for this: (1) the publication at the end of last year of a comprehensive monograph by Broom and Schepers[1] on all the remains discovered up to that time; (2) the discussion on their significance at the Pan-African Congress on Prehistory held at Nairobi last January; and (3) the discovery by Dr. Broom within the last few weeks of a new skull (almost complete except for the mandible) as well as portions of jaws showing more details of the permanent and milk dentitions.

At a meeting of the Zoological Society in London on May 13 a detailed account of the australopithecine material discovered up to the end of last year was given by Prof. W. E. Le Gros Clark, F.R.S., who has lately made a personal study of the original fossils in South Africa. Their main anatomical features can be summed up briefly. The general proportions of the skull are simian, with a relatively small brain-case and massive jaws. The intracranial capacity in the adult must have reached about 600 c.cm. and thus falls within the simian range; however, it is probable that the brain-weight/body-weight ratio was rather higher than in the modern large anthropoid apes, for the fragments of limb bones so far discovered indicate that the Australopithecinæ were relatively lightly built creatures. In the details of the skull and dentition there are several characters which differ significantly from those of the modern apes and make a remarkable approach to the Hominidæ. These include the contour of the supraorbital region, the relation of the frontal pole of the brain to nasion and glabella, the relatively weak development of the temporal ridges and the nuchal crest, the conformation of the glenoid cavity, the contour of the zygomatic bone and the "set" of the zygomatic arch, the relatively forward position of the foramen magnum, the persistence of the sutures on the roof of the skull after the eruption of the third molar, the shape of the palate and dental arcade, the relatively small size of the permanent incisors and canines, the nature of the wear of the permanent molar teeth, the cusp pattern of the first lower milk molars, and the diminutive size of the milk canines.

The new skull discovered by Dr. Broom on April 18 of this year confirms many of the inferences already drawn from less complete material. Those who are acquainted with the comparative anatomy of human and simian skulls will recognise from Dr. Broom's drawings and photographs in *Nature*[2] and the *Illustrated London News*[3] that this new australopithecine skull (which belonged to an old individual) shows human characteristics not to be found in fully mature ape skulls—particularly in the contours of the frontal and occipital regions and in the inclination and set of the orbits. There is also some reason to suppose, from these illustrations, that the flexion of the basicranial axis approached to some degree that characteristic of the human skull. The hominid characters of the skull and dentition of the Australopithecinæ are paralleled in a remarkable way by the limb bones, of which several fragments have so far been discovered (the lower end of a humerus, the upper end of an ulna, a talus, the lower end of a femur, and a capitate bone). The talus and the capitate bone show a curious mixture of simian and human features, but the other limb-bone fragments would probably have been assigned to Homo if they had been found unassociated with other parts of the skeleton. They certainly indicate that the australopithecine apes were capable of standing and walking with an erect posture closely approximating to that of man. This inference is supported by indirect climatological evidence that the country in which they lived was probably rather arid, and certainly not forested like the habitat of the modern anthropoid apes. Presumably, therefore, they must have been adapted for a terrestrial rather than an arboreal mode of life.

The significance of these remarkable South African fossils in the study of human evolution is likely to provoke discussion. Certain facts, however, seem well assured. They are clearly representatives of the Hominoidæ—the name given by Simpson[4] to the superfamily which includes in a common zoological group man and the anthropoid apes. They differ in many important respects from all the modern large anthropoid apes (and from all the extinct large anthropoid apes yet known) and in almost all these respects show closer resemblances to the Hominidæ. This is no longer a matter of dispute among those anatomists who have made a careful systematic study of the remains. The problem now resolves itself into the question of what these resemblances signify. If the usual morphological criteria for assessing zoological relationships are accepted, it must obviously be concluded that the Australopithecinæ are much more closely related to man than are the modern anthropoid apes. The possibility must no doubt be considered that their hominid characters are, so to speak, fortuitous, in the sense that they might be the expression of a parallel or convergent evolutionary process. But the resemblances are so numerous, detailed, and intimate, that this interpretation seems far-fetched. Whether the fossils have an ancestral relationship, direct or indirect, to *Homo sapiens* can only be finally determined when their geological age is accurately known. The type of the associated fauna has led local prehistorians in South Africa to the general conclusion that they are probably of Pliocene age; and, if this proves to be so, the fossils may well have been representatives of the ancestral stock which gave rise to the Hominidæ. If it were shown by further geological studies that they are of more recent date, they could at most be regarded as late (and apparently little modified) survivors of such an ancestral stock. These seem reasonable inferences from the data so far available, and from the strictly anatomical point of view there appears to be nothing to preclude an ancestral relationship.

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[1] Broom, R., Schepers, G. W. H. The South African Fossil Ape-Men, 1946, Transvaal Museum Memoir, no. 2.

[2] *Nature, Lond.* May 3, 1947, p. 602.

[3] *Illustrated London News*, May 17, 1947, p. 508.

[4] Simpson, G. G. *Bull. Amer. Mus. Nat. Hist.* 1945, 85, 1.

Some of those who have studied the australopithecine fossils have expressed doubt whether they should be regarded as a very progressive type of ape or an exceedingly primitive type of man. This doubt is readily understood when the anatomical details of the skull, dentition, and limb-bones are considered in detail one by one. Dr. Broom refers to these creatures as "ape-men," and this general and non-committal term has much in its favour. In his discourse at the Zoological Society, Professor Le Gros Clark suggested that, in view of the relative size and proportions of the brain, it might be desirable (pending the further evidence which is now accumulating) to adopt a conservative attitude by calling them apes rather than ape-men. He also urged that final and emphatic statements about their relation to the origin of man should be avoided for the present, since the discoveries during the last few weeks, and those likely to be made in the near future, will certainly yield much more information.

EDINBURGH AS POSTGRADUATE CENTRE

As might be expected from its ancient teaching tradition, Edinburgh is not lagging in its organisation of postgraduate education. In the last few years great difficulties have been surmounted; and the recent appointment of Major-General Sir Alexander Biggam, late consulting physician to the Army, as director of postgraduate studies, reflects the importance attached to further development in this sphere. The criticism that the Royal Infirmary contains too few patients for the proper training of postgraduates, in addition to large undergraduate needs, is more than ever valid in the present post-war rush. The Edinburgh Post-Graduate Board for Medicine has therefore looked elsewhere for its clinical material; and students are conveyed to the three large municipal hospitals, to special hospitals, and to the Royal Infirmary's rehabilitation centre. These are situated within easy reach, so little time is spent on the journeys. With sections of classes visiting these centres in rotation, the experience is wider than would be obtained by continuous instruction in the same general hospital; and the presence of postgraduate students in the various hospitals provides an additional stimulus to the staffs. The eventual aim is to establish a separate school for postgraduates, physically near to, but administratively independent of, the Royal Infirmary. There is little hope of new building within the next decade, but as an expedient the use of one of the smaller existing hospitals in the city would temporarily meet this need. At present the board is conducting short refresher courses and four long courses per year—two in internal medicine and two in general surgery. Applications for enrolment far exceed vacancies, and selection candidates according to qualifications and experience is made.

Edinburgh was always known as a gathering-point for overseas students, and the present postgraduate classes contain an ever-increasing number of graduates from South Africa, Canada, India, and other parts of the world. Undoubtedly some Dominion visitors, particularly those from Australia and New Zealand, who formerly came in large numbers, are deterred by the fear that they may not find accommodation. The board helps, where it can, by passing on the addresses of recommended lodgings and private hotels; but their number is often insufficient, and the authorities are seeking to buy a building capable of housing 80–100 students. The university must now be regretting that it did not take, or was not offered, the chance of purchasing the houses of University Hall—formerly run, principally for undergraduates, by the Town and Gown Association—which were sold at the end of the war.

Most other medical schools will acknowledge their debt to Edinburgh's example in the arrangement of systematic teaching, and they will still find novelties. For example postgraduate students are asked, at the end of each course, for their frank criticism of the arrangements for their instruction, and many of their proposals have been incorporated in the programmes of the classes.

RADIUM TODAY

THE Cancer Act of 1939 is now superseded by the National Health Service Act of 1946, and most of its provisions will be carried out by the new regional boards. The Radium Commission [1] strongly urge that every region should have a cancer organisation, under the wing of the regional board, to help in planning cancer treatment. From their long experience they suggest that this organisation should see that there are facilities for early diagnosis, treatment by trained specialists, follow-up, records, and research, and should make sure that these facilities are fully used by all concerned. The many difficulties to be overcome include lack of specialists (both surgeons and radiotherapists), and inadequacy of buildings and equipment, while further research will be needed to exploit recent discoveries in nuclear physics. The reports from the various centres indicate how some of these difficulties may be overcome, but through every report runs the same story—new building is essential. Birmingham has produced a cancer scheme for the West Midlands, but this depends on the opening of a new block at the Queen Elizabeth Hospital, for which an "A" licence has not been obtained. Leeds is seeking authority to add a new block to the present X-ray department. Liverpool must erect temporary accommodation. Newcastle has to treat patients in three hospitals, one at a considerable distance, which is extravagant both in the time of the specialist staff and in the use of specialist equipment. Manchester is fortunate in having obtained a licence to add an additional story to a ward block, but this must be followed by further building to make room for necessary equipment and services. It is easy to see how centres faced with so many obstacles can be helped by an advisory body, such as the Radium Commission. The evolution of specialist services for cancer can be properly controlled only if expert opinion is to be had when difficult decisions must be made.

The work done by the technical committee is also important. Large quantities of radium have been turned over by the Radium Trust for the increasing work of the commission's centres, and though there is still a bottleneck in the making and filling of containers, radium is gradually reaching the centres and enabling clinicians to try new methods of treatment. Particulars of the new types of container which have been measured and accepted during the year 1945–46 are given in an appendix to the commission's report—a valuable list of the approved types which will be helpful to hospitals when ordering new radium. The use of radon is also being brought under control. Under an arrangement with the Medical Research Council the radon centre at Barton issues radon only to hospitals which have been approved by the commission, and such approval is given only to those hospitals which have a radiotherapeutic department properly organised and equipped, and where the use of radon is suitably supervised.

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[1] 17th Annual Reports of the National Radium Trust and Radium Commission. 1945–46. Cmd. 7127. H.M. Stationery Office. Pp. 28. 6*d*.

PLANS OF THE R.M.B.F.

Westmoreland Lodge, the home for old people sponsored by the Royal Medical Benevolent Fund, is nearing its date of opening. In his report on the R.M.B.F.'s work presented to the annual general meeting on June 5, Mr. R. Handfield-Jones, F.R.C.S., spoke of this project as particularly dear to Sir Arnold Lawson, the late president, who before he died was able to ensure that a suitable house had been bought. This stands in its own grounds near Wimbledon Common, conveniently placed for bus routes to Wimbledon and Putney. It will contain enough single-room flats to receive twelve elderly ladies capable of looking after themselves, doing their own shopping, and cooking their own breakfast, tea, and supper. Midday dinner will be provided at a very low cost and served in the common dining-room and lounge. Residents will be independent, living with their own furniture round them, but the fund will supply central heating, hot and cold water, a gas or electric fire, and a gas-ring in each bed-sitting-room. The house has cost £7000, and repairs and alterations are estimated at a further £5000. Annual expenses will include rates, wages, garden, insurance, light, and heat. If Westmoreland Lodge proves a success the managers of the fund hope to open another home, possibly for elderly men, or possibly for the sick who need nursing. Meanwhile the undertaking has called for courage, and Mr. Handfield-Jones trusts that it will be cordially supported. The council of the British Medical Association have allocated £200 to it, and Mr. Handfield-Jones asks all the fund's subscribers, when sending their annual subscriptions, to add a special additional cheque or banker's order marked "Westmoreland Lodge." The profession should look after its own, when they fall on evil times, and he is confident they would resent outside assistance, in spite of the many opportunities of appealing to the general public which offer from time to time. He asks that, besides giving himself, every subscriber should enlist another during the year.

At the annual meeting Sir Alfred Webb-Johnson, P.R.C.S., was elected to succeed Sir Arnold Lawson as president. Dr. C. L. Batteson will remain treasurer, and Mr. V. H. Riddell, F.R.C.S., succeeds Mr. Handfield-Jones as hon. secretary.

PRESIDENT TRUMAN AND NATIONAL INSURANCE

On May 19 President Truman in a special message asked the United States Congress to give "immediate attention" to the question of enacting a national health programme to assure that "the opportunity for good health be made available to all, regardless of residence, race, or economic status." He stated that in November, 1945, he had in a message to the last Congress outlined a long-range health services plan, and that certain advances in the directions he then indicated had been made; but he urged the need for further effort to provide: (1) adequate public health services; (2) additional facilities for medical research and medical education; (3) more hospitals, and more doctors, dentists, and nurses; (4) insurance against costs of medical care; and (5) protection against loss of earnings during sickness. He laid special stress on the need for further research in the prevention and cure of disease, and for expanded educational facilities to meet the shortage of medical personnel, which is now severely felt, particularly in the rural areas, and would, he said, "continue to plague the nation until means are found to finance modern medical care for all of our people." The main conclusion to which Mr. Truman's review of the situation leads him is that "national health insurance is the most effective single way to meet the nation's health needs. Hitherto the American advocates of national health insurance have encountered formidable opposition from influential quarters—notably from the American Medical Association—and they appear to have achieved but little success in their efforts to secure legislation to carry their prospects into effect. But during Mr. Roosevelt's long period of office compulsory insurance against unemployment and old age was introduced and met with general acceptance, and it seems possible that familiarity with the practical working of these forms of social security may have removed much of the hostility to the form of social security that provides medical care through national insurance. In his latest message Mr. Truman states that he regards health insurance as "a logical extension of the present social security system which is so firmly entrenched in our American democracy"; and he concludes:

> "The total health programme which I have proposed is crucial to our national welfare. The heart of that programme is national health insurance. Until it is a part of our national fabric, we shall be wasting our most precious national resource and shall be perpetuating unnecessary misery and human suffering."

REMUNERATION OF SPECIALISTS

Some time ago the Minister of Health and the Secretary of State for Scotland appointed a committee to recommend "what ought to be the range of total professional remuneration of registered medical practitioners engaged in the different branches of consultant or specialist practice in any publicly organised hospital and specialist service." The membership of the committee has now been announced as follows:

Sir Will Spens (chairman), Mr. C. R. Dale, Sir Thomas Gardiner, Mr. T. Lister, Miss Elizabeth Looker, Prof. D. Murray Lyon, F.R.C.P.E., Lord Moran, P.R.C.P., Mr. Leslie E. Peppiatt, Prof. Harry Platt, F.R.C.S., Dr. S. Cochrane Shanks, F.F.R., Mr. J. R. H. Turton, F.R.C.S., with Mr. T. B. Williamson (Ministry of Health) and Dr. D. P. Stevenson (assistant secretary, British Medical Association) as joint secretaries.

THREE MONTHS' POSTPONEMENT

The day appointed for starting the National Health Service and the related schemes of social insurance has been changed from April 1 to July 5, 1948. In his statement last Monday the Prime Minister pointed out that "the various schemes are closely linked up with each other and with proposals for completing the break-up of the poor-law, and providing a comprehensive scheme of national assistance, standing behind the insurance provisions." A Bill to end the poor-law will be introduced next session, so that all the schemes can be brought into operation on the same day.

We regret to announce the death of Mr. John Crowlesmith who retired last year from the board of directors of Messrs. Hazell, Watson & Viney, printers of The Lancet. Eighty-six years of age, he joined the firm in 1882, and for the last 25 of his 64 years' service he was our valued associate in the production of this journal. He held office as president both of the London Master Printers' Association and of the British Federation of Master Printers, and he leaves happy recollections with all who worked with him.

eir treatment in the ward while at the same time her rderlies are re-educating the up-patients in walking. n the physiotherapy department patients with chronic ronchitis and emphysema are given group exercises to ncrease diaphragmatic movement, while those who need use the spirometer. Patients with lesions in the osterior columns of the spinal cord are given Frenkel's xercises to re-educate their kinæsthetic and proprioceptive sense, watching and checking their own movements in mirrors.

Control of intention tremor in disseminated sclerosis.

It seems useful to mention here the practice at another hospital—St. Helier, Carshalton. There, too, the nursing situation is acute, and has compelled this large general hospital to restrict its geriatric unit to two wards of thirty beds each. But St. Helier has the advantage of new buildings and lavishly equipped physiotherapy and occupational therapy departments, and has made use of these to develop outpatient treatment on an unusually wide scale. Many old people who cannot be found beds in the wards are collected daily in a Ford shooting-van, to attend exercise classes, receive physical treatment, and spend some hours in the occupational therapy department. The van runs a shuttle service, delivering three groups of patients daily, and taking them home again; and the members of each group naturally soon form a friendly and emulous club. Exercises are given early to hemiplegics, to strengthen backs, arms, and legs, and prevent contractures; and many of the patients have rheumatic and arthritic troubles which respond to treatment. A large ward has been equipped as a gymnasium, and contains, besides, six cubicles with couches, where radiant heat and other forms of physical treatment can be given. The occupational section contains benches for carpentry, and large looms, as well as rug-weaving looms which demand much use of the fingers, and small box looms which can be used in the wards.

THE USE OF SPRINGS

At Orsett, bed-patients are helped to exercise their muscles by some ingenious devices. The paretic and rheumatic limb have this in common with a prosthesis: the patient is aware of their weight. If some of the weight is lifted, movement can be much more easily effected and controlled; that is why exercises in the warm pool are so successful with young patients. Old people, however, can hardly be subjected to such measures, and Dr. Cosin therefore uses helical springs of varying tensions to help movement of the limb by reducing its effective weight. Springs of appropriate tension are attached to a balkan beam above the bed; linen slings, fastened to the free ends of the springs, carry the weight of the patient's arms or legs. If the patient needs to make an upward movement he has some slight support which encourages him to attempt it; if he needs to bring a hand or foot down to the bed he must overcome the slight resistance of the spring, which exercises the muscles used. Since gravity acts in the opposite direction to the spring this slight resistance is never too much to be overcome. This constant gentle exercise is applied to rheumatic arms and legs, to limbs recovering from paralysis due to a stroke, to limbs crippled by rheumatoid arthritis, to legs recovering after fracture of the femur, and to the incoördinate arms and legs of patients with disseminated sclerosis. Backs which need support are exercised on the same principle: a loosely padded linen back-sling, with a groove down the middle to allow room for the spinous processes of the vertebræ, is attached to two springs fastened to the foot of the bed. The sitting patient receives, from this sling, constant gentle lumbar support which reinforces his efforts if he wants to lean forward, and must be overcome if he wants to lean back on his pillows. The lumbar muscles are thus constantly mildly exercised, and respond by gaining strength.

Cases of hemiplegia, if straightforward and mild, are provided with springs and slings within a few days of the stroke. Light plaster splints may also be used to prevent contractures of the paretic limbs—for example, to maintain dorsiflexion at the wrist. Contracture of the pectoralis major can be prevented by an appropriately designed spring apparatus. Exercises are given, and in uncomplicated cases the patient is approaching reablement in six weeks. Incidentally, exercises can improve many other conditions. The intention tremor which gives so much trouble to the disseminated sclerosis patient can be largely overcome by the use of appropriate exercises; and even in such a hopeless and progressive condition as Friedreich's ataxia, severe disability can be long postponed. These conditions are not found in old people, of course, but patients afflicted with them are likely to be found in hospitals for the chronically ailing and the old.

THE FRACTURED FEMUR

The common accident to the elderly, fracture of the neck of the femur, is actively treated. His aim being to get early active movement without weight-bearing, Dr. Cosin prefers to pin intracapsular fractures of the femur rather than to treat them by extension. The shock of moving a patient in an extension apparatus on and off the bed-pan several times a day is greater than that of operation with a skilfully administered anæsthetic; and the care of the back is made much simpler if the patient is able to move about in bed. The Roger-Anderson apparatus, which applies well-leg traction, has proved suitable though not ideal in the treatment of the pertrochanteric fracture, because though the patient's legs are immobilised he can exercise his back muscles freely. In this method of treatment the weight of the plaster is partly carried by a spring and sling. Skeletal or skin traction is not often used because, by tending

Pertrochanteric fracture of femur treated by well-leg traction and springs.

to immobilise the patient on his back, it not only encourages pneumonia but adds greatly to nursing difficulties. At 70 or 80 a perfect anatomical result is less important to the patient than an early escape from bed, with bony union even if there is some shortening.

At Orsett the scarcity of good trained staff has made it difficult to foster the same enthusiasm for this kind of work which has grown up at the West Middlesex; and this is reflected in a slightly different spirit among the patients. Certainly the women are on the whole brisk and interested, but the senile old men are torpid and sluggish with little taste for any sort of activity. Whether a good part-time nursing scheme, in the Gloucestershire tradition, might alter this is something which the Essex County Council is taking steps to find out. Where such good work is already being done it seems a pity not to ensure that it is done under the best possible conditions.

Gloucestershire Hospitals

In Gloucestershire a soundly planned part-time nursing scheme[1] has benefited the old people in hospital. These nurses—who are not mere supernumeraries but form the actual staff of the hospitals—are drawn from every quarter of the county, and are picked up every day at approved collecting centres and carried to and from work, at the authority's expense, by taxi. Some are State-registered nurses, some assistant nurses; some when engaged have had a little previous nursing experience, some have had none. All are accepted, given responsibility appropriate to their standing, and trained to take more. They are asked to give just what time they can afford from other duties; and in practice the four-hour unit of service has proved acceptable, many nurses working this span on six days a week, others on two or three days. Their uniform is provided and laundered, and they are given a meal on duty.

One result of this modern scheme has been that the old people in infirmaries are now well cared for in fully staffed wards. A second, even more important, result is that the programme of medical and surgical treatment can now be greatly expanded. In the days of the shortage, treatment had to be reduced to its simplest terms because the nurses were too hard-pressed to attend to detail. No physiotherapist was attached to the hospitals at the time, which meant that the measures used successfully at Orsett could not be developed; but the county is now advertising for two physiotherapists and an occupational therapist. Already much is being done. Old people who had been kept unnecessarily in bed, simply because there were not enough nurses to get them up and dress them, are now getting about; and others will be able to join them when they have been given a few simple exercises and possibly some massage. Dr. T. B. H. Haslett, the consulting physician, would like to see a comfortable old people's home associated with the hospitals, to which those who have no homes of their own could be sent when they are fit. Gloucestershire had a good home of the kind, but has been obliged, owing to shortage of beds, to use it as a maternity hospital for the past five years; which means that many reabled old people have had to remain in the infirmaries.

SOME PROSPECTS

Those capable of such recovery include hemiplegics who have never been allowed to grow contracted and bedridden; patients with heart-failure who have profited by small doses of digitalis, mercury diuretics, and breathing exercises; patients with chronic bronchitis, who also benefit from breathing exercises, coupled in their case with small doses of ephedrine and perhaps inhalation of penicillin spray; and diabetics whose disease has been stabilised. With the help of a physiotherapist it will be possible to get many old people crippled with arthritis on to their feet. Attention to salt and water metabolism, blood-transfusion, and penicillin have all helped to make surgery safer for old people. Active treatment of all kinds in the infirmaries will in time encourage doctors to send in their old patients early instead of as a last resort; and the rise in standards of nursing is already changing the attitude of prospective patients: they no longer dread admission to hospital. Even old and forbidding buildings have changed their character with the help of light paint and the birth of an eager spirit in the staff.

Orsett and Gloucestershire, both doing good work for the old, present an interesting contrast in methods: one being founded on advanced physiotherapy with a minimum of ordinary nursing, the other on an able and numerically adequate nursing staff. While it is probable that a combination of both these services will give even better results, it is also clear that good schemes can be developed even in the presence of great handicaps.

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[1] *Lancet*, March 8, pp. 294 and 300.

Special Articles

GENERAL MEDICAL COUNCIL

AT the 171st session of the council, after the President's address, reported last week, 28 penal cases were considered.

Penal Cases

The name of *Herbert Stanley Arnell* was restored to the Dentists Register after penal erasure.

ALLEGED NEGLIGENCE AND COVERING

Chandra Shekhar Jagannath Dan De Kar, registered as of 24, Marden Road South, Whitley Bay, Northumberland, L.M.S.S.A. (1935), appeared in answer to five sets of charges:

(1) A conviction before magistrates in December, 1946, of failing to register dangerous drugs on 5 occasions and irregularly procuring them on 2 occasions; (2) in October, 1944, operating on a patient for scrotal hernia in his surgery without another registered medical practitioner being present; negligence in allowing the patient's face to be burnt and one of his arms to become paralysed, in sending him home in a few hours, in not visiting him that day, and in failing afterwards to treat or advise him properly for his injuries; negligence in operating on the hernia, so that a further operation was necessary; (3) in December, 1944, performing subtotal hysterectomy in his surgery without another registered medical practitioner being present; sending the patient in an ambulance after $3^1/_2$ hours, unaccompanied by a registered medical practitioner or a State-registered nurse, to her home, where she died two days later; negligence in and after the operation; (4) in April, 1945, removing tonsils and adenoids from a boy of 16 at his surgery, immediately after his first examination, without another registered medical practitioner being present; the respondent (the charge alleged) gave the anæsthetic, an unregistered person continued it, and the patient died without regaining consciousness; the performance of the operation was in all the circumstances an act of negligence; (5) signing blank prescription forms to be filled up by his nurse, thereby knowingly enabling her to treat insured persons and engage in professional practice as if she were qualified and registered.

Dr. Dan De Kar was accompanied by Mr. C. Paley Scott, K.C., and Mr. Norman Black, counsel, instructed by Messrs. Bentleys, Stokes, and Lowles. Mr. Gerald Howard, counsel, instructed by Messrs. Waterhouse, presenting the case for the G.M.C., said that the respondent had prescribed morphine sulphate for two of his insured patients who did not need it, and had received the drug himself. The doctor, after operating on the patient for scrotal hernia, had sent him home in an ambulance while still unconscious, and in spite of repeated telephone calls had not visited him till the next evening, and had not prescribed either for the burn or for the paralysis. He had charged a fee of 12 guineas. The operation for subtotal hysterectomy had been performed on a married woman of 31. The post-mortem examination, performed by the police surgeon, had not stated the exact cause of eath, nor confirmed the doctor's diagnosis of cancer. he youth upon whom the doctor had operated for nsillectomy had died on the operating-table. The only ersons present at these operations beside the doctor had een: a State-registered nurse, Miss Evelyn Adamson, nd an unregistered woman assistant.

The signing by the doctor of blank prescription forms ad been disclosed in the evidence of the doctor and iss Adamson in proceedings taken against them at ewcastle assizes for conspiring to obtain payment from he local authority by false pretences, of which charges hey had been acquitted. Dr. Dan De Kar had there dmitted, and Miss Adamson had confirmed, that he abitually left half a dozen signed forms with her when e went on his rounds. Forms had been produced bearing is signature and made out in Miss Adamson's handriting for iodoform gauze, white wool, aspirin, and over's powder. Mr. Howard called evidence in support f the charges.

The patient with scrotal hernia said in evidence that he ad been unable to have the operation performed in hospital ithout a long delay. On entering the operating-room he had een only the doctor, Miss Adamson, and a girl smoking a igarette and arranging instruments. He had been given a eneral anæsthetic, he did not know by whom. The doctor as in his shirt-sleeves and a rubber apron; the women ere not wearing gowns. His arm had remained paralysed or about 8 months. The doctor had visited him to take out titches, and had made him a belt, which he had not worn, but had not treated or prescribed for his face or arm injuries. The husband of the deceased woman patient said in evidence that he had been serving overseas at the time of the operation and had authorised it in writing. He had complete confidence in the doctor, who still attended him and his children. The father of the deceased boy said that the boy had suffered from infected tonsils and adenoids all his life. He had had an anæsthetic before. The father had complete confidence in the doctor and had signed a letter sent to the council by the branch committee of his trade-union asking that the doctor's name might be kept on the register.

Dr. Dan De Kar, giving evidence on his own behalf, said he had obtained the licence of the Bombay College of Physicians and Surgeons at the age of 20, and had qualified in England in 1935. He had studied for some time under Prof. G. Grey Turner. He had devoted himself exclusively to hard work, playing no games and taking no holidays. He had always been keen on surgery and had assisted Professor Turner and other eminent surgeons. He had equipped his own theatre when building the house in 1938. He had a waiting-room, a consulting-room with three cubicles, an ante-room, and the theatre. He had performed nearly 2200 operations there, mostly for the removal of tonsils, and apart from the two deaths mentioned in the charge had had only one other fatality. No medical help had been available in war-time, but Miss Adamson was highly qualified and competent. He had himself given the anæsthetics —A.C.E. mixture—and both he and his assistants had worn proper clothing. The deceased woman patient's uterus had been septic and invaded by a large malignant growth; her general condition had been poor. He had himself accompanied her home in the ambulance and had seen to her disposal in bed, and he had sent home for sheets of his own to put on the bed. He had visited her at frequent intervals until her death. Dr. Dan De Kar had no idea of the cause of the paralysis of the arm of the patient with scrotal hernia; at operation the arms had certainly not been overhanging the table. The burn was probably due to chloroform. No complaint had been made to him at the time. He admitted signing blank prescription forms to enable Miss Adamson to fill in details of routine medicines and appliances. She had never prescribed a dangerous drug nor any medicine that had not already been ordered by the doctor. This practice had been necessary to enable the great volume of work to be handled, but he had discontinued it. He undertook to perform no more operations at his own premises.

The council found the convictions for offences against the Dangerous Drugs Acts proved, and on this charge suspended judgment for two years, subject to the doctor's good conduct in the interval and his production of testimonials at the adjourned hearing. They found the charge respecting the operation for scrotal hernia not proved to their satisfaction. They found that the doctor had performed the operation for subtotal hysterectomy without another qualified or registered person being present, and had caused the patient to be taken home in an ambulance about $3^{1}/_{2}$ hours afterwards, but not that she had been unaccompanied by a doctor or nurse, nor that he had been guilty of negligence in this case, nor that the facts disclosed infamous conduct in a professional respect. They found that the performance of the tonsillectomy operation was an act of negligence not amounting to infamous conduct. They found the facts concerning the signing of blank prescription forms proved, but these also did not in their judgment amount to infamous conduct. The president admonished Dr. Dan De Kar to reconsider his position in regard to these operations, and said that the council took a grave view of laxity in certification.

MOTORING AND DRINK

Patrick O'Neill, registered as of Drombanna, Limerick, M.B. N.U.I. (1939), appeared in consequence of convictions before magistrates in 1943 for driving a motor-car while drunk and for improper use of fuel, and a conviction at assizes in 1946 for dangerous driving, for which he was imprisoned for three months. The council found the convictions proved but dismissed the case.

William Belton, registered as of 39, Blakehall Road, Wanstead, London, E.11, M.B. N.U.I. (1921), appeared in consequence of a conviction at Bow Street in 1938 for being drunk and disorderly and another at Stratford Court House last January for being drunk in charge of a car and for careless driving; he had asked the council also to take account of his dismissal from the Army in 1942 by court-martial for drunkenness and insulting behaviour. Mr. Oswald Hempson, who accompanied him on behalf of the Medical Defence Union, said he had a large practice and was strictly abstemious at home and in working hours. He was easily affected by drink and recognised that he should never touch it. He gave an unconditional undertaking to abstain in future. The council suspended judgment for one year.

James Anderson Edward, registered as of 179, Elm Grove, Southsea, Hants, M.R.C.S. (1929), had been convicted twice last year of drunkenness in charge of a car. He had been summoned to the November session, 1946, but had been at sea. Mr. H. D. Peacock, counsel, instructed for the London and Counties Medical Protection Society by Messrs. Le Brasseur and Oakley, solicitors, said that the doctor was still at sea, working as a ship's surgeon. He intended never to do general practice again, had sold his car, and expressed his apologies and regrets. His fault had been due to grave domestic and financial trouble. The president emphasised the necessity for his appearance before the council in May, 1948, until which session judgment was postponed.

The British Pharmacopœia

Prof. J. A. GUNN presented the report of the Pharmacopœia Committee. This stated that the appendices on tests, assays, and analytical methods had been completed. Comments from the Dominions had been carefully considered in the final revision of the Pharmacopœia monographs. The sections relating to penicillin had been reviewed in consultation with the Ministries of Health and Supply and the makers. The committee recognised that the descriptions of penicillin and its preparations were likely to need revision and extension in the near future in accordance with the rapid advance of knowledge in this field, also that other antibiotics might call for description in the Pharmacopœia.

The new United States Pharmacopœia was published on April 1. In revising the *B.P.* the Pharmacopœia Commission had had the page proofs of the *U.S.P.* at its disposal and had made every effort to bring the two into agreement. It acknowledged with gratitude the longstanding coöperation of the Committee of Revision of the *U.S.P.* The whole *B.P.* was now available in galley proof, but delays in printing and binding made it impossible yet to give a date for publication.

The *Medico-Legal and Criminological Review* is changing its title to the *Medico-Legal Journal* to make it clear that it is mainly concerned with the publication of original material.

Medicine and the Law

The Uncounted Swab

A RECENT inquest at Scunthorpe indicated that death was caused by a swab remaining in the patient's body after an operation. As reported in the *Yorkshire Post* of May 17, the deceased woman had been admitted to a maternity home last February for a cæsarean operation. She was discharged on April 19, but was readmitted $2^1/_2$ hours later and died early next morning from acute peritonitis. A swab was found in the peritoneal cavity. The coroner accepted the evidence of the county pathologist that, when the patient was discharged, there was no reason to anticipate the sudden relapse which followed; peritonitis would be swift in its onset and severe. The coroner considered that the post-mortem evidence showed that no fault could be found with the operation itself or with the care taken of the patient. A verdict of "death by misadventure" was recorded. In the course of his summing-up the coroner commented that there had been an oversight on the part of the sister. He added that the surgeon who performed the operation must bear some part of the responsibility for the sister's lack of precaution, because the counting of dressings was an essential feature of an operation. This last statement is open to challenge.

Nurses are nowadays accepted, as Lord Greene suggested in 1942 in Gold *v.* Essex County Council, as skilled members of a hospital's staff, along with medical practitioners. Nurses are not mere automatons who carry out blindly the directions of a surgeon or doctor. From what Lord Justice Goddard (now Lord Goddard, L.C.J.) remarked in the Gold case, it may be inferred to be possible that a nurse could be regarded as negligent even though she were carrying out the orders of a surgeon. "If a doctor in a moment of carelessness, perhaps by the use of a wrong symbol in a prescription, orders a dose which to an experienced ward sister was obviously incorrect and dangerous, I think it might well be held to be negligence if she administered it without obtaining confirmation from the doctor or higher authority." Lord Goddard conceded that, in the stress of an operation, the first thing required of a nurse would be an unhesitating obedience to the orders of the surgeon.

A study of these and other judicial dicta may lead to some confusion. Lord Justice Kennedy's judgment in the famous case of Hillyer *v.* Governors of St. Bartholomew's Hospital (in 1909) has lost much of its former importance. The courts no longer suggest that in the operating-theatre the nurse is the servant of the surgeon. If she does exactly what he tells her, she will not be found guilty of negligence; if she does something else, it may be otherwise.

To return to the responsibility for counting swabs, is it not the accepted and proper modern practice for the surgeon to leave this to a sister known to be competent? Is he not entitled to rely, in matters within their competence, upon his trained technical assistants? Is not a theatre sister perfectly capable of counting swabs, and is it not clearly regarded today as her duty? If these questions can be answered in the affirmative, does not the comment of the coroner at the Scunthorpe inquest need qualification?

When the Departmental Committee on Coroners (over which Lord Wright presided) reported in 1936, it made some reference to the occasional practice of praise or blame being awarded at inquests in matters of professional treatment. Mr. (now Sir Herbert) Eason, with representatives of the British Medical Association, had drawn the committee's attention to cases where coroners had sometimes censured or criticised hospital staffs and practitioners. Persons so attacked had no redress or remedy; the comments, being made in a judicial proceeding, were privileged and protected, and there was no form of appeal. The committee thought it undesirable that an individual should find himself thus exposed to public censure without the chance of reply. The Wright report, however, made an exception in favour of riders or recommendations of a general character, designed to prevent further fatalities. The lesson of the Scunthorpe inquest, where the conduct of the proceedings was otherwise unexceptionable, may be accepted in that spirit.

Public Health

Smallpox

CONTACTS are still under surveillance in connexion with the outbreaks at Barnsley, Yorks, and Bilston and Coseley, Staffs. A case, the first in the town, was detected at Wakefield on June 4.

Barnsley.—The total of cases is now 15 (with 3 deaths in persons aged 75, 72, and 70). Of these, 9 were in the second generation, and 1 is probably in the third generation. The common lodging-house where the disease first appeared, and its occupants, have been disinfected terminally, but remain under surveillance; the last case, removed on June 4, was in a man who had refused vaccination until June 3. St. Helen's Hospital, from which the last case was removed on May 29, is now empty. Patients and staff from the affected ward have been transferred to the infectious diseases hospital. Other patients have been discharged home under surveillance.

Bilston.—Recently 2 further cases have been reported. The 4th member of the family mentioned last week was removed on June 2. She is 12 years of age, vaccinated in infancy and revaccinated unsuccessfully on May 17, the day after her sister died. Further revaccination on May 23 gave a good take, but she developed modified smallpox rash on June 2 and was removed to hospital immediately. Her mother—another case in the same generation, with onset on May 29—died on June 5. The 2nd patient is a teacher at Villier School, aged 39, vaccinated in infancy and removed on June 4 (onset June 1, rash June 4).

Coseley.—There have been no further cases in this district. Contacts in two households remain under surveillance, and further cases, if any, should crop during the present week.

Wakefield.—This is the only new focus of the disease during the past week. Here a man, aged 71, vaccinated in infancy, became ill on May 31 and was removed on June 4. The date of rash is uncertain, but the clinical state suggests that it appeared about June 2. The man, one of forty-five permanent residents in the Model Lodging House, 62, George Street, Wakefield, was employed as night watchman at the corporation's electricity works. There is evidence that no casual vagrants stayed at the lodging-house; but passers-by frequently sat with the patient at work during the night.

Sheffield.—The last of 3 cases (in two generations) was removed on May 21. Surveillance of contacts has now ceased and the patients are awaiting discharge.

Infectious Disease in England and Wales

WEEK ENDED MAY 31

Notifications.—Smallpox, 14; scarlet fever, 886; whooping-cough, 1057; diphtheria, 194; paratyphoid, 7; typhoid, 1; measles (excluding rubella), 12,314; pneumonia (primary or influenzal), 512; cerebrospinal fever, 73; poliomyelitis, 18; polioencephalitis, 3; encephalitis lethargica, 3; dysentery, 46; puerperal pyrexia, 116; ophthalmia neonatorum, 56. No case of cholera, plague, or typhus was notified during the week.

Of the smallpox cases, 11 were notified at Barnsley, 2 at Coseley, Staffs, and 1 at Sheffield.

Correction: For the week ended May 24, the number of scarlet-fever cases notified was 982.

Deaths.—In 126 great towns there were no deaths from enteric fever, 1 (0) from scarlet fever, 1 (0) from diphtheria, 10 (2) from measles, 13 (4) from whooping-cough, 64 (3) from diarrhœa and enteritis under two years, and 7 (1) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 273 (corresponding to a rate of 31 per thousand total births), including 32 in London.

In England Now

A Running Commentary by Peripatetic Correspondents

GETTING a driving licence in Switzerland is by no means a simple matter. First you have to apply for a provisional permit which requires a photograph, and because this showed your peripatetic correspondent wearing glasses I was told that I had to submit a certificate that my sight, with glasses, was normal. Two opticians assured me they could not give such a certificate; it had to be signed by an ophthalmologist. Through the good offices of a colleague I eventually made an appointment to visit the ophthalmological clinic of the general hospital, where a charming woman ophthalmological surgeon "gave me the works" on slit-lamp, ophthalmoscope, dark vision, &c. This produced a lengthy letter certifying that my sight was normal with glasses, but that, by law, I must always carry a spare pair in the car. Now I have to pass a driving examination, and, much worse, the poor old 1937 Hillman has to survive a stiff test for road-worthiness, after the expenditure of vast sums for new headlights to conform with the Swiss "dipping" regulations and for insurance with a Swiss company. And with all this, I'm told that the comparable accident-rates are far higher in Switzerland than England.

To those who complain of bureaucracy and form-filling in Socialist England, I suggest they will find this free-enterprise country far worse. And what a sweet racket has been missed by ophthalmologists in Britain!

* * *

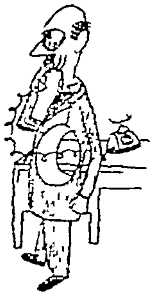
The association meeting finished early, leaving me in a strange town with a couple of hours before my train went. It was a nice afternoon, but of course early closing day, so looking into the shop windows was a sterile pleasure. However, I knew that the town had a pleasant river and I walked towards it, anticipating its coolness that hot summer's day. To my surprise the bridge had a toll-gate: "Passengers are liable to pay 1*d.* for the use of the bridge or road." Very well, I paid my penny and walked on to the centre of the bridge, looking down at the river, the greenery, the red buildings of the school in the background. In a moment a tub pair came along with two boys and a coach. It is more than 20 years since I did any rowing, but the sight of those two boys, doing everything wrong, made me feel like a cat looking through the window at birds on the lawn: I longed to get at them—arms wrong, hands wrong; oh, if I had a megaphone! But they passed underneath the bridge and floated away, happy in their ignorance. I returned the way I had come, to be greeted with "One penny, please." "But I just paid a penny; why should I pay another?" "The rule says you must pay a penny every time you use the bridge." "But I only used the bridge once!" "Well, that's the rule; a penny please." And alas I had to pay, with the poor consolation that next time I could walk on to the bridge, watch tub pairs all the afternoon and walk off again, without paying a penny, as long as I did not pass through the toll-gate. This in 1947!

* * *

More Hints for Doctors' Brides.—If you and the doctor make any rules about messages they will be broken in the first 24 hours. Rules are made for the panel patient but they are not often observed, though things are a lot better than they were before the war. Face the fact that there is no escape—it is useless trying to isolate yourself in the kitchen. Besides the adjustment you are forced to make to marriage you will have to adjust your marriage to the practice. You will have no devastating shock-absorbing receptionist to tell the doctor that two of the patients he most dislikes desire his early attendance. If you are out for half an hour taking the kids to school it will be then that the phone will ring its head off, and you will be greeted on return by an irritated type champing on the doorstep who will be quite unmoved by your information that you have done the shopping in record time.

When the doctor returns for lunch and you have a bagful of fresh messages for him you must be on your best form. You are the nearest object and whatever your form you will catch the blast. Avoid saying anything as if you were anxious about the fate of the messages you give. Bite down the desire to slip in that delightful sentence by C. S. Lewis to the effect that the future is something which everyone reaches at the rate of sixty minutes an hour, whatever he does, whoever he is. Bite off every witty retort you can think of—and you will think of many. Your sense of humour, though it is coupon-free, will be a utility garment oft-repaired and much treasured by the time your marriage is a year old. If there is much sunshine on one of those days when too much is demanded of your husband your reaction will be to cram your hat on your head and rush out into the countryside leaving the whole shooting-match to go to blazes. Rest assured, it will certainly do so. As you reach the end of the drive (garden path, front passage) you will be met by a scared child who says, "Please tell the doctor to come quick! Me mum's bin took bad (fallen down stairs, started 'er pains, cut 'er 'and opening the rations, put 'er 'ead in the gas-oven, &c.)."

Never mind, you will find that things are seldom so urgent as they seem. Always leave the doctor to decide. Never commit yourself. If after a year in the place he seems not to know what is urgent and what can wait a few minutes . . . well, girlie, you've had a tough break. Your most subtle question to the message-bringer is, "How long has he been ill?" (A gentle, innocent tone should be used.) Your careful reportage of the answer will bring you laurels and—who knows—may eventually lead the way to that little shop off Bond Street. Always assist your husband in his dash to the bedside of a perforated company-director (promoter, accountant, foreman, plumber, *grocer*, wine-merchant, &c.):



Perforated company-director

You must be on really palsy-walsy terms with the district nurses. If one rings up briskly, stating that she has a placenta prævia, do not ask, "What is that?" Say, just as briskly, "Harry is not due back until tonight. You had better ring up the hospital straight away. Tell Sister Blank he asked you to. I'll fix it with Harry when he comes in." Nurse will bless you, for you have made up her mind for her. Your husband is far too young to deal with things like that.

Here is a useful tip. When a caller asks for your husband to go to an unknown destination, and the caller is practically a moron, get him or her outside the post office facing uphill (as it were) and then lead them, in imagination, back to their homes, noting prominent places en route (just to check up on them). Remember, of course, that they will not have noticed places like the museum or Lloyds Bank; the public lavatories, the bus park, the Food Office, the Statchew, and the traffic lights will be more useful.

Snippets: Be sweet to the H.P. at the hospital; he has probably rung up to apologise to your husband for erroneously correcting Harry's diagnosis, and he is lonely at night anyway.

Go on and on at Harry to make sure he has not forgotten the message you gave him while he was shaving; his toilet demands immense concentration.

Never expect any thanks for anything from anybody; occasionally someone with a more than average imagination will send you a bunch of flowers; put these in the consulting-room.

In struggling towards a sense of proportion remember that your efforts are worth £90 per annum for income-tax purposes. What more could one desire in this life?

* * *

He was found dead in the kitchen with the gas turned on. He was a single man who had worked hard and had lately been a little worried about making do with his rations. Autopsy revealed a cerebral hæmorrhage, but his old aunt, who was his nearest relative, said she was quite satisfied with the coroner's verdict: "death from national causes."

Letters to the Editor

BACKACHE

SIR,—I wish to congratulate Burns and Young on their magnificent article of May 10. They have done pioneer work in England on this difficult subject, and have also shown great courtesy in explaining and demonstrating their technique to other orthopædic surgeons. A visit to their department at St. George's Hospital on a Thursday morning is most stimulating.

From their article and subsequent letters it appears that, although removal of a damaged disk may become necessary, non-operative measures often give relief—at least for a time. The forms of non-operative treatment recommended are:

(1) Rest in bed for three weeks, followed by the wearing of a corset (Burns and Young). In their hands neither physiotherapy nor epidural injections give lasting benefit.
(2) The wearing of a well-moulded plaster jacket for 2–3 months (Crisp).
(3) Osteopathic manipulations (MacDonald).

At a meeting of the British Orthopædic Association last year Cyriax demonstrated the effect of epidural injections on a recent case of lumbago, and his method of gentle manipulations. Kenneth Stone suggests the possibility of the presence of a rheumatic state either preceding or coincident with a disk injury.

The changes occurring in a torn or prolapsed intervertebral disk are in some respects similar to those seen in a torn internal semilunar cartilage. In the latter the flexors of the knee—the semimembranosus, semitendinosus, sartorius and gracilis—go into spasm. Full extension of the knee is impossible, partly through this spasm and partly through mechanical locking of the joint by the displaced torn piece of meniscus. When a tear is on the periphery, healing may take place if the knee is supported in plaster-of-paris and the muscles are moved isometrically (in contradistinction to isotonic contraction). If the knee is manipulated forcibly under an anæsthetic replacement may take place; but often the damaged cartilage is further contused and little improvement is obtained.

It can be seen that the contusion or tear causes (1) an inflammatory state of the joint, with (2) spasm of the surrounding muscles, which leads to (3) muscle imbalance between the flexor and extensor groups and muscle wasting. Each one of these factors must be treated separately, the first by rest and heat, the second by massage and gentle manipulation, and the third by graduated exercises and faradism.

During the past fifteen years I have had to treat several thousands of cases of low back pain, with or without sciatica. It is my impression that:

(1) In some cases there is a state of tissue œdema, due to transudation of fluid, before the true attack. Copeman and Ackerman [1] suggest that œdema of the tissues, especially the fatty tissues, may occur in fibrositis.

(2) If the disk is torn or if the pulp protrudes, there is inflammation not only round the disk but in the surrounding vertebral articulations. This is one of the causes of limitation of movement.

(3) The muscles of one side go into protective spasm, and the spasm accounts for the posture and for sciatic scoliosis, either homolateral, heterolateral, or alternating. The result in course of time is contracture of one group of muscles (with loss of extensibility), overstretching of the opposite group, muscle wasting, and all that goes to make for muscle imbalance. It was in such cases perhaps that successes were obtained in the past with forcible manipulation in the later stages, when the disk may have slipped back.

(4) With faulty posture—e.g., in a person with a marked lordosis and a pendulous abdomen, or in a man sitting in a cramped position in a tank—there is loss of *synergic action* between the spinal extensors and flexors; the front of the vertebral bodies are subjected to undue pressure and there is a tendency for the intervertebral disk to be squeezed backwards. Balanced synergic action between these groups must be restored by appropriate pelvic tilting exercises, so that the spine is straightened and the abdominal muscles are contracted and elevated and the buttock muscles *tighte* i.e., stand as if sitting on a shooting-stick.

(5) Tender points occur in relation to the sacro-iliac joint; either at the origin of the glutei or in the insertion of erector spinæ. Sacro-iliac tests are usually found to negative. It is suggested that these tender areas are the result of *primary muscle strain of the glutei* or erector or the result of muscle spasm in cases of lumbago or sciatica (cf. tennis elbow).

Young [2] describes two types of disks. In cases of prolapsed disk, giving rise to the compression syndrome, side bending *towards* the lesion is painful. In cases of tear of the annulus fibrosus, giving rise to a stretch syndrome, side bending *away* from the lesion is painful. This does not tally with Burns and Young, who state that sideways bending is free. I have found cases vary with regard to side bending; but where there is pain away from the lesion (stretch type, annulus tear) the condition might heal completely if the back was rested in a plaster jacket for three months.

I suggest that cases should be placed in the following groups:

1. *First attack, or patients refusing operation.*—Treatment is directed to reducing inflammation, muscle spasm, and (if possible) prolapse. The patient lies prone on two pillows supporting the abdomen, his legs being supported by further pillows to flex the knees slightly. Each day he is given infra-red heat for ten minutes, friction massage for ten minutes, gentle faradism to the erector spinæ and glutei for ten minutes, and anodal galvanism for ten minutes. We have had patients in severe pain coming in with a pronounced sciatic scoliosis, verified by X rays, and after the first treatment this has disappeared clinically and radiologically. The treatment must never be stimulating. If more than a subthermal dose of diathermy is given the symptoms are often made worse, and for this reason diathermy is not advised, especially in the early stages. If there is improvement gentle manipulation is added.

The patient is told to rest as much as possible, but back is supported by a felt pad and elastic webbing (a simple and practical method of giving support quickly, for of a corset, made to measure, takes weeks to obtain). In many cases he is almost symptom-free within a few days, and a great deal of time has thus been saved. Some patients experien a feeling as if something has slipped back into position. A few have shown no improvement, and at the end of a week treatment have either been given three weeks' rest in bed using bedpans, or, when this was impossible, have been giv a plaster jacket.

2. *Annulus fibrosus tears.*—A plaster jacket for t months, with operation if there is aggravation at first recurrence later. Recently we have had to operate on a patient, who had complete freedom from pain for eight months after wearing a plaster jacket for four months. At operation a large prolapsed disk was removed.

3. *Patients over 45 showing spinal arthritis with disk prolapse.*—Treatment should be as in group 1 and must be given a long and thorough trial before deciding on operation, *since this type of case may require spinal grafting* as well.

All patients have pelvic tilting exercises, and many have told me that if they have felt pain in their backs and carried out these exercises at once the pain has disappeared in a short time.

London, W.1. W. E. TUCKER.

ON THE RECORD

SIR,—Readers of your leader of May 24 may also like to hear that during the past year discussions have taken place among a group of provincial hospital records officers as to how the many problems of their departments could be eased immediately and solved eventually. It is recognised that the standard of clinical records is primarily a medical responsibility, but this responsibility could be lightened, and time and expense saved, by the provision of trained lay assistants. America and Canada long ago recognised that this section of hospital administration was a specialty, and organised training in these two countries has achieved its objects. The standard of records is said to be good, and experienced staff are available for the work.

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[1] Copeman, W. S. C., Ackerman, W. L. *Quart. J. Med.* 1944, 13, 37.

[2] Young, J. H. *Med. J. Aust.* 1945, ii, 234.

Records officers are attempting to improve standards th of the records and of the organisation of these partments, but their efforts are hampered by transient d often unsuitable staff, combined with lack of appreciaon of the importance of their work in service to the ck. Meetings have been held at the Christie Hospital, anchester, to ascertain the possibilities of following merica's example. It is thought that the best first eps would be the inauguration of:

Schools in university teaching hospitals for lectures and practical training.

A two years' course, with issue of diploma or certificate to students passing the examination.

An examining board with medical, administrative, and records-officer representation.

An association of qualified records officers.

Several of the provincial university hospitals houseovernors and superintendents have approved the cheme in principle. The support of other official odies concerned with medical records is being sought, nd I will gladly give further information to anyone nterested.

Elsie Royle
Christie Hospital, Withington, Manchester. Records Officer.

MULTIPLE-PRESSURE VACCINATION

Sir,—I should like to express my agreement with the etter by Dr. Vaughan in your issue of May 24. In a airly extensive experience of the multiple-pressure method of vaccination I found it to be much more eliable than the scratch method. I first used this method in 1943 when I was responsible for the health of large numbers of recruits to the Nigerian Forces. I was dealing with an intake of 600–800 men a month. About two-thirds of these men had been vaccinated by civilian African medical orderlies, using the scratch method, one to three weeks before they reached me, but in a large proportion—certainly over 50%—this vaccination had been unsuccessful. Revaccination of these men, and vaccination of recruits not previously vaccinated, using the scratch method, gave little better results. After changing over to the multiple-pressure method, however, failures became relatively very few. In all cases lanolated sheep lymph was used.

A further test of the method was given when a small outbreak of smallpox occurred in the camp. All ranks who could not show a very recently healed vaccination scar were revaccinated, this being the only effective way to ensure that none was missed. About 1000 men were vaccinated or revaccinated and less than 100 of these failed to develop a reaction. At a second attempt almost all the failures were successfully vaccinated.

Like Dr. Vaughan, I have in several cases obtained well-marked reactions in Europeans who have been repeatedly vaccinated in the past, including one N.C.O. who had been unsuccessfully vaccinated by the scratch method 6 or 7 times in the previous three years. He had not been successfully vaccinated since childhood. Vaccination by the multiple-pressure method was almost embarrassingly successful in this case, resulting in a very severe reaction of primary type necessitating some days in hospital. In the minimal reactions, as Dr. Vaughan has stated, itching was a most characteristic symptom.

The multiple-pressure method had the further advantage that I was easily able to teach my Nigerian orderlies to perform it correctly, which I had completely failed to do for the scratch method—probably explaining the bad results. As Dr. Vaughan remarks, the skin in the Tropics is hyperæmic, and in many Africans it seemed to be very easily pierced, so that the "scratch" produced by an orderly nearly always drew blood. Indeed some recruits, vaccinated elsewhere, reached my M.I. room with what were to all intents and purposes septic gashes.

The multiple-pressure technique is very easily acquired, needing only a few minutes' practice, and it is as quick as, or quicker than, the scratch method, done properly, because there is not the same need for carefully testing and varying pressure, according to the thickness of the individual skin; it soon becomes a purely automatic action.

Caerleon. W. C. D. Lovett.

HÆMOLYTIC DISEASE OF THE NEWBORN

Sir,—In answer to Dr. Henry Third's question (May 31) as to whether I would suggest that the "logical treatment of a severe case of icterus gravis, where . . . there is no anæmia, is to transfuse with Rh-negative blood 'to correct the anæmia,'" I would reply that if there were no anæmia to correct there would be no need for a transfusion.

If the title of "hæmolytic disease of the newborn" is to be changed at all, it should not be changed, as Dr. Third suggests, to "rhesus disease of the newborn," but to the more correct title of "iso-immunisation disease of the fœtus and the newborn"—if for no other reason than that "rhesus" is the name of a species of monkey!

Birmingham. Leonard G. Parsons.

ESTIMATION OF VITAMIN C IN LEUCOCYTES

Sir,—The hydrazine method for the estimation of vitamin C in leucocytes, described by Dr. Constantinides in your issue of May 31 (p. 750), purports to be a modification and an adaptation to a micro procedure of Roe's method. Unfortunately the author has not referred to the relevant work on the subject of his paper, apart from that of Butler and Cushman.[1]

To our knowledge, Roe's method has been used on leucocytes in various parts of the world by a variety of workers over several years. One of us (B. B. L.) started using it thus in 1943, shortly after the publication by Roe and Kuether[2]; our method, which has been published in *Recent Advances in Clinical Pathology* (p. 187), and Dr. Constantinides's method are almost identical. We use 3–20 ml. of blood, yielding 10–200 mg. of leucocyte-platelet layer. Dr. Constantinides uses 15 ml. and calls his method a micro procedure. It is quite unnecessary to use such large amounts of blood: Lowry et al.[3] have reported results for the leucocytes and platelets in 0·1 ml.—i.e., 1/150 of the amount that Dr. Constantinides uses in his "micro procedure." There is no published evidence for Dr. Constantinides's statement that "the interference of -SH groups such as glutathione" occurs in the estimation of ascorbic acid in leucocytes by the indophenol method (cf. Butler and Cushman [1]). Dr. Constantinides states that the hydrazine method is "extremely sensitive and specific." But there is published evidence[2, 4] that some reducing substances which interfere in the indophenol method also interfere in the hydrazine method. Having examined possible interference by substances other than ascorbic acid present in blood, Roe recommended the use of a filter with maximal transmission at 5400 Å, knowing that the absorption maximum of the pure ascorbic-acid derivative was at 5200 Å. Until it has been shown that the increased absorption at 5200 Å is wholly attributable to ascorbic acid it seems desirable to follow Roe's recommendation, as we have done. Apart from this, and the introduction by Dr. Constantinides of an error of the order of 5% by ignoring the volume of the leucocyte-platelet layer in his calculation, his method is practically the same as the method we have been using.

Dr. Constantinides says that "The ascorbic-acid content of leucocytes estimated by the hydrazine method agrees with the values given by the indophenol method." He quotes no evidence in support of this, and as he gives results for estimations by one method on only 8 samples it is reasonable to doubt if he has obtained such evidence; the fact that his range for 7 healthy persons overlaps the range obtained by Butler and Cushman by the other method is not evidence. However, we published two years ago[5] some remarks about the estimation of ascorbic acid in the leucocyte-platelet layer by the hydrazine method, and included a correlation between results obtained by the hydrazine and indophenol methods on 89 human samples.

Finally, Dr. Constantinides suggests that the lower mean value (29 mg.) which he gets on 7 healthy subjects, when compared with the mean value of 34 mg. which

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1. Butler, A. M., Cushman, M. *J. clin. Invest.* 1940, 19, 459.
2. Roe, J. H., Kuether, C. A. *J. biol. Chem.* 1943, 147, 399.
3. Lowry, O. H., Bessey, O. A., Brock, M. J., Lopez, J. A. *Ibid*, 1946, 166, 111.
4. Roe, J. H., Oesterling, M. J. *Ibid*, 1944, 152, 511.
5. Lloyd, B. B., Sinclair, H. M., Webster, G. R. *Biochem. J.* 1945, 39, 17.

Butler and Cushman obtained by a different method, may "reflect the difference in nutritional level between the post-war British and the pre-war American populations." This is quite unwarranted. It would be much less unsound to compare Dr. Constantinides's mean of 29 mg. (on only 7 subjects) with the means of 24·2 ± 0·6 mg. ($n=27$) or 23·7 ± 0·6 mg. ($n=27$) which Lowry et al.[3] obtained by the same method[6] on two groups of R.C.A.F. personnel who daily received respectively 70 mg. of synthetic ascorbic acid and an average of 78 mg. from their rations; if this comparison is made would one not conclude that the post-war British diet contains more than 78 mg. daily—which would satisfy even the most vigorous ascorbic-acid gluttons? Our mean for ascorbic acid in the leucocyte-platelet layer of 1351 samples from British subjects examined by the hydrazine method during the war was 14·0 mg. per 100 g.

H. M. Sinclair
Oxford. B. B. Lloyd.

CLICKING PNEUMOTHORAX

Sir,—Dr. Thomson describes in his paper of May 10 curious sounds synchronous with the heart-beat audible at some distance from the patient. He thinks the sounds are probably due to a small (spontaneous) left-sided pneumothorax in contact with a pleural adhesion, and he notes that they disappear when the pneumothorax enlarges. In two patients of mine a left artificial pneumothorax had been successfully induced for pulmonary tuberculosis. Refills regularly given formed a good pneumothorax as shown radiologically. Some adhesions were present in the upper zone. It was not until after about six months' treatment that the patients reported "funny noises" of the type described by Dr. Thomson. The noises were not permanent, but I and some other doctors heard them at a distance of about two feet. The patients felt absolutely well and were only somewhat annoyed that the noises sometimes prevented them from falling asleep.

Dr. Thomson's explanation may be correct, though an alternative one is possible. It seems unlikely that the cause of the manifestations is situated in the pneumothorax. If it were they should be more common, whereas in fact not many physicians have met with an example. The sounds may arise in the pericardial sac, if some air from the pneumothorax enters it through a gap formed when adhesions between the pericardium and pleura are torn. In the pericardial sac some fluid is produced in the same way as in pneumothorax. At every beat the heart then hits the fluid in the hydropneumopericardium and produces the sounds. The condition might to some extent be compared with hippocratic succussion. It is interesting that Dr. Thomson mentions (case 3) "a sound suggesting pericardial friction."

Hull. L. Dunner.

MODERN CARE OF OLD PEOPLE

Sir,—While welcoming your series of articles, as showing what should be done, I feel that there is a need to mention some of those things which should *not* be done when catering for the elderly.

The most frequent of these sins against the aged is to imagine that "they have had their day, poor dears." I know a number of old folk, some over 80, who are reasonably active, intelligent, and mentally alert. The common practice of putting such patients to bed and keeping them quiet, with sedatives if necessary, cannot be condemned too strongly. As Dr. Marjory Warren has shown, elderly patients are best kept out of bed as much as possible and encouraged to develop interests of their own. The usual excuse of shortage of staff is sheer nonsense. Old people who get up and about need fewer nurses or attendants than those who remain in bed.

The second heresy is the view that there is little response to medical treatment in old age, so that any sort of doctor is good enough. My own experience with Chelsea pensioners suggested that while diagnosis was more difficult than in earlier life, prognosis among aged patients depended to a great degree on starting treatment quickly. Pneumonia, for instance, is no longer "the old man's last friend" in the original sense of the phrase. Taking a different example, it is surprising how an elderly arthritic patient can be rendered mobile with little care and persistence. Similarly, many hemiplegics can be rehabilitated if proper remedial exercises are carried out from the start. Part-time general practitioners or newly qualified medical men are not the proper doctors for the aged. Old folk need more time, greater skill, and more intense interest than young ones. Their tendency to multiple disorders underlines the fact that nobody can know too much to treat these patients. Extensive clinical and pathological investigation may be necessary, considerable therapeutic judgment is often required. But when these are available a surprising dividend will be paid. Tough old folk are not a bad medical investment.

Finally, I would suggest that drab surroundings, limited visiting hours, uncomfortable furniture, and rigid institutional atmosphere are too common in hospitals and homes for the aged. Old men, and still more old women, are made miserable by being cooped in dull barracks. More colour, more comfort, and more freedom and elasticity are overdue. An Austrian physician, Lorand, once recommended life in an English workhouse as a means of attaining longevity. Today, our object should be "to add life to the years, not years to the life."

Purley, Surrey. Trevor H. Howell.

W.H.O. AND GREECE

Sir,—Dr. Judith Waterlow, in her letter on public-health work in Greece published in your issue of May 31, makes certain strictures on the administration, which, in particular cases, may have some foundation.

I must, however, most emphatically deny her very sweeping allegation that "the Greek government will not employ even the humblest clerk if he helped to resist the German occupation." This, of course, is untrue. I myself was in Greece throughout the occupation and can vouch for the fact that a very high percentage of the population, whatever their political affiliations, were engaged in some form of underground resistance against the Italian and German invaders.

It is true that, under present conditions, the Greek government is chary of employing Communists in the public services, even if they took part in the resistance, because so many of them have engaged in disloyal activities against the State since the liberation. But the majority of Greeks are not Communists but just ordinary patriotic citizens—we may call them Nationalists—who played their part in the resistance; and it is as ridiculous as it is unjust to pretend that they are excluded from the public services just because they helped to resist the German occupation.

A. A. Pallis.

Greek Government Department of Information,
34, Hyde Park Square, London, W.2

Sir,—Dr. Waterlow maintains that, because of the Greek government's interference with health work, the money of United Nations taxpayers will be wasted if applied to Greek health reconstruction. She believes that it might more profitably be spent in aiding countries such as Poland and Yugoslavia.

Her reference to Greece as one of "two countries chosen for special missions on the spot," ignores the fact that the World Health Organisation Interim Commission (Whoic) has missions not only in Greece but also in China, Ethiopia, Italy, and Hungary, while others are planned for Yugoslavia (for plastic surgery), Poland, and Austria.

Further, the choice of countries in which field work should be carried out does not rest solely, or even mainly, with the Interim Commission. The agreement with Unrra under which Whoic undertook to continue Unrra's work during 1947, to the extent that the $\$1\tfrac{1}{2}$ million generously provided by Unrra would allow, specifically mentioned the missions in China, Greece, and Ethiopia as worthy of continuation. Much more important, however, was the very natural condition that programmes must be planned in agreement with the governments concerned. Except that Whoic is unable to provide medical supplies, no restrictions whatever were placed on the form of assistance that governments might request. That there are no missions in, say, Czechoslovakia or the Ukraine is simply because the

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6. Bessey, O. A., Lowry, O. H., Brock, M. J. *J. biol. Chem.* 1947, 168, 197.

governments of those countries have asked for fellowships, medical literature, &c., and not for missions.

That there has been unwarranted political interference with UNRRA's health work in Greece, as elsewhere, no-one can deny. But in most of the cases representations have succeeded in putting matters right—admittedly after exasperating delays. As so often—and again this is not confined to Greece—the original "scandal" has become widely known but the subsequent correction is not "news" and is consequently not disseminated.

Dr. Waterlow states that "the Greek government will not employ even the humblest clerk if he helped to resist the German occupation"; but surely his risk of unemployment does not depend on his resistance to German occupation so much as on his past or present connexion with Left Wing groups—however deplorable such discrimination may be.

That Dr. Waterlow's views on the undesirability of assisting Greek health work are not shared by the majority of her former colleagues in Greece is shown by the many applications from UNRRA and voluntary-society workers there to continue their work under WHOIC auspices—applications which have nearly all had to be refused, as the WHOIC mission in Greece is limited to eight imported staff. Some of these workers, indeed, are continuing there without salary. Finally, a striking testimony to the value which the Greeks attach to outside expert advice is shown by the agreement recently concluded with WHOIC under which the Greek government agree to pay more than half of the costs of the WHOIC mission—no inconsiderable sum.

However, we can all agree that Dr. Waterlow's letter will have served a useful purpose if it has contributed in any way to preventing political interference with health work in any country.

NEVILLE M. GOODMAN
Director, field services, WHOIC, and late director of health, UNRRA, European Regional Office.

Palais des Nations, Geneva.

*** UNRRA's health campaign in Greece was described in these columns a year ago (1946, i, 789) by Dr. J. Miller Vine, who said that despite "multitudinous difficulties" the medical rehabilitation of the country was in full swing. In a paper read at the Royal Society of Medicine on March 28 he further described the success of the campaign against malaria, "the age-old scourge of Greece." Spraying of the marshes by UNRRA aircraft using D.D.T. has given brilliant results.—ED. L.

INFECTION BY INJECTION

SIR,—May I ask: (1) Why it is assumed that water is the only liquid that can be boiled? (2) Cannot bacteriologists tell us the temperature at which spore-bearing organisms will be destroyed? (3) Cannot chemists or physicists tell us of a substance or solution which boils at this temperature? Syringes could then be sterilised by boiling them in this substance or solution.

London, W.1. A. S. BLUNDELL BANKART.

THE OUTLOOK FOR PHYSIOLOGY

SIR,—We have observed that some writers on scientific topics use metaphors to give point, interest, or liveliness to arguments already expressed clearly in technical language; with others, however, the appearance of metaphors in their writings is a sign that principles of doubtful validity are about to be foisted on the reader.

Professor Lovatt Evans's lecture in your issue of Jan. 18 contains at least one metaphor of the second kind. Under the heading "Teaching of Physiology" he says: "It may be that in the very distant future some broad generalisations will emerge, as a result of which all physiological phenomena will be capable of expression in a few mathematical formulæ and chemical equations; but such a final crystallisation could only emerge from a mother-liquor supersaturated with exceedingly abundant and intricate detail." This passage implies that the generalisations of physiology are formed as the final result of reflection upon immense collections of fact, accumulated over long periods and including as much intricate detail, relevant and irrelevant, as the accumulators can discover. If this is so, physiological method differs from that used in other sciences. Almost without exception, the work of the great investigators in other branches of science has not been based upon this principle. Galileo, Newton, Harvey, Dalton, and Pasteur based hypotheses on comparatively few and simple facts, and while validating the hypotheses widened the factual knowledge relevant to the hypotheses, which altered shape as relevant information came forward. It would be extraordinary if, in order to grow, it were necessary for physiology to reject the methods customary in other sciences.

Professor Lovatt Evans's metaphor would apply more easily to a process of intellectual concretion than to intellectual calculus or crystal formation.

C. E. PALMER
Lecturer in Scientific Method.

Department of Physiology, University of Melbourne.

R. DOUGLAS WRIGHT
Professor of Physiology.

ACTION OF CURARE ON THE FŒTUS

SIR,—I have recently had the opportunity of observing the effect of curare on the human fœtus. During an operation for the removal of a large fibromyomatous uterus with a fœtus of 19 weeks, at the suggestion of the anæsthetist, Dr. Lawrence Morris, I injected the umbilical vein with 2·5 mg. of tubocurarine (B.W. CO.). To our surprise the fœtus immediately entered into a tetanic spasm involving the flexor muscles of the limbs, which lasted until its death a few minutes later.

This observation may be of interest to pharmacologists.

London, W.1. ALECK BOURNE.

SOCIAL ASPECTS OF EPILEPSY

SIR,—May I make a few observations from the point of view of a medical "sufferer"? In my own case the episodes have been of sufficient severity to produce incontinence and even quite severe physical injury on occasion, and yet I have been able to hide the fact of their occurrence from most of my acquaintance. The main difficulty in social adaptation is that of finding employment, especially as it is surprising with what prejudice one meets even in most enlightened quarters and when man-power is at its shortest. Fortunately, I have several other, more obvious, physical defects with which to explain my rejection from the Forces, but, of course, one cannot perjure oneself in connexion with life insurances or superannuation schemes, so the right job is often difficult to find even then. One has to be able to take things easily when required and to save money, especially as overwork and worry are certainly to be avoided.

A point which is not often realised is that many of us have what I call a remote, as distinct from an immediate, aura. Thus we can tell if an attack is impending and alter our habits and our drugs accordingly. Thus retention of fluids may be obvious for a few days preceding an attack and is easily noticed by the observant.

However, even to the experienced, a major episode is a most terrifying experience, and I am convinced that this fact militates strongly against the use of the water-pitressin test. Although I am perfectly aware of what is happening to me, the sense of utter frustration and helplessness at the beginning of an episode has never had its terrors dimmed by repetition, and I would never submit voluntarily to any procedure which I knew would bring it on.

ANON.

RUBELLA AND CONGENITAL DEAFNESS

SIR,—A few months ago I was called to see a patient, aged 65 years, suffering from a right hemiplegia of sudden onset. I had seen the man for trivial complaints before, and examination was complicated by his being a deaf-mute. His brother who was present told me that the patient had never been able to hear or speak properly—and added that their mother always insisted it was due to the fact that during the pregnancy she suffered from German measles.

In this case an "old wives' tale" has antedated Gregg's discovery by about sixty years. It makes one wonder whether the unsolved mysteries of medicine could not be more easily solved by listening closely to what our patients and their relatives say, and by studying carefully their habits, histories, and modes of life, than by investigating their biochemistry or experimenting on animals.

London, E.2. HUGH L'ETANG

Parliament

ON THE FLOOR OF THE HOUSE

THE outstanding political event of the week was the announcement by the Prime Minister of the early transfer of the political control of India to the Indian people. This development in the settlement of India's relations with us may have a great influence on the moulding of the future constitution of the United Nations as a world authority. The history of the British Commonwealth shows that free agreement without constraint or force of any kind is stronger as a link between nations than the most strictly drawn treaty of alliance.

The other work of the House has included the third reading of the Industrial Organisation Bill, the Agriculture Bill, and report and second reading of the Companies Bill, while the Lords have tackled Town and Country Planning and the National Service Bill. The legislative drive is still on but the tension is less. "Their Lordships" are somewhat alarmed at the possibility of having to sit until 11 P.M. on Mondays to Thursdays, but no-one has yet raised a protest at this direction of the labour of the Peers.

Sir Stafford Cripps and Mr. Herbert Morrison's insistence on increased production has sounded the note to which national activity must attune itself, and the need to economise in dollars means that we must provide more variety in food from home resources. Can the British garden and allotment produce a still larger proportion of British food during the next year? We may have to organise a drive by the W.V.S. and women's institutes to see that the best use is made of the thousands of tons of fruit that go to waste every year in small garden orchards.

MEDICUS, M.P.

FROM THE PRESS GALLERY

Venereal Disease in the Army

Speaking in the House of Lords on June 3 at the second reading of the National Service Bill, Lord MORAN said that the scientific way of life exaggerated the natural disposition of the man of sense to speak only of what he knows; but in the Bill before them it was difficult to see where the provinces of the soldier, the doctor, the politician, and the economist began and ended. The Government assumed that in order to give the country security they must provide a certain number of men for the Army and that this number could be raised only by conscription. Lord Moran admitted that he would himself support conscription if he were persuaded it was essential for security. But in fact he believed there was little risk of war in the next ten years. The Bill was designed not to give us security in time of war but to furnish us with overseas garrisons, and he was concerned about the medical reasons which made service overseas for conscripts so harmful.

Last September Lord Moran submitted to members of the Cabinet statistics concerning the incidence of venereal disease in the armies of occupation overseas. He hoped that, without the obvious disadvantage of publication, these statistics would be considered in any discussion of conscription. But they had not been considered, and he therefore felt obliged to put the figures before their Lordships' house. He realised he might be criticised for doing so, but the figures were given to him, without any condition, as a member of a small committee which advised the Secretary of State for War on medical matters. He held that, as a member of this committee, he had two responsibilities—to advise the Secretary of State, and to reassure the public that all was well in medical matters in the Army. "And if all is not well—and all is *not* well," added Lord Moran, "then I think it is time to speak up."

In the Army in Japan in September last 228 of every 1000 men had venereal disease.* In Germany the figure was 185; in Austria and Italy 168; and in Burma and Malaya 141. In the Middle East where there was little mixing between the Army and civil population the figure was 31. In the Army at home it was 33—much than the usual rate of about 12.

Lord NATHAN, Minister of Civil Aviation, in to ask Lord Moran from what sources his figures obtained as they were irreconcilable with figures in possession. Lord MORAN replied that the figures given to him in September. They were in print originated from the Army Medical Department. He confirmed that recent figures were substantially the

It was quite clear, in Lord Moran's view, that a from home was the vital factor which led to this incidence. It was also due to boredom. The men had healthy means of distraction. Many led a mechanical with not enough to do, waiting for the time to get The figures lent no support to the Prime Minister's a tive idea that the Army was a university, teac citizenship. Noble Lords might ask whether these meant that the price of keeping an army abroad is that 1 every 6 will get venereal disease. While it was true the times were abnormal in the sense that many men been in the Army for several years and were in a " care" frame of mind, Lord Moran thought that figures supplied an indictment of the conditions which these men were living. The most friendly of the Army must feel that they meant that the conscript's time abroad his experience in the was demoralising. The segregation of young men, the beginning of their life, under these conditions poor preparation for the more serious view of life was so sadly needed at present.

Replying to the debate, Lord NATHAN said he had startled by the figures given by Lord Moran of the inc of venereal disease in the Army. Lord Moran had ently been given the figures in his capacity as a m of the medical advisory council to the War Office, they were of a different order of magnitude from supplied by the War Office to Lord Nathan for period January, 1946, to March, 1947, which were as follows:

U.K. Forces: Highest quarter, 9·6 per 1000; lowest quarter, 5·3 per 1000.

Rhine Army: Highest, 44·6; lowest, 30.

C.M.F.: Highest, 39·5; lowest, 22·8.

M.E.F.: Highest, 9·4; lowest, 4·1.

S.E.A.L.F.: Highest, 37·1; lowest, 31·2.

Lord MORAN interposed to say he was quoting A.M.D.5 Statistics, September, 1946. He was giv the annual rate of cases. If Lord Nathan's figures, whi were quarterly, were multiplied by four the result wo not be very different from the figures Lord Moran h cited.

Lord NATHAN agreed that venereal disease was a serious problem which had to be dealt with promptly and properly, and he assured the House that great attenti was being given to it by the Secretary of State for War, the Adjutant-General, and the Commander-in-Chief in Germany.

QUESTION TIME

The Appointed Day Postponed

On June 9 Mr. VIANT asked the Prime Minister when it was intended to bring the rest of the National Insurance schemes and English and Scottish National Health Service schem into operation.—Mr. ATTLEE replied: The preparatory work necessary to arrange the transition from existing schemes an agencies and to create the organisation to operate the new provisions effectively is very heavy. Considerable progress has been made with these preparations in spite of great difficulties of staff and premises. The various schemes are closely linked up with each other and with proposals for completing the break-up of the poor-law and providing a comprehensive scheme of national assistance standing behind the insurance provisions. The Government consider that there are compelling reasons in favour of bringing all these schemes into operation on the same date. They have reached the conclusion that, by giving high priority to the legislation which it is hoped to introduce next session to complete the break-up of the poor-law, this will be possible. On a consideration of all the factors involved they have decided that the best date for this purpose is July 5, 1948, which coincides with the end of the next contribution year for health, pensions, and unemployment insurance.

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* Later in the debate Lord Moran explained that his figures represent annual infection-rates. Thus in Japan new cases of venereal disease numbered 228 per 1000 per annum.

Conjoint qualification in 1912. He had only just had time to "bed down" in the medical branch of the Navy when the 1914–18 war began, and it was not long before he was serving as P.M.O. of a light cruiser in the Grand Fleet. He was attracted to surgery and in time became a surgical specialist and the youngest surgeon captain in the Service. In 1937 he was appointed to the charge of the Naval hospital at the Cape of Good Hope till in 1943 he was moved to Plymouth. The following year, with his promotion to the rank of rear-admiral, he became P.M.O. Western Approaches, and in 1946 he was appointed honorary surgeon to the King.

"Mike Whelan knew the Service not only by family tradition but also from the executive and medical aspects," writes L. R., "and this may have been partly why he was liked, admired, and respected by everyone in the Service. But the chief reason was his ebullient, cheerful personality; no-one ever saw him downcast, and even when he had a grouse there was a smile on his lips. A fearless administrator, he said and did what he considered right whatever the consequences. A happy family man, Whelan was seen at his best in his own home. He married rather late and his children were young, but he could be young with them. Indeed his boyishness was always near the surface, wanting to break through even on the more solemn occasions—when you might imagine him reminding himself, come let us be grave, here comes a surgeon rear-admiral! And though his career was so rapid and distinguished he was never, like lesser men, weighed down by weight of office or any sense of importance."

RICHARD CLITHEROW

M.R.C.S., L.M.S.S.A., M.P.S., M.P.

As we announced last week, Dr. Clitherow, M.P., died in London on June 3.

Dick Clitherow (writes a colleague) packed a great deal of adventure into his 45 years. He was born and brought up in Liverpool, and it was as M.P. for the Edge Hill Division of Liverpool that he ended his days. At the age of 17 he emigrated to Canada, and for three years he served in the Canadian Mounted Police, rising to non-commissioned rank. In 1923 he returned to his native city, and for two years he was a member of the Liverpool city police force. On leaving the police force he qualified as a pharmacist, and for three years, from 1927 to 1930, he worked as a chemist and druggist in the United States and Canada. Once more he returned to Liverpool, and he had soon successfully established himself in the retail pharmacy business, with several chemist's shops. But these failed to absorb his energies, and in 1937 he was elected to the Liverpool city council. About this time he decided to study medicine, less with a view to practising than to fitting himself further for public life. As with many of those who undertake examinations later than usual, he found some difficulty in surmounting the hurdles; but he persevered and finally qualified after he had been elected to Parliament.

In 1942 he became an associate member of the Liverpool Fabian Society, and a year later he marked his full conversion to Socialism by crossing the floor of the city council chamber to join the Labour group. Throughout the war he did fine work as deputy chief warden in Edge Hill, and the popularity which he gained then as "the man with the beard" probably helped with his subsequent election success.

As a member of the Liverpool Hospital Committee he took a keen interest in the city's hospital services, which at the time he was seeing from the inside as a medical student.

Clitherow showed signs of developing into an inveterate exam-taker. At the time of his death he was already reading for the Bar and talking of taking the D.P.H. His wife, whom he married in 1930, would sometimes jokingly, and perhaps rather wistfully, complain that there seemed to be no end to his studies. He would rise regularly at 6 for two hours with his textbooks before breakfast. And the long hours in the train between Liverpool and London were always spent in study. He was a passenger on the night trains two or three times a week, for he liked to keep an eye on his businesses even when the House was sitting. And it may have been that this hectic way of living contributed to his early death. An attack of pneumonia during the spell failed to keep him away from the House for long.

As a Parliamentary speaker he was effective, with apt and dramatic turn of phrase. His usual sub was the health service of his native city. As a he was not easy to know. A restless streak marked character; he was seeking after something, he knew quite what. He was shrewd rather than learned, and great determination.

His wife and two sons survive him.

ARTHUR FREDERICK BERNARD SHAW

B.A., M.D. DUBL., F.R.C.P.I., D.P.H.

We have to record that Dr. A. F. Bernard Shaw, professor of pathology in the University of Durham and formerly in the Egyptian University of Cairo, died at Newcastle-on-Tyne on June 3.

The son of Arthur Wellington Bolton Shaw, he was born at Carraig-na-Chattan, co. Dublin, in 1888 and educated at Christ's College, Blackheath, and Trinity College, Dublin, where as a student he was twice awarded the medal of the University Biological Association. He qualified in 1911 and spent the next year as demonstrator in pathology in the university. After taking his D.P.H. in 1912 he was appointed senior assistant M.O.H. for Cardiff. But the 1911–18 war deflected him from a possible career in public health, for after serving in Gallipoli, Sinai, and Palestine, he finally became pathologist to the 69th General Hospital of the Egyptian Expeditionary Force. On his return to civil life he returned also to pathology and became lecturer in the subject in the University of Durham. He held appointment till he took up the Egyptian chair in 1933. For his work during the five years he spent in Cairo he was appointed commander of the Order of the Nile. He returned to Newcastle to his present chair in 1938. On the outbreak of war he was appointed regional adviser in pathology to the E.M.S. He was also a member of the senate of the University of Durham.

J. C. S. writes: "Shaw's work in pathology covered three periods, with a Rockefeller fellowship year at Johns Hopkins in America interposed. The first was as a lecturer in Newcastle, where he came in 1919, from an early training in Trinity College, Dublin, and an experience in pathology during the 1914–18 war. His second period was in 1933–38 as professor of pathology in the Egyptian University at Cairo; and the last was again at Newcastle, where he held the chair until his death. In his earlier period, at a time when he was impatiently busy with research, he worked under a burden of routine and teaching, and in physical circumstances so detrimental that they are horrid to look back upon. In spite of the interruptions of illness he completed work, which was widely noticed, on the influence of the vasomotor action on the leucocytic count of peripheral blood, on the diurnal tides of the leucocytes in man, and on constitutional abnormalities of the leucocyte. In addition he added to our knowledge of the pathology of rheumatic fever, and of Riedl's thyroiditis, in articles which are still standard references. In Cairo he had scope for the first time to create a department nearer to his desire. This he did in a way which was a testimony to his powers of organisation and his originality, and he left it a monument to his efficiency and sense of justice, for which the Egyptian government honoured him. In Egypt he made a notable contribution to the pathogenesis of pulmonary schistosomiasis and to the pathology of the spleen, but he was quickly absorbed in reviving the study of palæopathology with new techniques. Here also he found an outlet for his lifelong interest in anthropology and the history of civilisations, and some of his most memorable lectures are those in which he used his study and experience of the Egyptian civilisation to illustrate his views on pathology and the course of civilised life.

"Shaw returned to Newcastle as professor of pathology in 1938. The war was quickly on us but in spite of difficulties he was able to infuse activity into builders and architects to commence a building which would become an institute of pathology within the grounds of the Royal Victoria Infirmary, where pathological anatomy, experimental pathology, biochemistry, and bacteriology would have their place. This was another fruitful period of his life in spite of the inclemencies of war and interruptions of illness. His teaching and his influence then reached their full maturity.

"The nobility of his character and the depth of his mind will be known only to those whom he taught or with whom he was intimate, for he was a reserved man given much to quiet meditation. His was indeed the most cultured mind of any I have known. He had a stern but noble countenance covering a modesty which was at times embarrassing. Deeper still lay a generosity of heart and warmth of feeling which were revealed in a smile of great charm and in acts of exquisite courtesy. He loathed self seeking and insincerity, and was suspicious of Anglo-Saxon compromise. In æsthetics he was relatively insensitive to the visual arts, but vividly sensitive to the form and function of words. There is little wonder that his lectures were unforgetable. They were precise, sincere, and eloquent, with the right and unusual word always coming to his aid. He saw his pathology as part of man's whole struggle with his environment, but would at times laughingly confess that many of its evidences came near to metaphysics. Devoted to the scientific method and poignantly concerned about the function of the university in the modern world, he was intolerant of the compromises which would link commercial and professional interests to a university department, and was anxious to rid the teaching hospital of those burdens and arrangements which prevented it from doing its proper work. It appeared to him logical that a teaching hospital, with the functions of conserving knowledge, of advancing knowledge, and of setting the highest standards of practice should be arranged, administered, and staffed entirely for those purposes, and he saw the solution of this only by making these institutions university departments in the true sense of the word. He could argue these things with fervour, but would cease from arguing at the first sight of fixed prejudice or blind ignorance.

"Uncompromising in his conception of good and evil, of truth and untruth, he may have appeared obstinate at times; but the tragedies of the modern world saddened him, and he saw no way out except by combining reason with science and with that experience of things which we call culture. He lived as near to his own high conception of life as any man could. How strict and distinctive that conception was is known to his friends. By that he will be judged and remembered."

Professor Shaw married Miss Gertrude Frimston, of Liverpool, and they had two sons.

Births, Marriages, and Deaths

BIRTHS

Chippindale.—On June 1, Dr. Ruth Chippindale (née Stevenson), wife of Mr. D. Keith Chippindale, of Trammere Park, Guiseley—a son.

Jenkins.—On June 1, the wife of Dr. Rees Jenkins, of Twyford—a son.

Krauss.—On May 28, at Newcastle-on-Tyne, the wife of Dr. Stephen Krauss—a son.

Logan.—On June 2, at Wilmslow, Cheshire, the wife of Dr. R. F. L. Logan—a son.

Roth.—On May 25, in London, the wife of Dr. Martin Roth—a daughter.

Simmons.—On May 28, at Oxford, the wife of Dr. C. A. Simmons—a daughter.

MARRIAGES

Denham—Colchester.—On May 31, at Pyrford, Surrey, Robin Arthur Denham, M.R.C.S., to Rosemary Henrietta Colchester.

Fawcett—Whiting.—On June 2, in London, James Fawcett, M.B., to Barbara Whiting.

Hadley—Stewart.—On June 7, at South Hinksey, Oxford, George Dickinson Hadley, M.D., to Jean Elinor Stewart.

Joule—Mittell.—On June 2, at Sutton, John Wilfrid Joule, M.D., M.R.C.P., to Mary Louise Mittell, M.B., M.R.C.P.

Petro—Fitt.—On June 4, in London, John Petro, M.B., to Mary Fitt.

DEATHS

Aldridge.—On June 1, at Camberley, Arthur Russell Aldridge, C.B., C.S.I., C.M.G., M.B. Edin., lieut.-colonel R.A.M.C. retd., aged 82.

Allan.—On June 3, at Roehampton, William Smith Allan, M.B. Glasg.

Cato.—On May 31, at Lowestoft, Charles Stanley Cato, M.R.C.S.

Clitherow.—On June 3, in Liverpool, Richard Clitherow, M.R.C.S., M.P., aged 45.

Ewens.—On May 29, at Lowestoft, Bernard Ewens, M.R.C.S.

James.—On June 6, in London, Coram James, M.R.C.S., aged 84.

Morris.—On June 1, in Glasgow, Noah Morris, M.D. Glasg., F.R.C.P.

Shaw.—On June 3, at Newcastle-on-Tyne, Arthur Frederick Bernard Shaw, M.D. Dubl., F.R.C.P.I., aged 53.

Notes and News

EVAPORATED MILK FOR INFANT FEEDING

Unsweetened evaporated milk is now on points, but supplies for infant feeding can be obtained without surrendering points coupons on a doctor's certificate. The doctor should give the mother a certificate stating that the infant is under the age of 12 months and urgently requires evaporated milk. The mother must then take this certificate to her food office, who will issue her with an authority to purchase a month's supply of milk free of points. At the end of this initial month, continued supplies will be authorised by the food office when they receive a further medical certificate. This must give full details of the infant's condition, age, and weight at birth and at application, and must state whether any other milk preparations have been tried and found unsuitable. The following amounts of milk will be authorised under this scheme:

Age of Infant	*Tins of Evaporated Milk*
Under 5 months	Up to 20 tins per 4 weeks
5– 6 „	„ „ 24 „ „ „ „
7– 9 „	„ „ 26 „ „ „ „
10–12 „	„ „ 28 „ „ „ „

University of Oxford

The Nuffield Foundation has made a grant to the university of £50,000, over a period of ten years, to meet the capital and maintenance costs of a hæmatological research unit. The new unit is to be set up in the medical school in conjunction with the Nuffield department of clinical medicine and the Radcliffe department of pathology.

University of Cambridge

Status of women.—The syndicate appointed last January to consider the status of women in the university has now reported. It recommends that women should be admitted to the university and to all degrees on the same terms as men, and that women should be eligible for all emoluments and all offices (except those of proctor and esquire bedell), and for membership of all bodies concerned with the government of the university. Members of the syndicate differ as to the maximum total number of women students *in statu pupillari* which would be desirable, but they are agreed in considering that in normal times it should not exceed a fifth of the total number of men students.

Royal College of Physicians of Ireland

At a meeting of the college held on June 6, Dr. Eamonn de Valera and Dr. J. Browne Fleming were admitted to the fellowship. The following were also admitted to the membership:

Dr. P. M. Alston, Dr. Leslie Doyle, Dr. Leslie Fridjohn, Dr. A. P. Grant, Dr. George Gregg, Dr. John Hayes, Dr. P. D. J. Holland, Dr. W. D. Hughes, Dr. S. D. McGrath, Dr. Harry O'Flanagan, Dr. Bethel E. R. Solomons.

Royal College of Obstetricians and Gynæcologists

On Friday, July 4, at 3 P.M., at the college, 58, Queen Anne Street, London, W.1, Prof. F. J. Browne will deliver the William Meredith Fletcher Shaw memorial lecture on Hypertension in Pregnancy. At 5 P.M. on the same day Mr. J. A. Stallworthy will deliver the biennial scholarship lecture. He has chosen as his subject Fact and Fantasy in the Study of Female Sterility Admission is by ticket, which may be had from the secretary of the college.

Faculty of Radiologists

The annual meeting of the faculty is to be held in Birmingham from Thursday, June 26, to Saturday, June 28. The speakers will include Prof. Robley Evans, of the Massachusetts Institute of Technology, and Dr. J. Hamilton, of the Radiation Laboratory, Berkeley, California, who will discuss the Therapeutic Uses of Radioactive Isotopes. Dr. Brian Taylor, Dr. T. Lodge, Mr. A. L. d'Abreu, Mr. C. J. L. Thurgar, and Dr. Peter Kerley will open a discussion on Carcinoma of the Bronchus. At the therapy section Prof. B. W. Windeyer, Dr. P. B. Mumford, Dr. Bernard Tate, and Dr. J. F. Bromley will speak on Organisation for Superficial X-ray Therapy, and at the diagnosis section Prof. J. M. Smellie, Dr. J. C. Bishop, and Mr. H. H. Sampson on Bronchiectasis in Children.

Royal Society of Tropical Medicine and Hygiene

At the annual general meeting of the society to be held at 26, Portland Place, London, W.1, on Thursday, June 19, at 8 P.M., the new president, Sir Philip Manson-Bahr, will be inducted.

Pharmaceutical Society of Great Britain

Mrs. Jean Kennedy Irvine has been elected president of the society. Mrs. Irvine is superintendent of the Ministry of Health's south-eastern pricing office.

Manchester and District Medical Golfers' Assocation

The silver challenge cup of the association was won on June 4 by Dr. J. McSorley. There were 92 competitors.

Royal Institute of Public Health and Hygiene

The Bengué lecture is to be delivered at the institute on Thursday, July 17, at 3 P.M., by Dr. I. W. Magill, who will give a Review of Modern Anæsthesia.

Congress on Mental Health

The international congress which is being arranged by the National Association of Mental Health will be held at the Central Hall, Westminster, from August 12 to 21, 1948 (not this year, as announced in our issue of May 31).

Brighton and Sussex Medico-Chirurgical Society

Mr. H. J. McCurrich, the president, took the chair at the centenary dinner of the society on June 5, when the guests included Lord Moran, Sir Alfred Webb-Johnson, the Bishop of Lewes, and the Mayor of Brighton.

Fees Payable by Local Authorities

As an interim measure and without prejudice to subsequent negotiations, the Minister of Education has accepted the scale of fees for sessional or occasional work by doctors approved last February by the associations of local authorities and the British Medical Association (*Lancet*, March 29, p. 432).

Surgical Rubber Gloves

Doctors who need surgical rubber gloves for professional use are reminded that they should apply to the secretary of the Central Medical War Committee, B.M.A. House, Tavistock Square, London, W.C.1, marking the envelope "Gloves" in the top left-hand corner, and enclosing a stamped addressed envelope for reply. They will then receive a booklet of six certificates.

Records for the New Service

The Minister of Health has been advised that the executive councils which, under the National Health Service Act, will organise the local family-doctor services will need two registers—a nominal register, in alphabetical order, of persons who have been accepted by doctors, and a medical register. The existing records of the insurance committees, reorganised in alphabetical order, will form the nucleus of these new registers, and Mr. Bevan has accordingly asked the committees to help in the preparatory work by checking and bringing up to date their records of insured persons.

Maternity and Child Welfare Conference

The National Association of Maternity and Child Welfare Centres is holding an international conference at Friends House, Euston Road, London, N.W.1, from June 25 to 27, on the Present and Future of Maternity and Child Welfare in Europe. The speakers will include Dr. J. Greenwood Wilson, Dr. Fraser Brockington, Sir Allen Daley, Sir Andrew Davidson, Dr. H. E. Magee, Mr. Ian Sutherland, and Dr. Frederick Heaf. Mr. Aneurin Bevan, the Minister of Health, will open the conference with his presidential address at 10.15 A.M. on Wednesday, 25th.

Montreal General Hospital

Mr. J. H. Quastel, D.SC., F.R.S., has been appointed director of the enzyme research division of the Institute of Special Research and Cell Metabolism lately set up at Montreal General Hospital. McGill University has simultaneously appointed him to a professorship in the department of biochemistry, whose chairman is Prof. D. L. Thomson.

Before taking up his present appointment as director of the Agricultural Research Council's unit of soil metabolism, Dr. Quastel was director of research at Cardiff City Mental Hospital, and he has published many papers on bacterial biochemistry, on the metabolism of the fatty acids, and especially on the biochemistry and pharmacology of the central nervous system. He expects to sail for Canada in August.

Diary of the Week

JUNE 15 TO 21

Sunday, 15th

Empire Rheumatism Council
10 A.M. (Apothecaries' Hall, Blackfriars Lane, E.C.4.) Dr. F. Cooksey: Physical Treatment in the Rheumatic
11.15 A.M. Mr. W. D. Coltart: Orthopædic Aspects of Rheumatic Diseases.

Monday, 16th

Royal College of Surgeons, Lincoln's Inn Fields, W.C.2
5 P.M. Mr. Brodie Hughes: Interpretation of Visual Defects.

Tuesday, 17th

Royal College of Surgeons
5 P.M. Mr. Geoffrey Knight: Neurosurgery in relation to Oph mology.
Royal Society of Medicine, 1, Wimpole Street, W.1
2.30 P.M. *Pathology*. (Wellcome Physiological Research Labora tories, Beckenham, Kent.) Demonstrations on Imm and Experimental Chemotherapy.
5 P.M. Dr. G. Brownlee: film on Chemotherapy of Experim Tuberculosis.
London School of Dermatology, 5, Lisle Street, W.C.2
5 P.M. Dr. W. N. Goldsmith: Pigmentation of the Skin.

Wednesday, 18th

Royal College of Surgeons
5 P.M. Mr. Geoffrey Knight: Neurosurgery in relation to Oph mology.
Royal Society of Medicine
4.30 P.M. *Physical Medicine and British Association of Ph Medicine.* Dr. P. Bauwens: Complex Behaviour of frequency Currents in Simple Circuits.

Thursday, 19th

Royal College of Surgeons
5 P.M. Mr. F. G. St. Clair Strange: Plastic Procedures in Preparation of Amputation Stumps for Limb-fi (Hunterian lecture.)
Royal Society of Tropical Medicine, 26, Portland Place, W.1
8 P.M. Brigadier Sydney Smith: Prisoner-of-war Camps in Middle East.
Chadwick Lecture
4 P.M. (Chelsea Physic Garden, Swan Walk, S.W.3.) Prof. W. Pearsall, D.SC., F.R.S.: Water-supply and Fresh Biology.

Friday, 20th

Royal College of Surgeons
3 P.M. Dr. W. Russell Brain: Exophthalmos apart from End Disease.
4.30 P.M. Dr. Brain: Exophthalmos of Endocrine Origin.
Royal Society of Medicine
8 P.M. *Obstetrics and Gynæcology.* Dr. Engel, Mr. S. Kon, D.SC., Mr. S. J. Folley, D.SC.: Physiology of Breast.

Saturday, 21st

Royal Society of Medicine
2.30 P.M. *Orthopædics.* (Lord Mayor Treloar Hospital, Al Hants.) Sir Thomas Fairbank: Contributions of the Sir Henry Gauvain to Orthopædic Surgery. Prof. T. Po Kilner: Orthopædic and Plastic Surgical Team-w Mr. E. S. Evans: Mechanical Treatment of Tuberc of the Spine and Hip in Childhood. Mr. H. H. Langs Results of Brittain's Arthrodesis for Tuberculosis of Hip.

Appointments

Aspin, John, M.D. Camb., D.M.R.D.: deputy clinical T.O., Leeds.
Goligher, J. C., M.B. Edin., F.R.C.S.: asst. surgeon; St. M Hospital, London.
* Hewitt, Selwyn, M.B., B.HY. Durh., D.P.H.: deputy cou M.O.H., Herefordshire.
Liebert, Katharine, M.B. Manc., F.R.C.S., M.R.C.O.G.: gynæcolo Ancoats Hospital, Manchester.
MacDonald, N. M., M.B. Glasg., D.P.H.: M.O.H., Redcar, Saltb and Marske, and asst. school M.O., North Riding educati committee.
Nelson, M. G., M.D. Belf., M.R.C.P.: clinical pathologist, Roy Victoria Hospital, Belfast.
Tooley, P. C., M.D. Lond., D.P.M.: chief psychiatric asst., department of neurology and psychiatry, London Hospital.

* Amended notice

Queen Mary's Hospital for the East End, London:
Asst. obstetric surgeons:
Barns, H. H. Fouracre, M.B. Lond., F.R.C.S., M.R.C.O.G.
Spiers, B. G., M.B. N.Z., F.R.C.S.E., M.R.C.O.G.

St. Mark's Hospital, London:
Asst. surgeons:
Goligher, J. C., M.B. Edin., F.R.C.S.
Thompson, H. R., M.B. Camb., F.R.C.S.

Surrey County Council:
Asst. M.O.s in the medical and maternity and child welfa services:
Brodigan, Margaret, M.B. Lond., D.P.H.
Crowley, Matthew, M.B. N.U.I.
Ferguson, William, M.B.
Greenwood, W. E., M.B. Lond.
Hoey, R. A., M.R.C.S.
Winter, Cornelia J. J., M.B. Edin.

INFECTION OF WOUNDS WITH GRAM-NEGATIVE ORGANISMS

CLINICAL MANIFESTATIONS AND TREATMENT

M. E. Florey
M.B. Adelaide
RESEARCH CLINICAL ASSISTANT

R. W. N. L. Ross
M.R.C.S.
ASSISTANT BACTERIOLOGIST,
EMERGENCY PUBLIC HEALTH
LABORATORY, CARDIFF

E. C. Turton
M.B. Lond., M.R.C.P.
LECTURER IN PHYSIOLOGY,
ST. BARTHOLOMEW'S HOSPITAL
MEDICAL COLLEGE

From the Radcliffe Penicillin Unit of the Medical Research Council

The findings described here have been made on 53 air-borne battle casualties with 63 lacerated wounds, mainly involving compound comminuted fractures of the tibia, and on a further 10 superficial wounds caused by pressure sores and plastic operations.

As only 7 of the lacerated wounds could be completely closed by secondary suture or early plastic repair, the remaining 56 provided an opportunity of following their progress clinically and bacteriologically from first removal of dressings in this unit—generally within the first week after wounding—till they were fully healed from 6 weeks to 18 months later and at every subsequent operation for plastic or orthopædic repair. Since all the patients had received prophylactic injections of penicillin for various periods up to 3 weeks after wounding, and continued to receive prophylactic local applications or intramuscular injections throughout their treatment, the gram-positive organisms commonly considered responsible for major sepsis were of minor significance; and clostridia, though more difficult to eradicate, were not a problem for more than 3 weeks in most wounds. In 1164 swabs hæmolytic streptococci were present 50 times, and *Staph. aureus*, though it appeared in 174 (table I), was readily controlled by local applications of penicillin during the first 6 months of the investigation.

The clinical findings attributed here to infection by gram-negative organisms are those which have been found in wounds which harboured no hæmolytic streptococci or clostridia for 9–48 weeks and in which *Staph. aureus* —i.e., coagulase-positive staphylococci—appeared on isolated occasions only or not at all. Non-hæmolytic streptococci, clostridia, and coagulase-negative staphylococci appeared so erratically that it was impossible to associate any particular condition with their presence; so they are excluded from consideration here.

It had been hoped to compare the state and progress of wounds containing gram-negative bacteria with those of wounds in which these organisms were not present; but 51 of the 56 which could not be closed by secondary suture harboured one or more species of gram-negative bacteria from the second week after wounding onwards. It was therefore impossible to assess effects against a comparable number of controls. The 5 exceptions undoubtedly made steady progress towards healing and bony union, without the interruptions caused by sinuses or sequestra, and the time at which union was consolidated compared favourably with that in wounds completely closed by secondary suture.

CLINICAL MANIFESTATIONS

Acute Manifestations.—In the first 3 weeks after wounding it was difficult to attribute acute manifestations to these organisms, because other factors also were often present, such as foreign bodies, pieces of loose bone, and small necrotic pieces of soft tissue, even after careful excision. Clostridia were often found; nor had chemotherapy eradicated every *Staph. aureus* at this stage.

One purulent arthritis persisted even after *Staph. aureus*, hæmolytic clostridia, and streptococci had been eliminated; and gram-negative bacteria were the only organisms remaining other than non-hæmolytic clostridia.

In another case extensive cavitation of the head of the tibia, with some involvement of the knee-joint, had a clean, bleeding, and sterile surface when first examined 4 days after wounding. There were then no signs of inflammation and little constitutional disturbance.

At each extensive change of dressing and plaster during the next 8 weeks the patient acquired a new infection with a different species of gram-negative organism. He had a swinging pyrexia for about the same time and developed slimy putrefactive-smelling pus in his wound, with minimal formation of granulation tissue.

Clostridia also were cultured on 4 of the 7 occasions on which wound swabs were taken during this time; hence the gram-negative organisms may not have been solely responsible for his condition.

Long-term Manifestations.—Eighteen wounds have given us an opportunity of studying the effects of these organisms alone for fairly long periods. In 8 no *Staph. aureus* or *Strep. hæmolyticus* appeared at any time, and gram-negative organisms alone were present from within 4–10 days of wounding till healing had taken place from $3^1/_2$ weeks to 12 months later. Of these wounds 6 were compound comminuted fractures of the tibia, in the upper, middle, or lower third, where the wound could not be completely closed by early repair, and 2 were large soft-tissue wounds of back and thigh which were sutured but required a drainage-tube for several days, and in consequence a sinus persisted for $3^1/_2$–4 weeks. In the remaining 10 wounds gram-negative infection persisted alone for periods of 9–24 weeks.

All these wounds had undergone early débridement and, in contradistinction to those containing clostridia, had contractile bleeding muscles, no redness of skin edges, and a minimum of slough. After the first definitive operation all these wounds suppurated a little, the pus being mucopurulent and stained lightly with old blood. Growth of granulations was minimal, and there was no breakdown of suture lines or delay in ingrowth of epithelium. There was little constitutional disturbance, pyrexia not being more than 100°F at any time and subsiding below 99°F in 3 weeks in all but one patient, who later developed jaundice. There was no sign of the chronic anæmia associated with sepsis, for the number of red cells rose steadily from 3,500,000 to nearly 5,000,000 per c.mm., and hæmoglobin from about 70% to about 90–100% in the 6 weeks after wounding. Moreover the men's health remained excellent throughout their long convalescence.

The 2 flesh wounds made uninterrupted progress towards healing, and 2 of the compound fractures healed within 7 weeks without any subsequent formation of a sequestrum. Bony union in these was achieved in a time comparable with that in similar fractures whose wounds could be completely closed by secondary suture and so protected from infection at an early stage.

Thus, in the early stages the consequences of this type of infection did not appear to be severe, but its persistence had some serious consequences, for the 4 remaining compound fractures do not present so uncomplicated a picture. Sinuses persisted for various times. In the 2 less severe, 4 months elapsed before the sinus healed, and both later broke down again before final healing took place, 40 weeks after wounding. Sequestrectomy was necessary on several occasions in one, and cultures from the sequestra invariably yielded *Proteus*. In the remaining 2, where bony destruction was greater, sinuses remained not completely healed 9 months and a year, in spite of sequestrectomies and curettings. The bony cavities, which in other cases filled in as the tibia thickened at the site of fracture, remained, and the blood-clot which filled them at each

TABLE I—BACTERIAL FLORA IN DEEP AND SUPERFICIAL WOUNDS THROUGHOUT PROGRESS TO HEALING

Type of wound	No. of wounds	No. of swabs	Percentage of swabs in which organisms were present								%
			B. coli	*Prot*	*Ps. pyo.*	*S. aur.*	*Strep. h.**	Clos.	*S. alb.*	N.H.S.†	
Deep	63	1164	35·4	36·1	39·2	14·9	4·3	11·3	7·2	5·2	11
Superficial ..	10	174	11·5	17·2	17·2	44·8	0·6	0·0	21·3	0·6	17

* *Strep. h.*, hæmolytic streptococci, some not Lancefield groups and avirulent to mice.
† N.H.S., non-hæmolytic streptococci.

operation disintegrated and escaped as thin brown purulent discharge, some poorly developed granulations and a little slimy pus appearing in its place. More than 6 months after the fractures there was no development of firm fibrous tissue and no callus formation.

The remaining 10 wounds presented a similar clinical picture as regards the persistence of sinuses. After clostridia had been eliminated, the thick purulent discharge became thin, sometimes with a putrefactive odour, and eventually brown and slimy, making it easily distinguishable from the thick creamy pus seen in infections with *Staph. aureus* and *Strep. hæmolyticus*. The distinction was so clear that, on several occasions, on the appearance of the latter type of pus a diagnosis of secondary invasion by gram-positive organisms was correctly made before the bacteriological report was available. As the infection with gram-negative organisms came under control and cultures were eventually sterile, the exudate became serosanguineous or serous, and again the result of the swabs could be fairly prognosticated by its appearance.

TABLE II—BACTERIAL FLORA IN 53 SEQUESTRA

Organism	No. of sequestra	
	Total	No. of pure cultures
Bact. coli	29	12
Proteus	20	6
Ps. pyocyanea	18	2
Staph. aureus	3	3
Strep. hæmolyticus	3	..
Clostridia	3	..
Staph. albus	3	..
Non-hæmolytic streptococci ..	4	..
Sterile	6	6

There was no indication that discharge produced by gram-negative organisms had any irritant action on the skin, provided it was cleared away daily. In fact, epithelial growth proceeded remarkably rapidly till the wounds were no more than sinuses. If, however, the wounds were enclosed in plaster or in an occlusive dressing for several weeks, the surrounding skin was invariably excoriated. More disconcerting than the persistence of sinuses was the ability of epithelium to grow over their mouths, giving the appearance of a completely quiet fracture site without pain, tenderness, or redness. Evidence that a pathological state still persisted consisted only in the lack of callus formation visible on radiography or in the development of sinuses after the patient's leg had begun to bear weight.

Sequestra were on several occasions removed from these sinuses. When the cavities in which they lay were opened up they presented the same appearance as those already described. Bacteriological examination of the material removed revealed no other organisms than *Bact. coli*, *Proteus*, or *Ps. pyocyanea*. Among the 53 cases, many sequestra were removed from 21 wounds, and 53 were examined bacteriologically. Only 3 were infected with *Staph. aureus*, 6 were sterile, and cultures of the remaining 44 yielded *Bact. coli*[1] in 29 instances, *Proteus* in 20, and *Ps. pyocyanea* in 18 (table II).

The blood-clot which filled the bony cavitie af sequestrectomies, if sterile, remained intact and form a basis for the ingrowth of organising tissues and an epithelial covering; but, if infected with gra negative organisms, it steadily disintegrated, leaving foundation for repair. (Though *Bact. coli* does not, b *Proteus* and *Ps. pyocyanea*, liquefy proteins in vitro, appears to have interfered at some stage in the proc of organisation, as shown by the number of seque infected by it alone.) Such infection of the clot appea to be the reason for lack of union and the developm of sequestra, and it would have been legitimate ascribe to it the failure of bone grafts, had these be undertaken while the organisms were well establish When it was possible to close the wound early or prevent infection with gram-negative organisms, so limbs which were seen on radiography to have ma small fragments of bone and shell distributed among muscles or between the ends of bone did not devel sinuses. In other words, the fragments which mig have become sequestra were incorporated in the call

The 10 surface lesions gave no evidence that gra negative bacteria had any clinical significance. The organisms were much more tardy in making their fi appearance and were often overshadowed by the presen of *Staph. aureus* (table I). There were no blood-clots a seldom any dead tissue in these wounds, which theref offered a very different type of pabulum for organisms

COMBATING INFECTION WITH GRAM-NEGATIVE ORGANIS

It therefore seemed advisable that every effort shou be made to combat gram-negative organisms and compare the effects of the different agents already our disposal in eliminating them. Even if those tri were not very effective, the serial examination mig at least provide a standard against which to judge t effects of new and more powerful agents as they appea The effects of local application of different drugs we therefore observed besides those of other agenci expected to influence wound infection.

Agents used were as follows:

(1) Streptomycin[2]:
  (*a*) a powder containing 235 units per mg.;
  (*b*) mixed with sulphamezathine, 10,000 units per (1 wound);
  (*c*) an aqueous solution, 12,500 units per c.cm.;
  (*d*) a cream, 12,500 units per g.
(2) Kojic acid[3]:
  (*a*) the crystalline substance mixed with an equ part of magnesium carbonate to form a powder for insufflation;
  (*b*) neutralised aqueous solution, 1 : 200.
(3) Sulphathiazole;
  (*a*) in microcrystalline form as an insufflation, wi penicillin, 2000–5000 units per g.,
  (*b*) an aqueous solution of the sodium salt ('Cib zol') 1 g. per 5·5 c.cm. for irrigation of sinuse
(4) Sulphamezathine:
  (*a*) and (*b*) as described for sulphathiazole, th solution containing 1 g. per 3 c.cm.

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[1] At least one found to be hæmolytic.

[2] Concentrations used were worked out on a basis of 50 uni being equivalent to 1 unit of penicillin.

[3] Kojic acid is an antibiotic which is stated to inhibit *Bact. co* and *Proteus* at 1 in 400, and *Ps. pyocyanea* at 1 in 16,000 1 in 32,000, and to be non toxic to human leucocytes in vit at 1 in 400 (Jennings and Williams 1945).

(5) Proflavine :
 (*a*) a powder—proflavine hemisulphate 1% in sulphathiazole—'Thiazamide' (1 wound only);
 (*b*) an aqueous solution—'Isoflav' 1 : 1000 buffered to a pH of 6·3.
(6) 'Phenoxetol' : an aqueous solution, 1 : 45.
(7) Ammophenol : an aqueous solution, 1 : 1000.
(8) Eusol or 'Milton' : an aqueous solution, half strength.
(9) Penicillin :
 (*a*) a powder containing at least 100,000 units per g. ;
 (*b*) an aqueous solution, 500 units per c.cm. ;
 (*c*) a cream, 250 units per g.

Five was considered the least number of wounds om which any conclusions could be drawn about the ficacy of any agent ; but, inasmuch as the sulphonmides were used as a diluent for penicillin powder in he routine prophylactic insufflation, after dressings, gainst infection with gram-positive organisms, they had any more unintentional trials than the other agents.

Besides the changes of flora following the daily use f chemical agents, those following enclosure in plasterf-paris alone were recorded. Operation, when it nvolved excision, removal of sequestra, and curetting, ras also regarded as a possible cause of elimination of nfection. Finally, the presence of other organisms in he wound was thought to be a possible factor in the ontrol of infection with gram-negative organisms. There was no doubt that such infection flourished rrespective of the presence of non-hæmolytic streptoocci and of clostridia. Hæmolytic streptococci appeared o infrequently as to make it useless to draw any deductions from their presence, but *Staph. aureus* persisted everal months in 2 wounds and long enough in others to make it worth while to record its association with the gram-negative organisms.

As a control against which to measure the effect of the other agents, the results of swabs taken during penicillin applications without sulphonamides are recorded, for the three gram-negative bacteria in question all flourished on this treatment.

BACTERIOLOGICAL INVESTIGATIONS

All the 73 wounds were examined by serial swabbings taken from the time when the first dressings were removed till the wounds were healed. Windows were cut in plasters for this purpose and later to allow the daily dressing and application of local agents. Examinations were made weekly or twice a week during periods of observation, the only exceptions being those cases in which the effect of complete enclosure in plaster was being tested.

First Appearance.—*Bact. coli* was the earliest invader. In 50% of all wounds examined in their first week this organism had already appeared. *Proteus* appeared most often in the second week, and *Ps. pyocyanea* in the third. Fresh infection still continued after this ; hence by the end of 6 weeks, and in spite of a no-touch technique during ward dressings, all but 1 of those still unhealed had been infected with *Bact. coli*, and all but 6 with *Ps. pyocyanea*. *Proteus*, which at this time had not yet been found in 14, first appeared in a further 8 wounds during the following 21 weeks. *Bact. coli* and *Ps. pyocyanea* first appeared after operation as often as after ward dressings in spite of the many more opportunities the dressings provided. *Proteus* first appeared more often in the ward. Table III shows the order of appearance of these organisms, and table I indicates their persistence in spite of measures taken to eradicate them.

TABLE III—FIRST APPEARANCE OF GRAM-NEGATIVE BACTERIA IN 63 DEEP WOUNDS

Time after wounding	No. of wounds examined	% Wounds in which organisms had appeared		
		Bact. coli	*Ps. pyocy.*	*Proteus*
By end of :				
1st week ..	50	50	11	11
2nd " ..	61*	66·5	20	30
3rd " ..	58*	74	40	41
6th " ..	38*	95	84	66

* Remainder healed.

Methods of Recording Results of Treatment.—The results of the bacteriological examinations were charted concurrently with the type of local treatment applied and during a period of follow-up after treatment had been discontinued. These records were then compared with the incidence of any particular type of infection before treatment began. Since operations and replastering were necessarily performed irrespective of courses of local treatment, it was impossible to give every agent the same length of trial and the same period of follow-up after the cessation of treatment. Results are not recorded unless daily applications were used for 5 days or more—most trials lasted between 10 days and a

TABLE IV—DISAPPEARANCE OF *Bact. coli*

Factor influencing growth of *Bact. coli*	Before treatment			During treatment									First and second weeks after treatment		
				First week			Second week			Third week					
	No. of wounds	No. of swabs	% of swabs without *B. coli*	No. of wounds	No. of swabs	% of swabs without *B. coli*	No. of wounds	No of swabs	% of swabs without *B. coli*	No. of wounds	No. of swabs	% of swabs without *B. coli*	No. of wounds	No. of swabs	% of swabs without *B. coli*
Penicillin (as control)	49	518	*33*	36	35	*40*	33	40	*48*	11	13	*38*	24	38	*37*
Streptomycin..	5	134	*59*	4	4	*75*	4	6	*83*	..	..	..	5	10	*90*
Kojic acid ..	19	310	*41*	15	19	*47*	16	24	*58*	11	14	*71*	17	30	*33*
Sulphathiazole*	28	411	*36*	16	19	*47*	20	24	*54*	10	12	*92*	16	23	*74*
Sulphamezathine*	27	563	*34*	21	24	*46*	19	23	*61*	7	8	*38*	17	29	*52*
Proflavine ..	6	133	*45*	6	6	*83*	4	4	*100*	..	..	..	5	7	*71*
Phenoxetol ..	9	51	*37*	6	6	*50*	6	8	*38*	2	2	*50*	7	12	*42*
Aminophenol ..	2	26	*35*	1	1	*0*	2	3	*66*	..	..	..	1	1	*100*
Eusol or milton	4	71	*24*	2	2	*0*	4	4	*25*	1	2	*50*	3	3	*67*
Plaster-of-paris	51	715	*42*	..	..	..	23	23	*43*	16	17	*53*	25	50	*38*
Operation ..	84	919	*34*	66	68	*35*	15	15	*33*	..	..	..	52	66	*47*
*Staph. aureus**	36	655	*44*	23	28	*43*	14	21	*67*	14	17	*65*	19	32	*69*

* Usually with penicillin.

TABLE V—DISAPPEARANCE OF *Ps. pyocyanea*

Factor influencing growth of *Ps. pyocyanea*	Before treatment			During treatment									First and second weeks after treatment		
				First week			Second week			Third week					
	No. of wounds	No. of swabs	% of swabs without *Ps. pyo.*	No. of wounds	No. of swabs	% of swabs without *Ps. pyo.*	No. of wounds	No. of swabs	% of swabs without *Ps. pyo.*	No. of wounds	No. of swabs	% of swabs without *Ps. pyo.*	No. of wounds	No. of swabs	% of swabs without *Ps. pyo.*
Penicillin (as control)	47	691	*35*	37	44	*41*	32	39	*38*	11	14	*43*	25	48	*35*
Streptomycin ..	6	219	*42*	6	7	*71*	6	9	*89*	..	..	..	5	7	*71*
Kojic acid ..	19	296	*26*	16	17	*35*	15	22	*23*	10	13	*31*	15	27	*15*
Sulphathiazole*	30	531	*31*	20	21	*33*	22	24	*33*	10	10	*60*	18	33	*39*
Sulphamezathine*	30	575	*33*	22	27	*56*	18	22	*64*	7	9	*56*	22	37	*44*
Proflavine ..	8	225	*34*	7	11	*64*	5	7	*14*	1	1	*0*	8	9	*33*
Phenoxetol ..	8	31	*23*	8	9	*22*	6	7	*29*	2	2	*0*	7	12	*17*
Aminophenol ..	2	12	*8*	2	2	*50*	2	2	*0*	..	..	..	2	5	[illegible]
Eusol or milton	6	75	*32*	4	5	*80*	5	6	*67*	1	2	*50*	5	7	[illegible]
Plaster-of-paris	33	488	*32*	..	..	..	15	15	*33*	10	10	*40*	17	23	*43*
Operation ..	62	975	*38*	44	44	*39*	9	9	*44*	..	..	..	43	61	*49*
*Staph. aureus**	28	472	*31*	20	26	*62*	15	20	*55*	17	21	*71*	21	44	*34*

* Usually with penicillin.

fortnight. The variation in length of treatment, and consequently in the number of swabs taken, might have led to erroneous comparisons; for this reason the number of wounds examined in each week, besides the percentage of swabs from which organisms had disappeared, have been recorded for the assessment of results.

A follow-up of a fortnight was attempted; but, if cultures became positive again after the disappearance of the test organisms, the possibility of the introduction of extraneous infection had to be considered, and so the time for follow-up was limited by procedures which enhanced this risk. Records also had to be excluded where another agent had to be used, or *Staph. aureus* appeared during what should have been the follow-up period. The number of wounds examined during the follow-up period is thus less than those examined during treatment.

As swabbings could not be done on wounds enclosed in plaster, those taken immediately after its removal are recorded in the treatment columns, the follow-up being regarded as a more useful criterion, for the first swab alone might have given an erroneous impression owing to the presence of bacteria in the accumulated secretion. The same procedure was adopted for recording the effect of operations.

A further difficulty in interpretation arose from the fact that, while the wounds were large and comparatively fresh, serial sampling did not consistently yield the same gram-negative flora, in spite of the care taken to swab all parts of the wound. For instance, if *Bact. coli* disappeared after 3 consecutive positive swabbings, this was no criterion of its complete disappearance from the wound. A ratio of the order of 1 negative to 5 positive cultures was usual, even in the absence of specific treatment. On the other hand, when wounds were reduced to chronic sinuses, one type of flora was much more persistent, and one culture free of them had correspondingly greater significance and was often followed by healing. From these considerations it was realised that a series of swabs was needed before one could conclude that any particular organism persisted in a wound, or that any particular agent had had an effect.

It was clearly useless to regard the single swab immediately preceding treatment as the criterion of the presence or absence of a specific infection. Instead, a standard for each wound was made, based on all the swabbings from the time a particular organism first appeared. The effect of an agent was assessed by comparing the percentage of swabs from which the bacteria were absent after treatment had begun with the percentage during the preceding time. Tables IV, V, and VI show these percentages before and after beginning treatment with the various agents. In an ideal result the percentage would be well below 50 for the whole time before treatment began, rising steadily during each week of treatment, and maintaining a high figure after treatment had ceased, thus indicating that the agent had not only disinfected the wound secretions while present but also eliminated organisms from the surrounding tissues. The best order of precedence for the agents would be based on the degree in which they reduced the bacterial population during the follow-up. As, however, all wounds could not be observed in this period, and all agents were not applied for the same length of time, it was thought fairer to use an earlier criterion also. For practical purposes any treatment should produce an effect within a fortnight, and so the improvement obtained at this time is also recorded. These criteria of improvement are placed in the last two columns of the tables and are computed from the difference between the original percentage preceding treatment and that found at these times.[4] The improvement in the follow-up provides a check on the earlier figure and occasionally demonstrates the inability for improvement to be maintained after treatment was discontinued—e.g., kojic acid's action against *Bact. coli*.

Results.—A comparison of the results in each table shows that whereas some agents have some effect on *Bact. coli*, streptomycin is the only one for which the differences remain high for all three organisms. (Though only 2 wounds infected with *Proteus* were treated, they both had long-standing and persistent infections.) Sulphathiazole ranks next to it in its ability to eliminate *Bact. coli* and *Proteus*, and sulphamezathine in its almost equally good effect on *Bact. coli* and *Ps. pyocyanea*. Proflavine had the best effect on *Bact. coli* during application, but it did not maintain so great an improvement once treatment was discontinued. Eusol and milton were used on superficial wounds only, but their effect on *Ps. pyocyanea* on these easily accessible lesions was very good. The presence of *Staph. aureus* produced results of the same order as did the two sulphonamides.

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[4] For easier comparison table VII isolates the positive findings from those where there was no improvement.

The remaining agents did not produce consistent enough results for them to be classed in the same category as those already discussed. Aminophenol, though it appeared to have a very good effect on *Bact. coli*, cannot be assessed on the results obtained from 2 wounds only. Pursuit of further trials was not encouraged by finding that, on incubation with *Bact. coli* in slide cells and in the presence of whole blood, it did not inhibit the organism when diluted more than 1 : 4000, whereas proflavine inhibited up to 1 : 32,000 when similarly tested. With *Ps. pyocyanea* neither proflavine nor aminophenol produced inhibition at a dilution of 1 : 4000.

CLINICAL APPLICATION OF FINDINGS

The differential action of most agents, whereby they inhibited one species of bacterium more than another, was not appreciated till more than 6 months had elapsed from the beginning of the trials; hence, before the knowledge described here was obtained, no rational simultaneous or consecutive treatment of wounds with these agents was adopted. When one organism had disappeared under one treatment, another often remained to confuse the issue; hence treatment was abandoned without its being realised that some good had been done. By the time the results of the investigation became clear, not many persistent sinuses remained to be treated. Three which were infected with *Proteus*, having persisted unhealed 6 and 8 months, were rendered sterile and healed in 1–3 weeks following daily irrigations with sodium sulphathiazole (cibazol 1 g. per 5·5 c.cm.) for a fortnight. A fourth was cleared of *Staph. aureus* and *Ps. pyocyanea* by irrigations with penicillin and sulphamezathine, drying and healing within a week of cessation of treatment. The 6 sinuses which were treated with streptomycin were all more than 8 months old. With one exception they became sterile during treatment and made steady progress towards healing, which was complete within 3 weeks of the end of treatment. The exception contained *Staph. aureus* and *Strep. hæmolyticus*, and these did not disappear, nor did the lesion show progress towards healing, till penicillin paste was substituted for the streptomycin. After eventual subsidence of infection, as a prophylactic measure at operation for bone grafting, a combination of sulphathiazole, sulphamezathine, and 100,000 units of penicillin (for dose see Florey et al. 1946) in a powder form was sprinkled into the wounds. Inlay and chip grafts were subsequently laid in these, care being taken to secure hæmostasis with adrenaline 1 : 1000 before inserting the powder. These cases have all progressed uninterruptedly to consolidation without persistence of sinuses or the necessity for removing their vitallium screws. Such uniformly successful results cannot be claimed for 3 other grafts where local prophylactic chemotherapy was not used.

TABLE VII—IMPROVEMENT IN RELATION TO TREATMENT

Factor influencing growth of organisms	Increase in % of swabs free from organisms over % before treatment					
	Bact. coli		*Ps. pyocyanea*		*Proteus*	
	In 2nd wk. of treatment	After end of treatment	In 2nd wk. of treatment	After end of treatment	In 2nd wk. of treatment	After end of treatment
Penicillin ..	15	4	3	0	0	0
Streptomycin .	24	31	47	29	75	75
Kojic acid ..	17	0	0	0	0	10
Sulphathiazole.	19	42	2	8	18	39
Sulphamezathine	27	18	31	21	12	15
Proflavine ..	55	26	10	0	0	0
Phenoxetol ..	1	5	6	0	0	0
Aminophenol ..	31	..	0	12	0	0
Eusol or milton	1	41	35	39	2	2
Plaster-of-paris	1	0	1	11	0	5
Operation ..	0	13	2	11	0	4
Staph. aureus ..	23	25	24	24	19	28

It should be emphasised that this reduction of infection has only been obtained by cleansing of the wound in addition to the daily applications, and by constant attention to the guiding principle that, to produce the desired effect, full access to the infected part must be obtained. For this reason forced irrigations were used for sinuses, insufflations being reserved for surface infections and for the treatment of wounds at operation, after hæmostasis had been secured and when a good access could be obtained to all possibly infected parts.

Only 2 minute and occasional sinuses now remain of the 63 originally severe wounds 20 months after they were first inflicted, and there has not been any sign of breakdown since healing took place in the remainder 4 to 18 months ago.

DISCUSSION

The effectiveness of penicillin in eliminating gram-positive organisms has brought to the fore the problem

TABLE VI—DISAPPEARANCE OF *Proteus*

Factor influencing growth of *Proteus*	Before treatment			During treatment									First and second weeks after treatment		
				First week			Second week			Third week					
	No. of wounds	No. of swabs	% of swabs without *Pro.*	No. of wounds	No. of swabs	% of swabs without *Pro.*	No. of wounds	No. of swabs	% of swabs without *Pro.*	No. of wounds	No. of swabs	% of swabs without *Pro.*	No. of wounds	No. of swabs	% of swabs without *Pro.*
Penicillin (as control)	38	488	*30*	27	32	*33*	20	22	*27*	8	9	*33*	26	47	*30*
Streptomycin..	2	88	*24*	2	2	*100*	2	3	*100*	1	1	*100*	2	2	*100*
Kojic acid ..	15	180	*28*	13	17	*35*	12	17	*24*	9	11	*27*	13	21	*38*
Sulphathiazole*	27	419	*25*	15	16	*19*	21	25	*44*	12	13	*54*	19	33	*67*
Sulphamezathine*	24	404	*33*	16	18	*83*	15	20	*45*	6	8	*50*	18	29	*48*
Proflavine ..	4	105	*16*	4	6	*0*	2	2	*0*	..	..	..	3	3	*0*
Phenoxetol ..	7	39	*33*	3	3	*33*	6	7	*29*	4	4	*0*	7	12	*25*
Aminophenol ..	2	27	*15*	2	2	*50*	2	2	*0*	..	..	..	2	6	*0*
Eusol	3	14	*65*	..	..	..	3	3	*67*	2	2	*100*	2	3	*67*
Plaster-of-paris	28	360	*34*	..	..	..	10	13	*15*	8	8	*63*	15	23	*39*
Operation ..	62	752	*31*	43	43	*30*	9	9	*22*	1	1	*100*	49	68	*35*
*Staph. aureus**	21	403	*25*	12	15	*67*	12	16	*44*	9	12	*75*	12	19	*53*

* Usually with penicillin.

10 superficial wounds. Lysis of surrounding clot, persistence of discharge, and consequent interference with the processes of bony and soft tissue repair seem to be their main effect.

No unequivocal evidence was obtained that when one they produced toxæmic effects.

Bacteriological and clinical effects were observed of e daily local application of different agents in reducing e infection.

Streptomycin was the most effective in removing act. coli, Ps. pyocyanea, and Proteus both rapidly and ermanently in a few wounds.

Sulphathiazole was effective in eliminating *Bact. coli* nd *Proteus* to a lesser degree.

Sulphamezathine had a similar effect on *Bact. coli* and *s. pyocyanea.*

Eusol and milton appeared to have a good effect on *s. pyocyanea.*

The presence of *Staph. aureus* in the wound was almost s effective as the two sulphonamides in reducing the ram-negative population; nor was there any evience that daily applications of penicillin increased heir number when they were the only organisms resent.

Neither operation nor enclosure in plaster-of-paris ad any pronounced influence on the infection.

Clinical application of these findings showed that eliberate use of the sulphonamides, with penicillin hen necessary, or the use of streptomycin, could terilise persistent sinuses so that they healed rapidly.

We wish to thank the Sir William Dunn School of Pathology nd Prof. A. D. Gardner for providing us with facilities for oing the bacteriological work; Dr. R. L. Vollum and his taff, who carried on these examinations after one of us R. W. N. L. R.) had left the unit; Dr. Audrey Smith, for the arliest bacteriological investigations; Colonel J. S. Jeffrey, or allowing the work to be carried out on what were originally is cases; Messrs. H. Truelove and R. H. Snow, for their ssistance in keeping records; the nurses, for their patience during the prolongation of dressings that so many observations ecessitated; Dr. E. S. Duthie and Sir Hugh Cairns, for paring us a portion of their exiguous supplies of streptomycin; nd Dr. Mary Barber, Dr. J. Gough, Dr. M. A. Jennings, nd Mr. T. L. Williams for supplies of aminophenol, phenoxetol, nd kojic acid.

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DIETETIC DEFICIENCY SYNDROMES IN INDIAN SOLDIERS

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MANY members of an Indian infantry battalion developed, while on active service, a syndrome characterised by severe wasting, chronic steatorrhœa, and macrocytic anæmia, accompanied by evidence of specific deficiencies of the vitamin-B complex. Three-quarters of this battalion were Jats and a quarter Rajputana Mussulmans, the former habitual vegetarians, the latter meat-eaters. The Mussulmans, recruited from unfertile areas of Rajputana, tend to be smaller and more lightly built than the Jats.

The unit was ordered from Madras to Calcutta in November, 1943, to take part in famine relief measures. It remained in the Calcutta area until April, 1944. During this period the men were exposed to no hardships but were fed on the active-service scale of rations, in which the only source of animal protein acceptable to the vegetarians was condensed milk, of which each man received 2 oz. daily with which to make his tea. The Mussulmans ate a 6-oz. meat ration twice or three times a week, but in other respects their diet was at all times identical with that of the Jats.

The men were engaged on guard, loading, and food-escort duties, and any groups sent on convoy duty, when feeding difficulty might have arisen, were changed in rotation.

The battalion left Calcutta to share in the relief of Kohima and was stationed on the recaptured Treasury Hill from May 17 to May 27, 1944. After this it occupied a Naga village on the farther side of the valley and remained there until August 23, 1944. Both these areas had been the scene of much bitter fighting, and there were swarms of flies attracted by the dead. Consequently most of the men developed diarrhœa or frank dysentery, and those who escaped had little relish for their food.

From Burma the battalion was withdrawn to India, reaching its camp on Sept. 1, 1944. Next day many men reported sick; and, of a strength of 815, 126 were admitted to hospital with nutritional defects, while 349 others were excused all duties and given a special supplemented diet.

This paper describes the 42 worst cases, which were transferred to an Indian base general hospital for further investigation and treatment. Of these patients 3 were Mussulmans and the other 39 Jats (all previously vegetarians). Each patient said his illness had begun about two months before the withdrawal of the battalion from the fighting area. The initial symptom was loss of appetite, followed by increasing distension after food, and diarrhœa, with large pale pultaceous frothy stools. The tongue then became sore, and wasting and extreme weakness rapidly developed. These symptoms seemed to have been precipitated by diarrhœa in 6 cases, clinical bacillary dysentery in 16 cases, amœbic dysentery in 5 cases, and malaria in 10 cases.

The following broad clinical syndromes were encountered: (1) gross alimentary dysfunction, with steatorrhœa; (2) macrocytic anæmia; and (3) alimentary dysfunction combined with macrocytic anæmia.

ALIMENTARY DYSFUNCTION

Changes in Tongue and Mouth

Two distinct changes were noted in the epithelium of the tongue:

(1) A smooth glazed mauve surface beneath which no papillæ could be recognised. These atrophic changes were either generalised or localised to strips on either side of the median fissure, and caused soreness and burning. The tongue was small and pointed.

(2) A bright magenta inflamed surface without atrophy, rarely generalised, usually confined to the margins and tip. In the affected areas each fungiform papilla appeared swollen, with its summit eroded and conspicuous as a red dot. These changes were associated with aphthous ulcers on the tongue

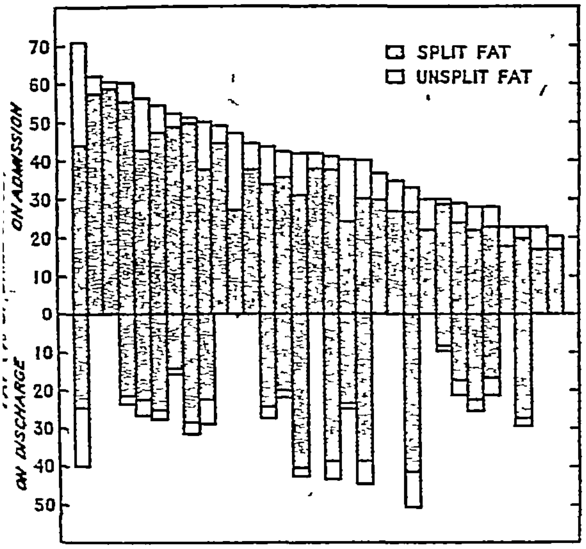

Fig. 1—Analyses of fæcal fat.

of the vitamin-B_2 complex. Since it was impossible to persuade habitual vegetarians to take a flesh diet, a high-calorie diet, with milk as the main source of animal protein, was prescribed for them, no attempt being made to limit fats and carbohydrates (table I).

Liver soup prepared from 8 oz. of fresh sheep's liver was given to each man daily: at first some difficulty was experienced in persuading the vegetarians to take this, but all soon agreed to do so.

Vitamins and Drugs

Intensive vitamin therapy was used in most cases.

Crude vitamin-B group was supplied in the form of a liquid culture of baker's yeast; an empirical dose of 3 oz. daily was given.

Nicotinic-acid tablets were used in 28 cases, the oral dosage being as follows:

300 mg. daily	9 cases
" " " rising to 500 mg. daily	16 "
" " " " " 600 " "	1 case
" " " " " 750 " "	1 "
" " " " " 1000 " "	1 "

Parenteral nicotinic acid 100–200 mg. daily was given over short periods to 6 patients, in whom an absence of sensations of flushing and burning following ingestion of the tablets suggested that the alimentary canal was not absorbing it.

Riboflavine was given in short courses of 9 mg. daily for four days to 16 patients, 11 of whom required repeated courses, up to six in number.

Liver extract (Teddington Chemical Factory, Bombay), 4 c.cm. every second or fourth day, was given parenterally to cases of severe macrocytic anæmia and proved effective.

Sulphaguanidine in standard doses was given to 16 patients who developed diarrhœa with cellular exudate; 9 required repeated courses up to three in number. Iron, as ferrous sulphate, was given in doses of gr. 32 daily whenever hypochromia was encountered.

Blood-transfusion

Since it has been my experience that cases of nutritional macrocytic anæmia whose initial red-cell counts are below 2,000,000 prove unresponsive even to massive parenteral liver therapy until blood-transfusion also has been given, transfusions were given as a routine to all such patients. Stored blood 36–48 hours old was obtained from a base transfusion unit. The following blood-transfusions were given:

Blood-transfusion total 2 pints given to	6 patients
" " " 4 " " "	1 patient
" " " 6 " " "	1 "
" " " 7 " " "	1 "
" " " 10 " " "	1 "

The last patient, who was very anæmic and had severe watery diarrhœa on admission, bled heavily from internal piles and became dangerously exsanguinated before this source of blood-loss was stopped by local injections of sclerosing fluid.

Plasma transfusions were given to 5 patients with peripheral œdema and hypotonia, suggesting hypoproteinæmia. 'Lyovac' dried plasma, reconstituted to double strength, was used; 4 bottles, equivalent to the plasma from 1000 c.cm. of blood, was the usual dose. Two patients received 1 such transfusion, two others received 2, and one received 3.

RESULTS

Two patients died. Their histories were as follows:

Case 3.—A Jat vegetarian, aged 22, showed on admission extreme cachexia, considerable hypotonia, and macrocytic anæmia (red cells 2,160,000 per c.mm., Hb 7 g. per 100 c.cm., colour-index 1·13). The plasma-protein level was low, total 4·25 g. per 100 c.cm. (albumin 2·48 g., globulin 1·65 g. per 100 c.cm.), and there was much steatorrhœa (total fat 47·8%: split 56%, unsplit 44%). He received transfusions of 500 c.cm. of twice-concentrated plasma on two occasions, but two days after the second transfusion he developed a heavy subtertian malarial relapse and died of peripheral circulatory failure.

Case 4.—A vegetarian Jat, aged 25, was received in an emaciated condition (red cells 1,680,000 per c.mm., Hb 7 g. per 100 c.cm., colour-index 1·54, mean corpuscular volume 139 c.μ, mean corpuscular hæmoglobin 45·6 μμg. The stools were loose but showed only slight excess of fat. (Total fæcal fat 28%; split 79%, unsplit 21%.) He was transfused with 2 pints of whole blood and showed improvement on oral nicotinic acid. He then had a subtertian malarial relapse, with acute diarrhœa. He was again transfused with 2 pints of blood with benefit. Shortly after this he developed clinical dysentery, causing circulatory collapse, for which a transfusion of $1^1/_4$ pints of twice-concentrated plasma was given by slow drip over six hours. This caused great improvement in the pulse-rate and blood-pressure, which was unfortunately only transient, for he developed acute *pulmonary œdema* two

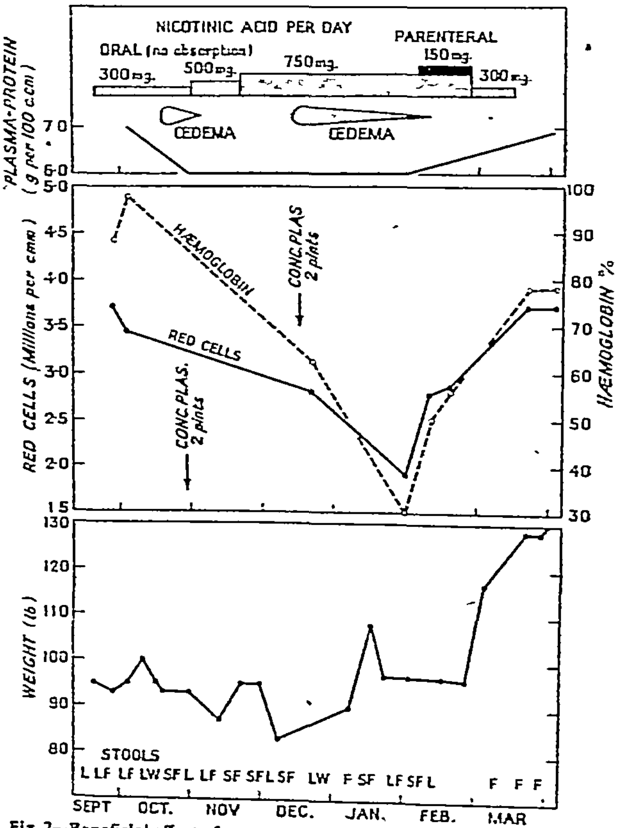

Fig. 2—Beneficial effect of parenteral nicotinic acid. Hb 100% = 14 g. per 100 c.cm. Stools: L, loose; LF, loose and fatty; LW, loose and watery; SF, semi-formed; F, formed.

hours after the completion of the transfusion and quickly died.

Necropsy showed old bacillary ulceration of the colon, and pulmonary œdema due to left-sided cardiac failure.

Three patients were invalided out of the Army. Two of these had developed intercurrent pleurisy with effusion, but both were in a state of excellent nutrition before their discharge from hospital; the third patient, when in a very good general condition, had to be invalided because of a progressive osteoarthritis of the hip due to trauma. The remaining 37 patients were retained in hospital until their general nutrition was good, their alimentary function appeared normal, and their blood picture was either normal or rapidly recovering. Of these 37 patients, 11 on discharge had red-cell counts of between 3,200,000 and 4,000,000 per c.cm., with slight macrocytosis (mean corpuscular volume up to 105 c.μ). Parenteral liver therapy had only been given to 2 of these.

TABLE II—ATTA AND RICE IN ACTIVE-SERVICE DIETS OF INDIAN TROOPS

Type of diet	Calories	Protein (g.)	Carbohydrates (g.)	Fat (g.)	Riboflavine (mg.)	Nicotinic acid (mg.)
Non-vegetarian:						
Atta 20 oz.	3832	118·2	548 8	129·2	1·52	43·4
Atta 10 oz., rice 10 oz.	3832	104·0	508·0	134·0	1·33	34·4
Vegetarian:						
Atta 20 oz.	3508	93·0	508·0	110·6	1·22	32·4
Atta 10 oz., rice 10 oz.	3568	79·0	568·0	110·0	1·03	23·0

In addition, 9 cases showed some residual steatorrhœa, with total fæcal fats up to 37%, but were passing only one formed stool of normal bulk daily, were well covered and free from tympanites, and had good appetites.

The results may be summarised as follows:

Recovered on diet and liquid yeast alone ..	13 out of 37 = 35 %
Recovered on diet and yeast and oral nicotinic acid	9 out of 37 = 24·4 %
Recovered on diet and yeast and oral nicotinic acid and parenteral liver therapy	9 out of 37 = 24·4 %
Recovered on diet and oral and parenteral nicotinic acid and parenteral liver therapy	6 out of 37 = 16·2 %
	37
Died	2
Invalided	3
Total	42

DISCUSSION

The cases described represent the results of a parallel experiment in two groups of men—one vegetarian, the other taking the same diet with the addition of a meat ration—who had been exposed to the same privations and suffered equally from enteritis, dysentery, and malaria. There were 13 times as many cases of grave malnutrition and anæmia among the vegetarian Jats as among the meat-eating Rajputana Mussulmans, though a quarter of the battalion were Mussulmans.

Malaria, to judge by the relapse-rate, since it occurred in only 25% of the cases, was an unimportant ætiological factor. On leaving the forward area the unit ceased to take "suppressive mepacrine."

Bowel infections seem to have been an important precipitating factor, having developed in 67% of patients, most of whom dated their presenting symptoms from such an attack. However, had such bowel infections been the main cause, a disproportionately high incidence among the vegetarians should not have been found.

That at the height of the illness a general absorptive defect was present is suggested by the fact that in 6 severe cases no symptoms of vasodilatation followed the ingestion of very large doses of nicotinic acid, ranging from 500 mg. daily in 4 cases to 700 mg. daily in 1 case, and even to 1000 mg. daily in 1 case. With the general and digestive improvement consequent on parent nicotinic-acid therapy (150 mg. daily for 10–14 day all these cases regained the power to absorb oral nicoti acid and complained of flushing and burning of the s when given only half the original dose.

The beneficial effect of parenteral nicotinic-acid therapy is shown in fig. 2.

The occurrence of clinical hyporiboflavinosis, which might relapse, during the recovery phase is of interest, since it conforms with reports of the sudden appearance of specific hypovitaminotic syndromes in civilian internees in Germany recovering from long-continued starvation.

The syndrome shown by most of these cases was that of sprue and seemed similar to that observed among British personnel from Burma, except that the incidence of grave macrocytic anæmia was higher in this series than in reported series drawn from British troops.

The disproportionately high incidence among the vegetarian group conforms with the report of Taylor and Chhutani (1945), who noted an incidence of anæmia, mainly macrocytic, 22 times greater in vegetarian than in meat-eating troops in Iraq. Table II sets out the important constituents of various Indian diets, according to the active-service scale.

These diets are adequate in all essentials provided they are taken in full, but they are bulky and tim consuming both to prepare and to eat. There is som evidence (Major H. Lehmann, R.A.M.C., personal communication) that, under peace conditions, the Indian soldier taking two meals a day may eat no more than 60% of his total atta (whole-meal flour) ration, and probably this also obtains under campaign conditions. If so, the vegetarians' intake of nicotinic acid and riboflavine, which depends chiefly on his atta consumption, can easily fall below the safe levels of 15 mg. and 1·4 mg. daily. An alimentary infection, by reducing intake and interfering with absorption, may precipitate a state of deficiency in men who for several months have been taking barely adequate amounts of these two essential vitamins.

Deficiencies of riboflavine and of nicotinic acid lead to distinct changes in the epithelium of the tongue. Whereas nicotinic-acid lack is characterised by atrophy of the papillæ, associated with gross failure of absorption from the alimentary tract, riboflavine deficiency causes swelling of individual papillæ (especially the fungiform), with erosion of their apices. This appearance is often associated with well-recognised lip lesions, but riboflavine deficiency by itself does not appear to cause any other disturbance of alimentary function.

The changes described here resemble those reported by Everley Jones et al. (1944), who suggest that even extreme atrophy may respond to riboflavine therapy. Such a response was not found in the present series, among whom such cases improved and showed regeneration of the papillæ only when large amounts of nicotinic acid were given, usually by injection.

SUMMARY

Deficiency syndromes among Indian troops on active service are described. The high incidence of these syndromes among vegetarians, as opposed to meat-eaters suggests that the deficient factors are derived from animal protein; but intestinal infections play an important precipitating rôle.

A syndrome superficially resembling sprue commonly results. This responds specifically to nicotinic-acid therapy, though parenteral administration may be necessary.

Distinction is made between the tongue changes associated with deficiencies of riboflavine and of nicotinic acid.

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ATYPICAL PNEUMONIA

SIGNIFICANCE OF COLD AGGLUTININS

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The condition at present known as "atypical pneumonia" or "virus pneumonia" may be a group of diseases similar in clinical manifestations but of different ætiology. This view has been stated by Drew et al. (1943) and supported by many others. There is little doubt that most, if not all, of these cases are of virus origin (Longcope 1942, Weir and Horsfall 1940, Eaton et al. 1941, 1944, Francis and Magill 1938, Commission on Acute Respiratory Diseases 1945).

In an attempt to discover some variations in the clinical picture which might be attributable to differences in ætiology, the records of 56 patients admitted to a R.A.F. hospital in twenty-one months were examined. Clinical, pathological, and radiological findings were reviewed, and particular attention was paid to the tests for cold agglutinins which had been performed in most instances.

The standards by which atypical pneumonia was diagnosed have been described elsewhere (Drew et al. 1943, Longcope 1940, 1942, Kneeland and Smetana 1940, Ramsay and Scadding 1939). The present series corresponded closely to those of other workers in the incidence and duration of individual signs and symptoms, in values obtained for sedimentation-rates and leucocyte counts, and in radiological findings.

COLD AGGLUTININS

The primary object of this investigation was to assess the significance, if any, of the cold-agglutinin titre in these cases. Out of 51 cases in which this test was performed, 26 had titres of 1 : 64 or higher. The incidence of cold agglutinins at various stages of the disease is shown in table I. Maximal titres developed during the second and third weeks. This is consistent with the findings of other workers (Commission on Acute Respiratory Diseases 1945, Turner et al. 1943, Humphrey 1945).

To enable the cold-agglutinin titres to be correlated with other features of the disease the series was arbitrarily divided into "*cold-agglutinin positives*," comprising the 26 with titres of 1 : 64 or more, and "cold-agglutinin negatives," which had titres below this figure. To exclude errors arising from tests taken at irrelevant periods in the course of the illness, only cases in which cold agglutinins were tested during the second, third, or fourth week were included. The series was next divided into groups according to differences in certain individual features, and the incidence of positives similarly calculated in each group. The significance of the differences between the incidence of cold agglutinins in these subgroups was then assessed by the usual statistical method.

TABLE I—INCIDENCE OF COLD-AGGLUTININ TITRES AT VARIOUS STAGES OF ATYPICAL PNEUMONIA

Titres	Week of illness					
	First	Second	Third	Fourth	Fifth	Sixth and later
Total cases tested ..	14	23	30	17	13	12
1 : 16 and over	4	16	20	14	8	8
1 : 64 and over	1	9	15	7	5	4
1 : 128 and over	1	6	10	4	3	0

There was no significant correlation between the incidence of cold agglutinins and duration of the disease, duration of pyrexia, duration of radiological abnormalities, or incidence of pleural involvement.

Comparison of the incidence of cold-agglutinin positives with the various types of radiographic appearances, however, produced some interesting findings. The radiograms were not available, but the radiologists' reports showed three main types of radiological abnormalities. These are analysed in table II and related to the incidence of cold-agglutinin positives.

The standard error of the difference between the proportion of positives in groups A (28·6%) and C (75%) being 14·6, this difference appears to be statistically significant.

Another clinical feature in 20 of the present cases of atypical pneumonia was "migration" of the pneumonic process from one lobe to another. Of these migratory cases 18 were detected clinically and 15 presented radiological signs. Since this phenomenon was not especially sought for, some cases of migration may have been missed. The number of cold-agglutinin positives among the migratory cases, however, was 15, compared with 7 in a group of 20 cases not showing migration. The difference between these two proportions being greater than double the standard error (14·4), this also appears to be significant.

TABLE II—ANALYSIS OF RADIOLOGICAL FINDINGS IN ATYPICAL PNEUMONIA IN RELATION TO THE INCIDENCE OF COLD AGGLUTININS

Radiological findings	No. of cases	No. of "cold-agglutinin positives"
(A) Partial or complete consolidation of "lobar" distribution confined to one lobe	14	4
(B) Striation or "increased bronchovascular markings"	6	0
(C) Localised mottling and/or patchy areas of consolidation	28	21
Totals	48	25

The 15 cases of migratory atypical pneumonia which gave cold agglutinins are summarised in table III, with the maximal titre of cold agglutinins and the radiological findings. Of these 15 "migrators," 14 showed mottled lung shadows. The radiological reports of the 15th case suggested that it might also have been included in this category, but the information given was not sufficiently conclusive.

The close association of cold agglutinins, migration, and the mottled type of lung shadows suggests that these cases may have a common origin, and table IV, showing the parallel seasonal incidence of cold-agglutinin positives and migration, lends further support to this possibility.

DISCUSSION

Opinions on the significance of cold agglutinins in atypical pneumonia vary considerably. Peterson et al. (1943) found them to be rare, and Stats and Wassermann (1943) consider the test to be "no more than a laboratory curiosity" apart from a few cases of hæmolytic anæmia and Raynaud's syndrome. Turner (1943) found them in 10 out of 22 cases of atypical pneumonia, Turner et al. (1943) in 28% of 132 cases, and Turner (1945) in only

1 out of 39 tests. Viswanathan and Natarajan (1945), however, found titres of over 1 : 256 in 3 out of 5 cases, the Commission on Acute Respiratory Diseases (1944) found cold agglutinins in 31% of cases, and McNeil (1945) found that the incidence of cold agglutinins differed in different outbreaks.

This wide variation can be explained by one of three possibilities: (1) the test may be entirely irrelevant and the positives due entirely to chance (the difference between their incidence in cases of atypical pneumonia compared with controls, coupled with the demonstrable rise and fall in titre during the course of the illness, render this supposition unlikely); (2) the discrepancies might have been due to errors or differences of technique or to some of the tests having been performed at the wrong stage in the illness; and (3), as McNeil (1945) suggested, cold agglutinins may be present in significant titres in only certain outbreaks of the disease. If the third explanation is correct, the cases with cold agglutinins would be expected to have a common and distinctive ætiology.

TABLE IV—SEASONAL INCIDENCE OF (a) TOTAL CASES, MIGRATING CASES, AND (c) COLD-AGGLUTININ POSITIVE THREE-MONTHLY PERIODS

Type of case	Sept.–Dec., 1943	Jan.–Mar., 1944	Apr.–June, 1944	July–Sept., 1944	Oct.–Dec., 1944	Jan.–Mar., 1945	Apr.–June, 1945
Total cases ..	11	11	5	3	3	8	4
Migrating ..	5	8	3	1	1	2	[illegible]
Cold-agglutinin positive ..	4	9	5	1	1	4	[illegible]

Atypical pneumonia is almost certainly of virus origin; but there are probably several viruses capable of producing this clinical picture (Drew et al. 1943, Weir and Horsfall 1940, Francis and Magill 1938, Eaton et al. 1941). It is suggested that patchy radiological shadows in t lungs, migration of the pneumonic process from one lob to another, and the presence of cold agglutinins in titres 1 : 64 or more may form a triad distinguishing one grou of cases from the remainder. That this distinction ma

TABLE III—CLINICAL AND RADIOLOGICAL FINDINGS AND COLD-AGGLUTININ TITRES IN 15 CASES OF MIGRATORY ATYPICAL PNEUMONIA

Case no.	Sex	Age (yr.)	Summary of findings	Cold-agglutinin titre	Type of X-ray picture*	Duration of pyrexia (days)	Durati of illne (days
1	F	23	Began with cough, fever, and pleural pain, with moist sounds at right base and pleural rub at left base. Radiogram showed mottling of right lung. 2 weeks later physical signs and radiogram showed involvement of both bases.	128	C	19	38
8	F	25	Was in contact with case 1 and developed similar symptoms 16 days later. Both bases showed opacities simultaneously, and moist sounds heard bilaterally.	256	C	3	30
10	M	24	First seen on 8th day of disease. Sticky crepitations at right base, but radiogram showed patchy consolidation of right middle and lower zones.	512	C	4	28
11	M	22	Admitted on 8th day of disease. Bronchial breathing and scattered râles over right lower lobe. Impaired breath sounds at left base 2 weeks later. Radiogram showed patchy opacities at both bases on 15th day of illness.	256	C	10	23
12	M	28	Cough, with scanty blood-flecked sputum. Moist sounds first heard at right apex. Râles at right base 3 days later. Radiogram on admission showed partial consolidation of right middle lobe.	128	C	2	10
13	M	30	Admitted on 7th day of disease. Cough, but little sputum. Moist sounds at right lower lobe, with impaired percussion note and breath sounds. Radiogram showed increased striation in left lower zone, with patchy shadowing of right lower and middle zones.	1024	C	2	35
15	M	26	Admitted on 10th day of disease. Cough and slight hæmoptysis, pleural pain, bronchophony, and râles at left base. Râles were heard at right base a week later, and left lower lobe showed signs of consolidation. Radiogram showed dense opacities at both bases, and later bilateral pleural effusion developed. Repatriated to Canada; further progress unknown	128	C	15	[illegible]
0	M	19	Cough and scanty sputum. Râles heard at both bases. Radiogram showed a fairly dense non-homogeneous shadow in right lower zone only, suggestive of partial consolidation.	256	C	nil	27
18	M	18	Cough, with no sputum. Sticky râles at right base, with tubular breathing. Radiogram showed partial consolidation of right lower lobe. Symptoms resolved but relapsed after 2 weeks. Râles heard in right interscapular area, and radiogram showed soft shadows in right upper and middle zones.	64	C	14	120
20	M	29	Admitted on 10th day. Cough and general malaise. Treated with sulphathiazole for 6 days without benefit. Many moist sounds in right base, and diminished air-entry in left base. On 15th day of illness developed a pleural rub with clinical consolidation of right lower lobe. Radiogram on admission suggested atypical pneumonia involving right mid-zone and left lower and middle zones. Leucocytes never exceeded 14,000/c.mm., and no pneumococci cultured from sputum.	256	C	36	80
27	M	33	Admitted on 9th day. Cough and malaise, with slightly bloodstained sputum. Diminished ventilation at left base, with râles at both bases. Radiogram showed patchy shadows in all zones on right side.	256 +	C	6	31
30	M	25	Cough, malaise, slight dyspnœa. Diminished movement at left base, with moist sounds at both bases. Slight pleural rub heard 3 weeks later at right base. Radiogram showed patchy consolidation of both lower lobes.	64	C	20	30
41	M	25	Admitted on 8th day. Cough and pain in right chest. Râles at right lower lobe. Sulphathiazole (40 g.) given with no definite effect. Radiogram showed slightly impaired translucency at right base, with "congestive changes" at left base.	64	C	5	35
51	M	32	Cough and pyrexia. No sputum. Râles at right lower lobe, right apex, and right axilla. Radiogram showed "dense opacity" at right upper zone only.	128	A	3	35
52	F	21	Developed cough and pyrexia while in hospital under treatment for chronic pyelitis. Post-tussive râles over left lower lobe, but radiogram showed irregular mottling of left upper zone, suggesting a resolving atypical pneumonia	128	C	12	21

* Radiological findings classified according to description in table II.

be due to a specific ætiological factor is supported by the seasonal incidence of this type of case and by the closeness of the association between these features in cases known to have a common origin.

SUMMARY

A survey was made of the clinical, pathological, and radiological findings in 51 cases of atypical pneumonia admitted to a R.A.F. hospital between September, 1943, and June, 1945.

In their general characteristics these cases closely resembled each other and those described by other workers. Correlation of cold-agglutinin titres with other features of the disease, however, suggested that some of the cases, presenting the triad of patchy consolidation, migration of the pneumonic process, and cold agglutinins, might have a common and distinct ætiology.

My thanks are due to the Director-General of Medical Services, R.A.F., for permission to publish this paper; to Group-Captain W. A. S. Duck, O.B.E., for permission to collect the necessary material; and to Wing-Commanders F. H. Coleman, A. Nelson-Jones, and D. G. Ferriman for their coöperation in the investigation.

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INTRADERMAL REACTION IN TRICHOMONAS INFECTION

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IT is not difficult to prepare bacteria-free cultures of *Trichomonas vaginalis* by exploiting the bacteriostatic action of sulphonamides and penicillin.[1] With antigens prepared from such cultures we have investigated the question whether vaginal infection with *T. vaginalis* produces any detectable immunological reaction in the host.

Preparation of Antigen.—Rich cultures of liver slant overlaid with Trussel Johnson's fluid medium adjusted to pH 6 are used. Inactivated calf serum 10% is used instead of human serum.

The cultures are washed by centrifuging three times in saline, and the number of flagellates per c.cm. in a suspension of saline is determined by counting in a hæmocytometer.

The suspension of flagellates is again centrifuged, and distilled water is substituted for the saline in quantities sufficient to produce 2,000,000 flagellates per c.cm. The suspension is next allowed to stand overnight in the ice chest and is then centrifuged.

The supernatant fluid is next added to an equal amount of 1% solution of phenol in distilled water, so that the final product is an aqueous extract of 1,000,000 flagellates per c.cm. and 0·5% phenol. This is used for the intradermal tests.

Method of Testing.—The tests were carried out on outpatients. For each intradermal test (on the forearm) 0·1 c.cm. of the antigen is used, and 0·5% solution of phenol is used as a control. The patients were observed for half an hour after the injection, and in no case was any difference noted then between the sites inoculated with antigen and the control sites. They were re-examined after 24 hours and after 48 hours, and some of them subsequently.

The site inoculated with the antigen was compared with the control site, and a reaction was considered positive if there was an area of very definite redness round the site of inoculation and the control was completely negative.

Results.—The area of redness varied from 1 to 2 cm., and in three refractory cases was 5 cm. in diameter. The reaction in most cases began to fade after 48 hours, but in nine cases the reaction was still positive after 48 hours, and in one case after 72 hours. In one case a second inoculation with antigen caused a severe reaction; the patient complained of malaise and was confined to bed for 2 days.

In 59 cases in which *T. vaginalis* was not found on microscopical examination, 45 gave a negative, 7 a positive, and 7 an indefinite skin reaction. Of the 7 which gave a positive reaction one was reinvestigated and found positive on microscopical examination, and another was again found negative. The remaining 5 patients did not return for re-examination. Of this series (excluding the case which was subsequently found positive on microscopical examination) 77% therefore gave a negative reaction.

In 43 cases proved positive by microscopical examination, 35 gave a positive, 2 a negative, and 6 an indefinite skin reaction. Thus 81% in which flagellates were found on microscopical examination gave a positive skin test.

In 23 cases, 12 negative and 11 positive on microscopical examination, the reactions produced by an aqueous extract of 2,000,000 flagellates per c.cm. were compared with those produced by the extract of 1,000,000 flagellates per c.cm. As a result of these tests 3 cases (2 negative and 1 positive on microscopical examination) which had not reacted to the extract of 1,000,000 flagellates per c.cm. gave a positive reaction to the extract of 2,000,000 flagellates per c.cm.; 2 cases (1 positive and 1 negative on microscopical examination) which had given an indefinite reaction to the extract of 1,000,000 flagellates per c.cm. gave a positive reaction to the extract of 2,000,000 flagellates per c.cm.; and 2 cases negative on microscopical examination did not react to either extract.

In one case positive to both extracts the erythema disappeared after 48 hours from the site inoculated with the extract of 2,000,000 flagellates per c.cm. but persisted in the site inoculated with the extract of 1,000,000 flagellates per c.cm.

In 15 of the cases (8 positive and 7 negative on microscopical examination) there was no difference in the results obtained with the two extracts. In 7 other cases negative on microscopical examination antigen was inoculated simultaneously into two sites with identical (negative) results.

It seems that there is no important difference in the results obtained with aqueous extracts of 1,000,000 and of 2,000,000 flagellates per c.cm.

Discussion.—Obviously the use of the skin test for diagnostic purposes is not to be recommended since direct microscopical examination gives better results. In only one case did we detect by the skin reaction an infection which was not revealed by the first microscopical examination. But it is of interest to note that in about

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[1] Adler, S., Pulvertaft, R. J. V. *Ann. trop. Med. Parasit.* 1944, 38, 183.

80% of cases of infection with *T. vaginalis*, which produces a local infection, antigen is absorbed in amounts sufficient to produce a specific sensitisation; and about the same percentage of women with negative microscopical findings give a negative skin reaction. In our series we have not noted a correlation between the severity of the clinical condition and the skin reaction, but this point remains to be investigated further.

SUMMARY

In 35 out of 43 women with a vaginal infection with *Trichomonas vaginalis* a skin test 24 hours after intradermal inoculation with 0·1 c.cm. of an aqueous extract of 1,000,000 (and in some cases of 2,000,000) flagellates per c.cm. gave a positive reaction.

In 45 out of 58 women negative on microscopical examination there was no reaction.

Antigen of *T. vaginalis* is absorbed through the wall of the vagina.

We are grateful to Miss Alexandra Polyakoff for help in recording skin reactions and following up cases.

URTICARIAL REACTIONS TO INTRAMUSCULAR PENICILLIN

A REPORT OF FOUR CASES

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URTICARIA is the commonest delayed reaction to intramuscular penicillin (Haswell and Wilkinson 1946, Gordon 1946, Barker 1945, Criep 1944, Stokes et al. 1944, Moore et al. 1944). It is doubtful, however, whether penicillin or some impurity is the responsible agent. When a supply of pure penicillin became available at Horton Emergency Hospital this point was investigated.

INVESTIGATION

Four patients were selected who had previously shown urticarial reactions, and intradermal tests were performed on each with three batches of penicillin: (1) penicillin X, generally used in the hospital; (2) penicillin Y, from a different source and not in general use here; and (3) pure penicillin. The penicillin contents of these products were 1420, 450, and 1666 units per mg. respectively. They were made up, on label values, in a strength of 1000 units per c.cm. in normal saline. The preparations were tested simultaneously, by intradermal injection of 0·05 c.cm. into the volar aspect of the arm and forearm.

An immediate slight red flush round the site of injection was noted with all three preparations. This lasted a minute or so only and was thought to be traumatic. In negative tests there was no further reaction. In positive tests it was followed in about ten minutes by the appearance of a mottled red area 8–12 cm. in diameter, round the injection weal. The weal became very white, tense, and slightly enlarged. This appearance persisted at least an hour and was associated with local itching.

Case 1.—A man, aged 23, with pulmonary tuberculosis, had had a two-stage thoracoplasty, with a course of penicillin after each stage. The first course consisted in three-hourly intramuscular injections of 20,000 units each. Three doses were given on the first day, and eight each day thereafter for a further seven days. On the seventh day of this course a giant urticarial rash appeared on the patient's back. This spread rapidly till it covered his whole body except face, palms, and soles. There were intense itching and some malaise. There was a favourable response to subcutaneous adrenaline in two days. The second course began twenty-one days after the beginning of the first. Four doses of 20,000 units were given on the first day, and eight of 15,000 units on each of two subsequent days. On the last of these three days the urticaria recurred. Penicillin was discon and with subcutaneous adrenaline the condition re

The penicillin administered in this and the foll cases was freshly made up in sterile normal saline, 5 containing 100,000 units.

The patient gave no personal or family history of a phenomena. He had had a course of intramuscular pe in India a year previously. No details were availabl he thought that an American product had been used had developed no allergic reaction on that occasion.

His skin reactions were tested twenty days after th appearance of his urticaria, and again twenty-one days with identical results, except that dermatographia wa noted.

Case 2.—A man, aged 36, with furunculosis, was t with intramuscular penicillin. He received forty inje of 25,000 units in six days.

Next day, the seventh after the start of his treatme developed a giant urticaria, with intense itching. rapidly spread from his back and buttocks to cover hi and whole body except palms and soles. The con responded in a day or two to subcutaneous adrenaline.

The patient stated that he had for some years been s to mild recurrent attacks of urticaria, which he attribut certain foods, such as shellfish. He gave no family hi of allergy and had never had penicillin before.

His skin reactions were tested twenty days after the appearance of his urticaria, and again twenty-one days with no change in the results.

Case 3.—A man, aged 56, with lung abscess, was gi course of intramuscular penicillin. On the first da received one dose of 20,000 units. On each of the subse seven days he received eight doses of 30,000 units. O eighth day of the course he developed a giant urticaria lower back and buttocks. His course of treatment completed that day, and the rash did not spread. There however, intense itching. The reaction responded fa ably to subcutaneous adrenaline. The patient gav personal or family history of allergy and had never penicillin before.

His skin reactions were tested once only, sixteen days the first appearance of his urticaria.

Case 4.—A man, aged 28, with pulmonary tubercu had had a course of intramuscular penicillin in another pital about three weeks before admission here. The re of this course were not available, but the patient, who intelligent and coöperative, stated that he had had 10 units a day for eight days. On the seventh day he developed a blotchy red rash all over his body. There been intense itching and considerable malaise. He gav personal or family history of allergy and had never penicillin before.

His skin reactions were tested once only, about tw three days after the first appearance of his rash.

The results of the skin tests on these patients shown in the table.

INTRADERMAL TESTS ON PATIENTS SHOWING URTICARIA A PENICILLIN

Case	Penicillin X	Penicillin Y	Pure penicil
1	+	+	0
2	+	+	0
3	+	+	0
4	+	+	0

0 = no reaction. + = positive reaction.

Control observations were carried out on allergic non-allergic subjects who had never had penicillin having had it, had shown no untoward reaction to They may be divided into three groups:

I.—Five medical students aged 22–35. All were heal none had had penicillin before, and none gave a person family history of allergy.

II.—Four patients who had had penicillin 12–32 d previously without reaction. They gave no personal family history of allergy. Two had had thoracoplasty pulmonary tuberculosis, one a partial gastrectomy chopneumonia, and one a repair of inguinal hernia. The ge of penicillin given varied from 160,000 units a day for e days to 240,000 units a day for ten days.

III.—Five allergic subjects. Only one had ever had icillin. All were cases of bronchial asthma, with eosinoilia ranging from 4·8% of 8400 white cells per c.mm. to 2% of 34,000 white cells per c.mm. One patient had had urse of 160,000 units of penicillin a day for four days for ipelas two years previously, without reaction. She had d bronchial asthma for about six years.

None of the subjects in any of these three control ups showed any reaction to either of the commercial icillin preparations or to pure penicillin.

DISCUSSION

Most attempts to determine whether penicillin or purities have been responsible for untoward reactions ve been made in conditions other than penicillin ticaria (Bedford 1946, Barker 1945, Pyle and Rattner 44, Goldman et al. 1946. Silvers 1944). Two investigaons in cases of urticaria may be mentioned.

Barker (1945) describes two reactions, one of which was an ticaria developing four or five days after the start of penicillin tment. He tested his patient's skin reactions to comcial penicillin before and after autoclaving. His patient wed a positive reaction to the untreated preparation and o reaction to the autoclaved preparation. Barker deduced at the reaction was due to penicillin, though it appears sible that autoclaving destroyed not only the penicillin t also some at least of the impurities.

Criep's (1944) patient received a fourteen-day course without reaction; but, when a second course was begun ten days ter, there was an immediate massive generalised urticaria, hich persisted for the seven days of this second course. Criep formed intradermal tests on his patient with penicillin, icillium extracts, and a mixture approximating to the dium used in the preparation of penicillin. He obtained a sitive reaction to commercial penicillin, and no reaction o either of the others.

All of the present series of patients showing penicillin ticaria are males. There is an impression in this spital that reactions are commoner in males than in males, and most of the reactions recorded elsewhere ve been in males.

All the reactions were similar, consisting in a giant rticaria beginning on the back within seven or eight ys of the start of treatment, irrespective of the dosage f penicillin. Thus, case 1 received 160,000 units a day, se 2 had 200,000 units a day, and case 3 had 240,000 its a day. The urticaria was associated with intense ching and responded fairly rapidly to subcutaneous drenaline in the three cases in which it was tried.

All the cases showed positive skin tests with two ands of commercial penicillin but not with pure nicillin.

In the controls, which included normal subjects and bjects showing allergic phenomena, who had not had nicillin or had had it without reaction, no skin sitivity to any of these preparations was demonrated. This reaction therefore appears to be an llergic response to an impurity in commercial penicillin, hich is not specific to any one brand and is not eradicated y commercial purification of the preparation to 1420 its per mg., though this may give a lesser incidence.

Criep's (1944) observations suggest that the responsible purity is not a normal constituent of the medium sed in the preparation of penicillin, nor of *Penicillium tatum* itself, but that it is a metabolic or similar oduct produced during the growth of the mould. His case, however, showed urticaria twenty-four days after the start of penicillin therapy, as opposed to seven r eight days in this series.

The results of repeating the skin tests on cases 1 and 2 appear to indicate that the allergic state induced by commercial penicillin persists at least six weeks after its first appearance.

DERMATOGRAPHIA

Skin tests were repeated on case 1 three weeks after they were first performed. His sensitivity to the commercial products had persisted, and the immediate traumatic reaction to all three penicillin preparations was severe and persisted half an hour. It was also noted that, unless the preparation of the skin with spirit was done very lightly, it was followed by deep reddening of the area treated. The patient's back was then scratched lightly with a needle. This produced the typical exaggerated weal and flare of dermatographia. The patient was surprised to find that moderate friction of his skin caused the appearance of bruising, and said he had never noted this before. When his skin reactions had been tested previously no such severe response to friction or to intradermal injection had been observed, but it cannot be stated unequivocally that he had not had dermatographia at that time. Dermatographia was also seen by Barker (1945) in his urticarial case, and by the doctor in charge of case 2, during the attack of urticaria, although it could not be elicited at the time of either of his skin tests. It therefore appears to have been a temporary condition in case 2.

SUMMARY

In 4 cases intramuscular penicillin caused urticaria. The results of intradermal tests with pure and commercial penicillin suggest that this was an allergic response to an impurity in the commercial preparations. Controls showed no skin sensitivity to any of the penicillin preparations. In 2 of the cases dermatographia was observed.

I would like to thank Dr. E. H. Creed, sector pathologist, Emergency Pathological Services, for his advice in the compilation of this paper; Prof. Arnold Sorsby, for supplying me with pure penicillin; and the members of the staff of Horton Emergency Hospital who made their cases available to me.

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POST-TRAUMATIC FISTULA OF PANCREAS

SUCCESSFULLY TREATED BY SURGERY

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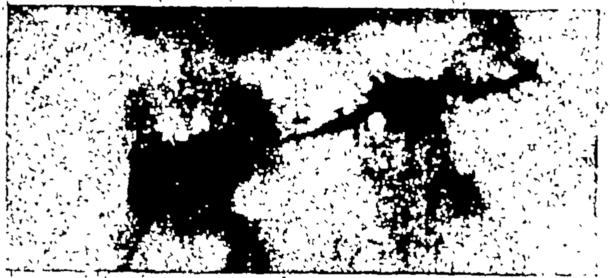
THE vast majority of persistent pancreatic fistulæ follow marsupialisation of pseudopancreatic cysts. Those which result from direct trauma are almost always due either to damage done during a surgical operation, such as gastrectomy (Biancheri 1940) and duodenal resection (Zinninger 1942), or to penetrating wounds of the abdomen, usually gunshot wounds and usually involving trauma to some other organ. The case recorded here belongs to the remarkably rare group where trauma was direct, did not penetrate, and affected the pancreas exclusively. I have been unable to find a similar injury recorded.

In the operation of choice, which was used in the present case, the fistula is implanted into some portion of the alimentary tract (Lahey and Lium 1937). There are several modifications. Thus, 15 of the 27 published cases were performed as pancreaticogastrostomies, 10 as pancreaticojejunostomies, 1 as a pancreaticocholecystostomy, and 1 as a pancreaticocholecystostomy followed by a cholecystogastrostomy. Holbaum's (1927) was the only fatal case. The surgical technique is well described by McCaughan and Sinner (1937) and McCaughan and Purcell (1941).

The non-surgical treatment of pancreatic fistulæ dates back to Claude Bernard, who tried to close them by inducing pancreatic "atrophy" with olive-oil injections into the sinus. The effect of these in diminishing secretion was probably due to digestion of the oil, causing blockage of the fistula by soapy deposit. A similar state of affairs arose in the present case when 'Neo-Hydriol' was used to delineate the fistula.



Radiogram showing pancreatic fistula communicating with main duct of tail of pancreas.

Lahey and Lium (1937) found experimentally that pancreatic secretion was stimulated by taking food (especially carbohydrate), by drinking water, and particularly by highly acid gastric secretion. A diet of carbohydrate 328 g., protein 102 g., and fat 134 g. produced a daily flow of 550 c.cm. of pancreatic juice (collected from a tube passed into the fistula); while sodium bicarbonate gr. 30 and calcium carbonate gr. 30 given hourly, with atropine gr. $^{1}/_{150}$ t.d.s., reduced the amount of secretion to 387 c.cm. The relatively high proportion of carbohydrate was justified by its easy assimilability as opposed to fat or protein. The effect of atropine alone, even in toxic doses, was negligible.

On the other hand, Wohlgemuth (1907) advocated a low-carbohydrate diet (since carbohydrate appears to stimulate secretion) with high fat and high protein, supplemented with alkalis. This régime produces a definite fall in secretion and is of value in reducing a large fistula to convenient proportions for operation.

Among the many non-effective measures which have been tried for closing persistent fistulæ may be mentioned the application of local caustics, the administration of 'Ereptone' and of atropine, and the use of radium or deep X rays. All are useless.

The fistulæ encountered in practice are always partial, since a total pancreatic fistula does not appear to be compatible with life. McCaughan and Elman (1927) have shown that a total fistula in dogs leads to death in 5–8 days, and the same seems to hold good in man.

CASE-RECORD

A healthy flight-sergeant, aged 28, riding a bicycle at night on August 11, 1942, with an electric torch thrust inside his shirt, fell off, and the torch was forced against his upper abdomen. He was taken to hospital with spasmodic attacks of severe epigastric pain accompanied by vomiting, and was found to have moderate rigidity of his upper abdomen, with tenderness over the right colic gutter. His temperature was normal and his pulse-rate 72 per min.

A laparotomy was performed the same night, through a right upper paramedian incision. The gastrocolic omentum was found to be infiltrated with blood and the lesser omentum to be torn for about 4 in. Blood-clot and an area of fat-necrosis were present in the lesser sac, and the pancreas was seen to be ruptured at the junction of head and body. No other viscus was damaged in any way. A bleeding area in the ruptured pancreas having been ligated, the whole site was drained and the abdomen closed. The patient made a reasonably uneventful recovery from this operation. Clear pancreatic continued to drain from his abdominal wound at the about 400 c.cm. per 24 hours.

On Nov. 3 he complained of abdominal discomfort, and fistula was seen to be dry. He vomited once or twice. examination a cystic swelling was palpable in the epigas so the abdomen was reopened through a *transverse* in which included the fistula and divided the left rectus m A cyst was opened near the greater curvature of the s and found to contain about half a pint of turbid fluid. was evacuated, and the cyst wall was swabbed with formalin. A gauze pack was inserted and the wound c A Wangensteen régime, with duodenal intubation, adopted, and the patient made a good recovery. This portion of his treatment and the first two operations carried out in Malta by Lieut.-Colonel H. S. Shucksmith.

On Nov. 14 the patient's condition was sufficiently good him to be transferred to England. On arrival here, his ab nal wounds were well healed, except for a small fistula drained at the junction of the vertical and transverse inc From it *flowed a clear* pancreatic juice, which had se excoriated the surrounding skin in spite of zinc-oxide dr There was no abnormality of his stools, either in colour composition. No neutral fat, soap plaques, or fatty crystals were seen. His diastatic index was 60, and his output of diastase 204,360 units. The fasting blood-sugar 95 mg. per 100 c.cm., and his glucose tolerance was no The specific gravity of the secretion was about 1·012.

The fistula was gently dilated with filiform gum-el bougies until it would accommodate a no. 4 soft ru catheter, which was passed up the track for about 4 in. was then led *to a bottle strapped to the patient's* thigh, all secretion collected was fed back by mouth, mixed f palatably with his food. The flow of juice remained a *400 c.cm. per 24 hours, and the excoriation of the skin* rap disappeared after the secretion had been diverted to collecting flask. Radiography after 5 c.cm. of neo-hyd had been injected through the catheter outlined a nar track passing upwards, backwards, and to the left, and end in what was clearly the main duct of the pancreatic tail w numerous short wide branches (see figure).

On Dec. 8 an operation for the closure of the fistula carried out by Air Vice-Marshal Geoffrey Keynes, using Lahey technique. The vertical incision was reopened, toget with a few inches of the transverse, the track itself be excluded. The track was then pared out, with considera difficulty, from the dense fibrous tissue in which it embedded, and was found to run between the stomach *transverse colon—i.e.,* through the gastrocolic omentum to the region of the junction of pancreatic body and tail.

During this process the track, along which a no. 6 rubber catheter had been passed as a guide, was *accident* opened. The tear having been sutured over, and the wh fistulous track pared down to convenient dimensions, a lo of the proximal jejunum was approximated to the *distal* e of the track. A purse-string suture was then inserted on antimesenteric border, which was secured by four *Allis force*

Through this prepared arena, a pair of mosquito force was thrust, and the opening into the bowel lumen was gen enlarged until it would accommodate the track. The appro mation was made by passing two running sutures through t distal end of the track, leading them through the hole in t jejunal wall into the bowel lumen, and out again on each si of the mesenteric attachment, each suture end being separate threaded on an intestinal needle.

By *these four guy ropes* the track was introduced into t jejunum, and the junction secured by interrupted catg sutures round the proximal neck of the track and the jejun orifice. The purse-string suture was *also* drawn tight, and few more interrupted sutures were inserted outside this f additional security. The rubber catheter had previously be cut short flush with the end *of the fistula, and the* remaini portion left in situ to secure the fistulous lumen from occlusio

The guide sutures were then withdrawn, the gastrocol omentum repaired, and the abdomen *closed* in *a* single laye A corrugated rubber drain was left to safeguard the area anastomosis.

For the next four days the patient *was* treated with intra venous glucose saline and continuous duodenal aspiratio At first there was a good deal of pancreatic leakage, but th diminished after the *removal of the* drain, and subside altogether at the end of a week. The patient has since mad an uninterrupted recovery, except for occasional mild nause nd some attacks of aching between the shoulder blades. The bdomen is well healed, and his fistula has been eradicated.

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BILATERAL PNEUMOTHORAX AFTER PARTIAL THYROIDECTOMY

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ACCIDENTAL injury to the apical pleura is a recognised omplication of thyroidectomy, but injury on both sides, s in the following case, must be unusual. Sir Thomas Dunhill and the late Mr. C. A. Joll had never encountered a similar complication in their own practice.

A man, aged 44, was admitted to hospital with a non-toxic goitre. Radiography of the chest before operation showed no abnormality of the lung fields.

A partial thyroidectomy was done under rectal bromethol, followed by gas and oxygen. No form of pressure anæsthesia was used. Small retrosternal extensions were present on both sides, but no particular difficulty was encountered during the operation. Some bubbling in the depths of the wound was noted, but there was no hiss of air or any suggestion of entry into the pleura. The anæsthetist noticed that the patient's breathing was laboured towards the end of the operation.

On his return to the ward the patient's pulse-rate was unduly raised, and there was respiratory distress. A tentative diagnosis of collapse of the right lower lobe was made. The patient's condition continued to deteriorate. Four hours after operation there was definite surgical emphysema of the neck and well-marked cyanosis. There was increased resonance over the right lung, with diminished air entry over all the lung fields, particularly on the right. The difference in the physical signs on the two sides was slight and was obscured by many adventitious sounds. A provisional diagnosis of a right tension pneumothorax was now made.

Radiography of the chest showed a bilateral pneumothorax, more pronounced on the right side, with collapse of the right upper lobe. The left pneumothorax had not been suspected clinically.

Intrapleural pressures were found to be +15 to −10 mm. Hg on both sides. A total of 4000 c.cm. of air was withdrawn from the right side and 1500 c.cm. from the left, but this gave little relief. It was concluded that the small tube draining the incision in the neck was maintaining the pneumothorax. The tube was removed and the wound firmly strapped. The pleural pressures were then stabilised on the negative side, and the man's general condition improved considerably. Next day a further 250 c.cm. of air was withdrawn from the right pleural space.

Apart from gross subcutaneous emphysema and a transient atelectasis of the right lower lobe, the patient made a remarkably good recovery. He was discharged nine weeks after the operation. Radiologically, the lungs had re-expanded and the fields were clear.

The main interest of this case lies in the difficulty of diagnosis. During the operation nothing unusual, such as a sudden hiss of air, was observed which might have led one to expect a pneumothorax. Postoperatively the diagnosis could not be made on the physical signs, and if the patient had died the true state of affairs might not have been appreciated even at necropsy. The diagnosis could finally be established only by radiography.

It seems, therefore, that in all patients developing acute respiratory distress after thyroidectomy—or indeed after any operation where the field approaches the pleura, as in cervical sympathectomy—the possibility of a tension pneumothorax should be investigated by radiography of the chest.

I wish to thank Mr. David Levi, Prof. G. W. Pickering, Mr. T. Holmes Sellors, and Dr. K. Stokes for permission to report this case.

Reviews of Books

Recent Advances in Clinical Pathology

Editor: S. C. DYKE, D.M. Oxfd, F.R.C.P., pathologist, Royal Hospital, Wolverhampton. London: J. & A. Churchill. 1947. Pp. 468. 25s.

THIS book, by a group of recognised authorities, will be found more often on the bench of the hospital pathologist than behind the glass door of his book-case; it will also appeal to the physician and surgeon. The articles on atypical pneumonia, anaerobic infections, Rh factor, blood-chemistry in gastro-intestinal disease, and analysis of semen all illustrate the growing importance of clinical pathology. Histology, a subject often regarded as having achieved finality, is discussed in a well-illustrated chapter, and the biopsy techniques now in vogue are set out: a statistical analysis is included of material collected over a period of six years in the Oxford Lymph Node Registry.

The book owes its origin to the European Association of Clinical Pathologists, a body of men and women who during the war years worked in our midst. Some of them, now back in their homes, have sent over their contributions to this record of the present state of the knowledge and practice of clinical pathology in Britain.

Biochemistry of Cancer

JESSE P. GREENSTEIN, head biochemist, National Cancer Institute, Bethesda, Maryland. New York: Academic Press. 1947. Pp. 389. $7.80.

THIS monograph, which the author has tried to make intelligible rather than comprehensive, is the most satisfactory account so far published of the recent biochemical phase of cancer research. Early in this century experimental pathologists established the fundamental research techniques and methods. Their work revealed the biological nature of malignant growth and opened the way for advances by biochemists, chemists, and geneticists. The greater part of the book sets out the knowledge of the biochemistry of cancer gained during the last twenty years. After describing general properties of animal tumours, Dr. Greenstein discusses the induction of cancer, summarising the research which led to the isolation and synthesis of carcinogenic compounds. Although several hundred different carcinogenic substances are known to induce a large variety of growths in different species and strains of animals, the mechanism of the carcinomatous change is still obscure. We still do not know whether carcinogens merely hasten the appearance of tumours which would normally arise spontaneously or whether they are the sole cause of the malignant transformation. The intrinsic factors in carcinogenesis include the sex hormones, such agents as the milk factor or mammary-tumour inciter, the genetic constitution of the host, viruses, and other less well defined non-specific endogenous carcinogens. The influence of hormones, and of nutrition and chemotherapy, is considered in the section on attempts at control of tumour induction and tumour growth.

Dr. Greenstein's own researches on cancer have been mostly on the comparative enzymology of normal and malignant tissues, and he describes this work in the section on the properties of tumours—the longest and best section in the book. One of the difficulties in this kind of work is to decide with which tissue the malignant growth can be compared. The most extensive and most reasonable comparisons have been made between hepatomata and normal adult, regenerating, and fœtal liver. No evidence of a specific constituent of cancer cells has ever been found. Malignant cells differ from normal cells not in the kind of their enzymes or other components but rather in their relative amount or activity. Tumours of all types and all species resemble each other chemically more than they do normal tissues, or than normal tissues resemble each other. Some tumours contain specific enzyme systems which are vestiges of the tissue of origin, but these tend to be lost on transplantation or on natural spread of the tumour to other parts of the body; the metastases of primary tumours resemble each other even more closely in their chemical properties than do the original primary tumours.

No less important than the properties of tumours are the changes which the tumour induces in the host. Dr. Greenstein makes no attempt to deal with the mass of empirical work which has been devoted to the search for a diagnostic test for cancer. One of the outstanding changes seen in tumour-bearing animals is the reversible reduction in liver catalase. Other changes are a fall in serum proteins and hæmoglobin, an increase in plasma enzymes such as zymohexase in rats with large tumours, of alkaline phosphatase in cases of some bone tumours, and of acid phosphatase in cases of prostatic carcinoma. Recent American work suggests that the pattern of α-keto steroids in the urine is changed in some forms of cancer (in addition to tumours of the adrenal), and these changes may ultimately be of value for the diagnosis of cancer.

In discussing the present status of the cancer problem, Dr. Greenstein says: "By and large, one of the principal hopes of the control of cancer lies fundamentally in a knowledge of the chemical nature of the malignant cell, and in successful development of chemotherapeutic approaches which must depend upon this knowledge. The fact that cancer tissues appear to have a nearly similar chemical pattern offers some hope and encouragement in their study."

Renal Hypertension

Eduardo Braun-Menendez; Juan Carlos Fasciolo; Luis F. Leloir; Juan M. Munoz; Alberto C. Taquini. Translated by Lewis Dexter, M.D. Springfield, Ill.: C. C. Thomas. London: Baillière. 1946. Pp. 451. 37*s.* 6*d.*

This monograph, by a group of men whose studies have contributed so largely to the illumination of the problem of renal hypertension, is lucidly written, and the English text bears no sign of translation. While the conclusions on human hypertension of various sorts have a humoral leaning, conflicting views are well discussed, and each of the 18 chapters carries a short, critical, and (considering the controversial nature of the subject) remarkably well-balanced summary. An appendix gives details of technical and experimental procedures.

Gynecological and Obstetrical Pathology

(2nd ed.) Emil Novak, M.D., F.A.C.S., associate in gynecology, Johns Hopkins Medical School. London: W. B. Saunders. 1947. Pp. 570. 37*s.* 6*d.*

This book deals systematically with the naked-eye and microscopic appearances of pathological conditions of the female reproductive tract, and to a lesser extent with pathological conditions of pregnancy. It is written for the clinician, showing how essential it is for him to have a thorough knowledge of the pathology of the conditions he is called upon to treat, if his judgment is to be sound and his treatment rational. Normal histology and physiology is described first so that deviations from the normal can be readily appreciated. The work is balanced but also comprehensive, even rare conditions being adequately described. Gynæcological lesions are particularly well covered, but it seems a pity that many of the pathological lesions of pregnancy, occurring in the kidney, liver, brain, and other organs, are not included.

The work is profusely illustrated with photomicrographs and photographs, some of them in colour; over a hundred new illustrations have been added in this new edition.

Principles and Practice of Tropical Medicine

L. Everard Napier, C.I.E., F.R.C.P., consultant to the Secretary of War, formerly director and professor of tropical medicine, Calcutta School of Tropical Medicine. New York and London: Macmillan. 1946. Pp. 917. 35*s.*

This new textbook is founded on a smaller volume published privately by Lieut.-Colonel Napier in India. It is a textbook on the so-called tropical diseases, and not an encyclopædia of tropical medicine. The various conditions are systematically dealt with in a manner particularly applicable to the student and non-specialist practitioner, and to these this volume should afford essential information in a clear and concise form. The book is liberally illustrated, though the standard of production falls below what is customary in works published in the United States. Under the h of malaria, much space is devoted to the use of q and a lesser amount to mepacrine and pamaquin, no reference is made to the newer and more synthetic antimalarials. Again, in the treatment amœbiasis the specific treatment of an associated subsequent bacillary colitis with the sulpho preparations or penicillin finds no place; and in that the spirochætoses, although penicillin is referred to specific in relapsing fever it is not mentioned in nexion with yaws. Many of the addenda to the v chapters were brought up to date in 1944 and perhaps have been incorporated in the text. Th however, are not serious matters. Colonel Napier provided a thoroughly practical textbook on its subj

A Manual of Tomography

M. Weinbren, B.SC., M.R.C.S., F.F.R., radiologist, Ch of Mines Hospital, Johannesburg. London: H. Lewis. 1946. Pp. 270. 15*s.*

This monograph is a good survey of tomogra based on seven years' extensive use of the me The section on the lungs, with good illustrations cavities and tumours, is followed by an outstan chapter on coarctation of the aorta, with unique pict of angiocardiography and tomography combined.

The longest section of the book deals with the sp a region where tomography is seldom employed in country. Dr. Weinbren has a very wide experience spinal injuries in the Rand miners and proves t tomography reveals many fractures invisible in strai radiograms. This section is worthy of close stud by orthopædic surgeons as well as radiologists, suggesting as it does a more extensive use for tomography in medico-legal cases. Dr. Weinbren's enthusiasm for his subject is shown by his tomographic investigations of such diverse regions as the nasal sinuses, the kidneys, and the gall-bladder; and though he does not advocate it as a routine in these regions, he shows that it can be of great help in difficult cases.

Student's Handbook of Surgical Operations (8th ed. London: Cassell. 1946. Pp. 574. 15*s.*).—Sir Cecil Wakeley, in his latest revision of this well-known handbook, has included some new operations on the chest and heart, and has added 50 new illustrations. The book remains a useful summary for the examination candidate.

Chemical Constitution of Natural Fats (2nd London: Chapman & Hall. 1947. Pp. 554. 45*s.*).—Prof. T. P. Hilditch's notable monograph has put on weight. Despite the frustrations of war, study of the fats has gone on, mainly perhaps in the United States and India, but also in England, Holland, and France; "at all events," he says in the preface, "a great deal of new matter has appeared during the six or seven years which have elapsed between the two editions of this book." He includes among the more striking advances many new facts about component acids in the groups of land-animal and vegetable fats, new data on seed fats and on depot fats in man and in a wider range of wild animals, recent work on component glycerides, and much fresh information on fatty acids. The chapter on experimental technique has been revised and expanded, and the indexing has been rearranged.

Allgemeine Neurosenlehre (2nd ed. Basle: Schwabe. 1946. Pp. 518. Sw. fr. 32.).—The author of this work, Prof. Rudolf Brun, is a psycho-analyst, but with a difference: like his teacher, August Forel, he has occupied himself with the behaviour of ants as well as of men. His entomological studies led him in 1920 to examine closely what we mean by instinct, and in 1926 to state the biological parallels which exist between conflict, as understood in the Freudian theory, and the instinctual conflicts that may be manifested in ants and other animals. This psychobiological theme runs prominently through the 22 lectures here reproduced, and gives them an individuality which distinguishes them from the general run of psycho-analytic formulations of the causes and pathology of neurotic illness. Although the author pays very little attention to recent work on the psychology of animals, yet the effort at synthesis between biology and psychology, and the incorporation of much of von Monakow's teaching make the book a useful contribution to a well-worn subject.

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References : Shortage of space precludes list of references, but full documentation may be obtained on application to Clinical Research Dept. 26 B.

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THE LANCET

LONDON: SATURDAY, JUNE 21, 1947

Cardiology as a Specialty

THE Royal College of Physicians has published e report of its committee on cardiology,[1] appointed st summer. Of the four terms of reference, the first as the training of cardiologists. A six-year minimum suggested, comprising a year as resident, of which x months should be in a house-physicianship; o years as registrar or the equivalent, in general edicine, with part of that time spent in a laboratory; year in a non-clinical subject, or in research or avel; and two years in a cardiac department: e programme should be elastic. There can be little dverse criticism of this, for it gives reasonable nphasis to a fundamental training in general edicine and a fundamental discipline in a laboratory ıbject. But it should be regarded as a guide to oung men and their advisers, not as a set curriculum.

The second term of reference was "conditions of ecognition as a consultant or specialist in cardiology." We find no mention of this topic in the report. Perhaps ome members of the committee thought that no onditions should be laid down, officially or unofficially, for such recognition. We could have wished hat all the members had held this view and had tated it. There may be room for doubt whether ualifications for holding the position of a physician r that of a surgeon in a national health service hould be officially defined; but it seems clear that o define the qualifications required of a cardiologist, nd to confine appointments to candidates satisfying he definition, would be to put cardiology in a straitacket. The administrative mind would argue that f centrally made regulations define a cardiologist, nd if a local-hospital board or management committee can appoint to a cardiological post none but man who fulfils the definition, then every hospital vill surely have a satisfactory cardiological service. With the incursion of the civil service into medicine, t would be all too easy for this kind of argument o prevail, and we must oppose it at every appearance In the example of cardiology the main fallacy is that prescribed training does not necessarily make a good ardiologist, nor the lack of it connote a bad one. The prescribed training takes no account of character and personality, which are important ingredients of the quality of any physician; it takes no account of development of the subject, which may outmode the prescription within ten years; and it leaves no door open for the odd original mind which may have found its own cardiological training during twenty years of practice in Burnley, or somehow equally unexpected. For undergraduate students a curriculum and a qualifying examination are necessary. For the major specialties they may perhaps be desirable But for the smaller specialties, which should be the growing changing pseudopodia of medicine, they will act as a fixative. Let hospital boards and management committees with their advisers be trusted to choose their own cardiologists, free from any central prescription. Responsibility not regulations will make them wise.

The third term of reference was "to make recommendations concerning the practice of cardiology in the hospitals and the National Health Service." The committee envisages at least one full-scale cardiac department in every region, associated with the central teaching hospital, staffed with physician, assistant physician, assistants, and residents, and disposing of its own 30–40 beds, outpatient section, X-ray and electrocardiographic equipment, and ancillary staff. The main function of this department is explicitly stated—namely, "advanced study of all problems connected with the heart and circulation." The department would not undertake to look after all cardiac cases attending the hospital to which it belongs, let alone all in the area it serves; and general physicians would continue to treat cardiovascular cases. Cardiology, in other words, makes no attempt to be a monopolistic specialty. The task of the pure cardiologist is to advance his subject and teach it to his less specialised colleagues. The flow of patients to his department must be carefully adjusted, to include difficult or problem cases for consultation, cases of the kind in which he may be specially interested, and a limited number of "routine" cases. The report says that the cardiologist in charge of this department "should be prepared to devote himself entirely to the problems of the heart and circulation, but he should have had a wide experience of general medicine." We may here ask whether the two years of general medicine, just after qualification, which are allowed in the prescribed training, afford a wide enough experience of general medicine to last a pure cardiologist through thirty professional years. In other words, is it wise to let a young man confine himself to cardiology from the fifth year of his qualified life onwards, and to staff central departments with men so trained?

For the cardiac department of a district hospital the report suggests that "a physician trained in cardiology" should be in charge. This suggests a better approach to specialism than the pure cardiologist's training It suggests a man who, for his quality and experience as a general physician, has earned staff status, and who in addition has had a cardiological training. He might be called the physician-cardiologist, and he would no doubt continue practising general medicine as well as cardiology in his district hospital. Among such men a few may show originality, or outstanding teaching ability, or some special achievement in cardiology that would mark them out as suitable heads of central cardiac departments. They should not be crowded out of that opportunity by the pressure of the "pure" strain of cardiological trainees. It would be better to limit the latter to a few, fill the lower appointments in the central departments largely, with general physicians adding cardiology to their training, and keep the top appointments widely open to those, from any quarter, who have shown their quality. The service, after all, needs few pure cardiologists, but many physician-cardiologists; the plan of training and the system of promotion should be designed mainly to develop the latter. The leaders, left to themselves, will come to the top as pure cardiologists. It would be a mistake to erect a promotion ladder for them; its lower rungs would become overcrowded, and it would shut out the original mind with the unusual training, whose potential contribution to the subject is great. Yet the report seems to picture that kind of ladder, without discussing its dangers. We doubt whether, in the words of the fourth term of reference, it would "pertain to the progress of cardiology as a branch of medicine."

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[1] The members are Lord MORAN, P.R.C.P. (chairman), Sir MAURICE CASSIDY, M.D. (vice-chairman), Prof. W. E. HUME, M.D., Dr. JOHN PARKINSON, Dr. A. HOPE GOSSE, Sir FRANCIS FRASER, M.D., Dr. GEOFFREY BOURNE, Dr. B. T. PARSONS SMITH, Dr. J. M. H CAMPBELL, Prof. J. CRIGHTON BRAMWELL, M.D., Dr. H. WALLACE JONES, Dr. D. EVAN BEDFORD, Dr. L. B. COLE, Dr. K. SHIRLEY SMITH (secretary), Dr. WILLIAM EVANS, Dr. C. W. C. BAIN, Dr. J W. BROWN, Dr. A. RAE GILCHRIST, and Dr. ROBERT MARSHALL.

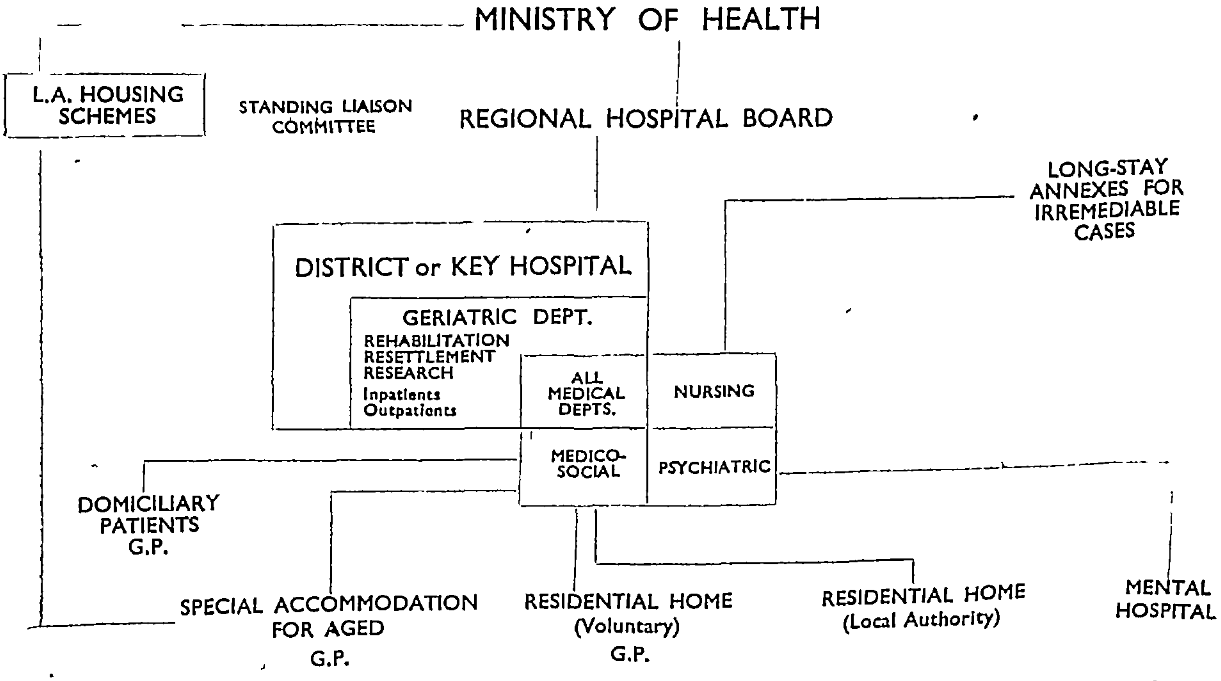
Care of the Aged

ENGLAND'S social services, like her industries, are now suffering as a result of their early start; for the system built up between eighty and a hundred years ago is in need of overhaul to meet the changed conditions. This applies with particular force to the care of the aged, whose number grows each year. Everyone is agreed on the necessity for action; but the question at this time of shortage in materials and in medical, nursing, and other personnel is not so much What ought we to do? as What can we do? A year ago the British Medical Association appointed a committee [1] to investigate the problem of our old people, and, though its report published this week [2] sets out to answer only the first question, the answer to the second is clearly implied.

The committee endorses the view, now gene supported, that the healthy old should be offe suitable dwelling-places in specially designed cott or blocks of flats; but the old, like the young, m wait their turn in the queue for houses, and report deals principally with the care of the and ailing. This, owing to acute pressure on hosp beds, is a question which calls not only for long-te planning but for short-term action. The committe plan (see diagram below) is based on geriatric unit selected general hospitals. These would be the h from which social and medical services would extended on the one hand to the old peoples' hon and residential homes and on the other to the lo term annexes. All cases of sickness, including th of mental illness, would, in the first place, be admitt for assessment to these units. The committe estimate is that of all new geriatric admissions, 40 would be discharged from hospital and 40% wou die, while 20% would need permanent nursi *attention in long-stay annexes. Existing* annex administered by the public-assistance authorities, very large; and the committee's recommendati that the units should be of not more than 30 beds c clearly not be effected for a decade or more W enlightened administration, however, nothing ne stand in the way of the further suggestions that t geriatric team "feeding" the annexe from the hosp should be responsible for the patients in it, and th grouped segregation should be adopted for the p manently incontinent and those with senile dement with individual segregation for those who are in pa or are dying, or whose condition might distress oth patients. This scheme of staffing would, by breathi new vitality into the medical organisation of t annexes, foster active treatment, thus reducing t stagnant pool of permanently bedridden and provid a larger outlet for the hospitals.

The report rightly stresses the importance of usi hospital beds to the fullest. It proposes that reside

A GERIATRIC SERVICE



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[1] The members are: Dr. JANET K. AITKEN (deputy chairman), London; Lord AMULREE, F.R.C.P., London: Dr. A. GREIG ANDERSON (chairman), Aberdeen; Dr. E. B. BROOKE, Carshalton; Sir ERNEST ROCK CARLING, F.R.C.S., London; Mr. L. Z. COSIN, F.R.C.S., Orsett; Miss E. M. CROTHERS, London, Dr. MARY ESSLEMONT, Aberdeen; Dr. J. FENTON, London; Dr. R. G. GORDON, Bath; Mr. T. ANTHONY GREEN, F.R.C.S., London; Dr. E. GUTTMANN, London, Alderman Mrs. M. M. C. KEMBALL, Eccles; Dr. G. MACFEAT, Douglas, Lanarkshire; Miss C. MORRIS, London; Mr. R. L. NEWELL, F.R.C.S., Manchester; Dr. A. T. ROGERS, Bromley; Dr. W. D. STEEL, Worcester; Dr. F. R. STURRIDGE, London; Dr. S. WAND, Birmingham; and Dr. MARJORY WARREN, London.

[2] Report (1947) of the Committee on the Care and Treatment of the Elderly and Infirm. *Brit. med J.* June 21, supplement.

tial homes should be established for those considered fit for discharge from hospital. There is little doubt, as the article on Glasgow elsewhere in this issue suggests, that in such homes and in private dwellings systematic medical supervision, perhaps with out-patient attendance for physiotherapy, together with communal feeding and home-helps, would reduce the hospital admission-rate. Nowadays large houses are out of favour with the private owner; and the number of residential homes could be greatly increased without new- building, though not without costly adaptation. There are still insufficient home-helps for those who continue to live in their own houses. The experience of one area with an elaborate system of home-helps and district nurses is that their energies are being dissipated on long hours of work for hopeless cases living alone; and perhaps a temporary solution may lie in admitting without question to long-stay annexes and to residential homes only those requiring continuous supervision, while all others who have relatives would be returned to their care. This would release accommodation for the old people now struggling along alone and would enable home-helps to spread their services more usefully.

The idea of special geriatric units under the charge of specialist geriatricians has not commended itself to some, and not even to some geriatricians, who are reluctant to perpetuate the division of care of the aged from that of other patients. Medically, however, the division can perhaps be defended as reasonably as that of pædiatrics from the general body of medicine; and from the administrative angle a separate department is undoubtedly needed to supply the special services beyond the hospital for which the plan calls. It will be agreed, too, that the committee is right in seeing care of the aged, whether healthy or ailing, as a single problem, each aspect of which must be closely knit with others. Unhappily, the ground is to be shared by different authorities—the regional hospital board, the general practitioner, the local authority, and a new body to be set up to administer the poor-law.

> "The scheme may well fail unless, through the establishment of standing liaison committees, means are found to bring about such close coördination of the functions of the various authorities as will ensure the free passage of elderly people, under the expert guidance of the geriatric department, from home to hospital and from hospital to home in accordance with their changing needs."

This, so far as it goes, is admirable, but for the long-stay annexes it is not enough: these should surely be brought wholly under the control of the regional hospital boards.

Waste Not, Want Not

AT the beginning of the late war the Ministry of Health set up an organisation for the preparation and distribution of plasma for transfusion. During the war the organisation was expanded and achieved a very high level of efficiency. It succeeded in meeting virtually all the requirements of our civilian population and of the wounded evacuated to this country. Now, though the problem of the wounded is no longer with us, the demand for plasma is greater than ever before, and the resources of production are being strained.

In some respects the present big demand is justifiable. It is now widely realised, for instance, that when a patient is receiving his fluid intravenously it is necessary not only to meet his electrolytic requirements but also to ensure a sufficient intake of protein; accordingly it is customary to substitute a pint of plasma for a pint of glucose or saline solution during each twenty-four hours. Again, the unrivalled value of plasma in patients suffering from shock unassociated with hæmorrhage, as in severe burns, has been brought home forcibly to the younger generation of surgeons. Plasma-transfusion may be a life-saving measure in surgical or obstetric emergencies when compatible blood (or any blood at all) is unobtainable. It is essential needs such as these that the peace-time organisation for the supply of plasma is intended to meet. But there are undoubtedly many instances where this new-found weapon is being wielded unnecessarily. The surgeon about to engage on an operation a little beyond his proven powers very properly enlists every available means to promote success. The first thing that occurs to his mind is that hæmorrhage may be excessive, so an array of plasma bottles is assembled in the theatre and the first stage of the operation is to start an intravenous plasma infusion. Apart from the additional risk of homologous-serum jaundice that plasma carries, this is inexcusable waste. Very few operations need to be shored up by transfusions and then it is nearly always blood that is required. Another abuse of plasma is as a substitute for whole blood. It is indeed a very effective substitute in many conditions, but it can never be so satisfactory in cases of shock arising from blood loss, and its misuse in such cases is often simply the outcome of laziness. It is certainly more trouble to perform the preliminary tests necessary before blood is given, and blood may be harder to come by. But the choice of transfusion material should not be based on considerations of this kind. If the clinical indications are for whole-blood transfusion, plasma should be substituted only in the last resort. At present there is a wide variation in the proportion of plasma to blood required by hospitals for transfusion; in some regions the ratio is as low as 1 of plasma to 7 of blood, whereas in others it rises to 1 : 1—and this variation cannot be explained by lack of blood in certain regions. It must be that opinions differ on the indications for the two transfusion materials.

To facilitate the use of whole blood every modern hospital should have a resident transfusion officer attached to the pathological department, and also a central supply room. The transfusion officer will soon acquire the skill in immediate grouping and rapid administration of blood which only experience brings, so the mechanism for giving a blood-transfusion will run smoothly and readily. He will supervise the blood-bank maintained in his hospital by the regional transfusion centre of the National Blood Transfusion Service and ensure that the blood is wisely and economically used. He can also keep a panel of donors on whom he may call at short notice for special cases, and his ability to withdraw blood without causing pain or mishaps will encourage recruits. It is a pity that there is little inducement as yet for doctors to take up appointments as transfusion officers; the post should be filled by a fairly senior member of the hospital staff, preferably resident, and preferably possessing a knowledge of pathology, since compatibility tests should be done before all transfusions and only blood of the homologous group should be given An honorarium should certainly be attached to the appointments. The central supply room ensures that blood is readily accessible to the wards and theatres, and not, as is occasionally the case, tucked away in far corners of the pathological laboratory in the medical school. Further, the blood will be adequately preserved in refrigerators used only for this purpose.

A combination of efficient organisation on the part of the hospital authorities and intelligent application on the part of the doctor is essential if transf therapy is to function as a life-saving method precision. Plasma-transfusion is in danger degenerating into the "spot of" category— doctor who does a "spot of" surgery, who give "spot of" gas, or prescribes a "spot of" peni may well consider that a spot of plasma won't any harm. This attitude is both unworthy dangerous; plasma, like other foods and fuel, is short supply. It should be prescribed like chee on points.

Annotations

SULPHONAMIDES IN COMBINATION

ONE of the chief dangers of sulphonamide therapy has always lain in the tendency of these compounds to be deposited in the urinary tract and thus to cause blockage of the uriniferous tubules, the renal pelves, or the ureteral orifices. Sulphapyridine, sulphathiazole, sulphadiazine, and sulphamerazine are all liable to be thus deposited if the dosage is high or the fluid intake too low. 'Sulphamezathine' is more soluble and less dangerous; sulphanilamide never causes this trouble. The danger can be considerably reduced by making the urine alkaline, since these compounds and their derivatives are more soluble in alkaline urine than in acid—for example, the solubility of acetyl-sulphathiazole is only 7·3 mg. per 100 ml. at pH 6·4, but it is 31 mg. per 100 ml. at pH 7·6. The onset of urinary blockage is marked by one or more of the following signs or symptoms: pain in the loin (radiating to the groin) or abdomen, diminished output of urine proceeding to anuria, and macroscopic hæmaturia. The first step in treatment is to discontinue the sulphonamide. If some urine is still being excreted, fluids and alkalis are given to wash away the crystals; if blockage is complete, only enough fluid should be given to balance the loss through the bowel, skin, and respiratory tract,[1] and surgical measures should be urgently considered.

In the prevention of sulphonamide anuria reliance has hitherto been placed mostly on caution in giving large doses, on the administration of alkalis, and on the maintenance of a large fluid intake. A new approach has been evolved in Sweden by Frisk and his colleagues[2] on the principle that if two or more sulphonamide compounds are administered in combination the therapeutic actions of the different compounds are additive but their solubilities remain independent of each other. Accordingly it is possible to obtain a strong therapeutic action without the usual risk of urinary blockage. Apparently the same idea has been developed by Dr. David Lehr, of New York. Frisk et al. recommend a mixture containing 37% sulphathiazole, 37% sulphadiazine, and 26% sulphamerazine; this has been named 'Sulphadital.' In rabbits the greatest daily dose of the individual components which could be given without producing urinary concrements was only 0·4–0·6 g. per kg., whereas sulphadital could be safely given in doses of over 1 g. per kg. The maximum tolerated doses of the three components produced a blood concentration of about 3–7 mg. per 100 c.cm., whereas the maximum dose of sulphadital produced a blood concentration of 20 mg. per 100 c.cm. For the treatment of pneumonia the recommended course of sulphadital is two doses of 2 g. followed by repeated doses of 1 g., all at four-hour intervals. After fifteen hours the mean blood concentration per 100 c.cm. is 7·8 mg. free and 8·5 mg. total sulphonamide. If desired these doses can safely be doubled. Sulphadital has been used in Sweden in hundreds of cases of pneumonia and gonorrhœa with any signs of urinary blockage. Lehr seems to have a mixture of equal quantities of sulphathiazole sulphadiazine with similarly favourable results. simple scheme may prove a useful minor improve in sulphonamide therapy. But if a soluble but pow sulphonamide is all that is needed it is surprising t more attention has not been given to the British sulphamezathine, either alone or as a component these mixtures.

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[1] Maegraith, B. *Lancet*, 1945, ii, 58.

[2] Frisk, A. R., Hagerman, G., Helander, S., Sjögren, B. *Brit. med. J.* 1947, i, 7.

FROM SCHOOL TO WORK

> "Though it has been difficult to obtain precise informati it would seem that more than half the classrooms for chil of junior school age (7 to 11 or 12) are smaller than th stipulated by the Ministry."

Throughout the latest report[1] of the Central Advis Council for Education (England) to the Ministry of Edu tion the inadequacy of our present school buildings, b for juniors and seniors, runs like a sad refrain. They ag with the well-worn principle that good teachers are m important than good buildings, but point out that e the best teachers are handicapped by cramped and du schoolrooms, and by the lack of a school hall, or even larger "general activity" rooms required by the r building regulations of the Ministry. Poor quart make anything but "chalk and talk" methods teaching very difficult; and defective sanitary cloakroom accommodation make nonsense of the pri ples of hygiene and healthy living which the schoo supposed to teach. In the words of the National Fede tion of Women's Institutes, "so many schools are most depressing places—dull and dreary—if not actu unhealthy." In the circumstances, parents who send th children to private schools can hardly be arraigned snobbery: "when the conditions under which pu education is given are unwholesome," says the rep "parents who can afford it naturally seek an alternativ

The school medical service is also criticised, not the work it does but for its limited scope. The chil still examined only three times in his school life, as laid down in the Act of forty years ago. Special exami tions are commoner than they were, however, nea equalling the routine inspections in number, and more thorough. Treatment, made compulsory un the 1918 Act, has only been applied to defects of e and teeth, minor ailments, and chronic tonsillitis inflamed adenoids. The committee suggest that sup vision of health in schools should be comprehensive continuous, and should aim at fostering positive heal This means that the school doctor must have time consult with parents and teachers, to study the child in the classroom and at play, and to examine them m more fully, and if possible more often, than he does present. In the face of the shortage of doctors this hard to arrange. They suggest that for the mom the scope of the examinations should be impro rather than the number increased. The school nur they think, should combine her work with that of hea visiting in the children's homes. She should visit the school at least once a week and be responsible for routine semi-medical tasks which now fall to the teacher, such as eye-testing; she should also keep height and weight records of the children, as well as full records of her own work.

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[1] School and Life. A first inquiry into the transition from sch to independent life. H M. Stationery Office. 1947. Pp. 1 2s. 6d.

The report is packed with sensible advice about the relationship of school and parents, the introduction of the young worker to industry, the effects of urban life on *children's standards, and the purposes of education.* Some examples of schools which have built up good relationships with parents make it clear that the teacher who is good at his job cannot settle down to a quiet evening once he has corrected the day's exercises. During term-time teaching is full-time work in a sense that would be accepted in few other occupations except medicine. But the teacher who gets to know the parents through parent-teacher associations, talks on educational purposes, and demonstrations by the children of music and singing, physical training, spoken English, and drama, and whose school becomes a social centre for the neighbourhood, is really interested in education, and is helping to rear young people with active minds and a grasp of social issues. This kind of work has been done too long under poor conditions. The report quotes Mr. Churchill's remark on the plans for the new House of Commons: "We shape our buildings and afterwards our buildings shape us." Children taught in many of our present schools are having no chance of developing fully.

"THE BIRTH OF A BABY"

In 1940 the National Baby Welfare Council introduced to this country an instructional film on pregnancy and childbirth.[1] A new generation has arisen since the film completed its tour in 1942; and it is once again to be released. Made in 1937 for the American Committee on Maternal Welfare, the film through the story of one woman's pregnancy and delivery gives a fair and fairly frank account of its subject. The first aim is plainly to encourage women to seek attention early in pregnancy; and the immediate effect of its earlier showing was increased attendance at antenatal clinics. The film also has wise words on related topics, such as abortion; and its honesty is calculated to dispel superstitious ignorance and to foster healthy curiosity in the process of childbearing.

Between 1940 and 1942 great difficulties were surmounted to secure a public showing of this production. The British Board of Film Censors, perhaps finding that it could not be placed in any of the three categories of approval (universal, adult, and horrific) withheld its licence. The board, contrary to popular belief, has no statutory powers or obligations; and local authorities, though usually accepting its decisions, are not bound by them. The National Baby Welfare Council therefore approached each of the local authorities in whose area the film was to be shown. There are some 1200 authorities in this country, and many, it seems, have no suitable mechanism for dealing with such applications. Sometimes they are referred to the watch committee, sometimes to the health committee, and occasionally even to the police-court. In the end few authorities withheld their permission; and, opinion having advanced in the last five years, it is anticipated that they will now be more ready to welcome the film. The L.C.C. has already granted it an "A" licence.

Nevertheless, the position is unsatisfactory. It may be hoped that this is the forerunner of other films on kindred topics. Is the road always to be so stony? Clearly, as with films for entertainment, local authorities should receive at least some guide from a qualified central authority; and perhaps the Board of Film Censors, reassured by the public's reception of this first film, may see its way to creating an educational category.

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[1] See *Lancet,* 1940, i, 325.

OLD WIVES AND GERMAN MEASLES

It has seemed odd that the old wives, always ready to find some appropriate explanation for congenital malformations, from being frightened by a dog to the more modern buzz-bombing, did not notice long ago the significance of german measles in early pregnancy. Dr. Hugh L'Etang's letter last week (p. 849) showed that in one case a mother did connect her german measles in pregnancy with her son's deaf-mutism, and sixty years before Gregg in Australia first suspected that the unusual number of cases of congenital cataract he was seeing in 1941 were the aftermath of the big epidemic of rubella which swept across the continent in 1939. But for that very exceptional epidemic the connexion might have remained unrecognised indefinitely, because in an ordinary epidemic year the number of cases of rubella in pregnant women would not be sufficient to produce an obvious rise in the incidence of congenital defects. The notifications in Manchester,[1] for instance, show that the epidemic of 1940 was remarkable for the relatively high incidence in women of child-bearing age, but if one calculates the probable number of women who were in the first three months of pregnancy at the time of their rubella—as can be done by applying the Registrar-General's maternity incidences—it is clear that only 20 or so fœtuses in Manchester were in danger from that epidemic, compared with about 14 in 1944 and less than 10 in any other year since 1940. Moreover, we do not yet know how many of these would escape damage altogether, or how many would be so severely damaged that they would be aborted or born dead. It might be practicable to obtain this information by following up the married women in the Manchester notifications (as was done in Milwaukee), but in the meantime anyone who encounters a case of miscarriage, stillbirth, or normal birth after the mother has had an exanthem early in pregnancy should report it, either in a medical journal or to the research-workers now investigating the subject for the Medical Research Council. And whenever a child is born with a congenital defect a close inquiry should be made into the events of the first few months of the mother's pregnancy.

TREATMENT OF PENICILLIN URTICARIA

Pretty well any remedy, whether organic or inorganic, may produce sensitisation; and the fact that penicillin occasionally does so is neither astonishing nor disappointing. Moreover, the observations of Dr. Steingold in this issue suggest that at any rate some of the sensitisation reactions are the effect of impurities rather than of penicillin itself. Though skin-tests are not a wholly reliable index of susceptibility to a drug it was a striking finding that in his 4 cases of penicillin urticaria the patients all gave positive reactions to two commercial brands of penicillin containing 1420 and 450 units per mg. but negative reactions to a "pure" preparation containing 1666 units per mg. It is conceivable that the patients were not sensitive to all forms of penicillin, and that the penicillin in the pure preparation was in a form to which they were insensitive; but sensitivity to impurities in the commercial preparations is a far more likely explanation.

The incidence of urticaria during penicillin therapy varies considerably, as would be expected if it is largely the result of impurities. Dawson and Hobby[2] saw 3 examples in 100 patients; Pillsbury et al.[3] saw 2 in their first 200 cases of syphilis treated with penicillin but 12 in the next 200. Reactions are more common during second or subsequent courses of penicillin than during the first course, though 3 of Steingold's 4 patients developed urticaria in their first course. A reaction in one course does not necessarily indicate that the patient will get one in a subsequent course—again this is easy to understand if impurities are the cause. Skin-tests cannot be relied on to predict whether or not a patient will react to the drug. As usual with drug reactions there is an incubation period, rarely shorter than five days but sometimes much longer, between the start of penicillin therapy and the appearance of urticaria; in Steingold's cases the rash appeared on the seventh or eighth day of treatment.

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[1] Clayton-Jones, E. *Lancet,* Jan. 11, p. 56.
[2] Dawson, M. H., Hobby, G. L. *J. Amer. med. Ass.* 1944, 124, 611.
[3] Pillsbury, D. M., Steiger, H. P., Gibson, T. E. *Ibid,* 1947, 133, 1255.

The antihistamine drugs work very well in penicillin urticaria. A dose of 50–100 mg. of 'Benadryl' or 'Pyribenzamine' three times a day will usually give relief in twelve hours, but it must be continued for as long as the rash would last without treatment or the urticaria will reappear. If the reaction is severe benadryl can be given slowly intravenously in a dosage of 5–10 mg. in 20 c.cm. of isotonic saline, but this is still rather an experimental procedure. Pillsbury et al. mention the "decidedly startling" hypnotic effect of intravenous administration and are not convinced that it is always safe; adrenaline seems to be as effective and its action is more predictable. As a rule they stop the penicillin immediately when a reaction appears and give benadryl or pyribenzamine 50–100 mg. t.d.s. or four-hourly by mouth. If the reaction subsides they give a test dose of 1000 units of a different brand of penicillin, having adrenaline at hand in case of emergency and continuing with the antihistamine drug by mouth. If there is no reaction to the test dose in six hours they give another 10,000–20,000 units, and if this is well tolerated they then return to the full dosage. The benadryl or pyribenzamine may be reduced gradually and can sometimes be given up after two or three days.

Drug reactions of this kind might have been said to have lost their terrors but for one snag—that in a few people the antihistamine drugs produce sensations so unpleasant as to prohibit their use.

HOW TO POISON RATS

It is obviously futile to poison bait with a substance whose taste is unacceptable to rats; but the discovery of a poison whose taste does not offend is not the entire solution of the problem of destroying these pests. Contrary to general belief, rats are not clever at discriminating between poisoned and harmless bait; they owe their multitudinous escapes almost entirely to their timidity. When bait is freshly laid on their runs, rats will at first give it a wide berth, even when it is not poisonous. Several days may pass before they investigate it, and even then they nibble only a very small amount. In this way, if the bait is poisoned, sublethal doses are ingested, and the discomfort that these cause only makes the rats bait-shy.[1] Sublethal doses sometimes even produce tolerance, as in the case of α-naphthyl-thiourea, known to the trade as 'Antu.'[2]

If either shyness or tolerance results from laying a certain poison, it is better to try again, using fresh bait with a different poison. But it is still better and far more humane to prevent the development of shyness and tolerance. This is done by prebaiting: that is, by laying easily edible quantities of harmless bait in the same places for several consecutive days until the rats, suspicious of anything new, become familiar with it and eat without fear. Then by poisoning all the bait on a single occasion a kill of 85–100% of the local rat population can be confidently expected. Mass extermination is the only way to get rid of rats. Their net reproduction-rate is so high that killing a few rats occasionally is mere waste of time.

The choice of poison is important from the view both of efficiency and of humaneness. Zinc phide is now generally preferred, as being highly e and less inhumane than most. Red squill is of u quality, often ineffective, and extremely inh For brown rats antu is highly toxic, with a LD 4 mg./kg., and appears to cause relatively little For the black rat, however, which is the usual of the plague flea, its LD_{50} is much higher—n 250 mg./kg., as compared with the 40 mg./kg. of phosphide and 190 mg./kg. of arsenic.

MEDICAL HONOURS

Among the honours to medical men in the B Honours list those awarded for services to the this year take precedence. Sir Godfrey Huggins, minister of Southern Rhodesia since 1934, beco privy councillor, and Surgeon Vice-Admiral H. St. Colson, director-general of the Navy, a knight com of the Bath. In the Royal Victorian order, w reserved for personal services to the Royal House Hugh Lett, honorary secretary to King Ed Hospital Fund, is appointed knight commander, Surgeon Rear-Admiral H. E. Y. White, who accomp the King on his tour to South Africa and has his honorary surgeon since 1936, was promoted t same rank. Dr. Alexander McCall, the Foreign tary's medical attendant, and Dr. T. W. Meagh former lord mayor of Perth, Western Australia, become knights. Knighthoods have also been conf on Dr. W. Norwood East for his services to the of criminal psychology; on Prof. D. K. Henderson, holds the oldest chair of psychiatry in the country, in the University of Edinburgh, and has done muc further the development of psychiatry in relation t State; on Prof. E. L. Kennaway, F.R.S., lately dir of the Chester Beatty Research Institution of the Cancer Hospital, who laid the foundations of the stu experimental carcinogenesis; on Mr. A. H. McIndoe, sultant in plastic surgery to the Royal Air Force, whose on behalf of the few will be remembered by the many Dr. R. A. Young, consulting physician to the Midd and Brompton Hospitals, who has for many years ex a soberly progressive influence on the treatmen tuberculosis; and on Colonel G. R. McRobert, l professor of medicine at Madras. To these and al other colleagues whose honours are listed on an page we offer congratulations.

INTERNATIONAL CONFERENCE OF PHYSICI

The preliminary programme has now been publi of the international conference which the Royal Co of Physicians is holding in London from Sept. 8 t under the presidency of Lord Moran. The work o conference has been divided between the follo sections: cardiology (chairman, Sir Maurice Cass disorders of the chest (Sir Robert Young), dermato (Sir Archibald Gray), neurology (Dr. Gordon Hol F.R.S.), pædiatrics (Sir Leonard Parsons), psychi (Dr. Bernard Hart), social medicine (Sir Wilson James and general medicine (Lord Moran). The speakers include visitors from America, Belgium, Czechoslov Denmark, France, Holland, Norway, Sweden, Switzerland, and the full programme will be foun our advertisement columns. Dr. G. B. Mitchell-H is the organising secretary of the conference, and doc who wish to attend should apply to him for ticket admission at the college, Pall Mall East, S.W.1.

Dr. **Leonard Findlay**, consulting physician to Queen Elizabeth Hospital for Children, London, formerly professor of pædiatrics in the University Glasgow, died at his home in Farnham on June 11. He was 69 years of age.

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[1] Barnett, A. (in Johnson, M. L., Abercrombie, M. New Biology II (Penguin Books), London, 1947).

[2] See *Lancet*, April 12, 1947, p. 492.

Modern Care of Old People

IV

A CITY'S PROBLEMS

GLASGOW, the largest municipality in Britain, with a population of over 1,000,000, has 120,000 old-age pensioners. The centre of an industrial area, it has special problems, for the poorer people in such an area are said to age more rapidly than those elsewhere. Not so long ago it was a depressed area, and unless light industries are established before the end of the boom in steel and shipping it may become one again. In 1939—the latest year for which returns are complete—the rate of poor relief per 10,000 population was 850, compared with just over 200 for London and just under 200 for Birmingham. Finally, with its heritage of slums and overcrowding—60% of the population live in one- or two-roomed dwellings—Glasgow must balance the claims of the aged against the equally just demands of the young. Against this daunting background the welfare and public-health departments, and the university authorities largely inspired by the late Prof. Noah Morris, have set about improving the lot of the old people, and studying their needs. Professor Morris recently held one successful weekend course in geriatrics for doctors, and hoped to arrange others.

WELFARE DEPARTMENT

The aged include the well and fit, who are capable of living alone or with their family; the ill, feeble, or infirm; and the ailing, who are able to look after themselves with a little help. The first group simply need suitable housing. At present some elderly people are living in houses with 3–5 rooms, now too large for them but suitable for those with large families who are confined to small tenement-dwellings. The plan is to help both by decanting the old wine into newer (and smaller) bottles. The housing committee of the corporation have had designed a group of 25 cottages for ageing couples, and a site has been earmarked. New housing estates will carry a proportion of houses specially suitable for the old. Progress thus will be slow. Sometimes help can be given in finding a suitable small house; but these are scarce, and their owners more often than not insist on selling outright. Other ways, therefore, must be found. Glasgow's experience of hostels for the elderly, run by caretakers, has not been entirely happy: communal bathrooms, lavatories, and kitchens have been found to foster communal strife, and the authorities have turned their faces against extension of this scheme. Instead, they have decided to take over large houses and convert them into separate small dwellings. This is known to be a temporary and unsatisfactory expedient, since most rooms in these houses, being very large, with high ceilings and only one window, are difficult and expensive to divide and convert.

CROOKSTON COTTAGE HOMES

There is no hint of expediency, however, about the cottage homes constructed at Crookston, five miles outside Glasgow, just before the war. Here the welfare department decided to set up, near a home for the infirm, a village for the aged who are still fit enough to keep house. The plan was for 64 flats for couples and 144 for single people; but building was interrupted by the war, and only half that number was completed.

Though in open country, the village is within a penny bus-ride of shops. Surrounded by grass, the two-story buildings are faced with distempered roughcast, and have roofs of variously coloured tiles. They are constructed in pairs at right-angles, with a common dayroom at the angle. The ground-floor flats each have a front porch, while those on the first floor have a balcony. The occupants reach their dayrooms by way of a covered corridor.

The front door leads directly into the living-room, from which the bathroom and kitchen open. Opposite the fireplace is a bed-recess. Every living-room has a pull-out table which will seat four, 2 easy chairs, 2 straight-backed chairs, and an inset bookcase and cupboard. A wireless speaker (supplied from a centrally controlled set) can be turned on at will, and there is an electric point for iron, lamp, or personal radio-set, as well as an electric clock. The room is heated by a coal fire, above which is a small oven, suitable for keeping food hot or for drying sticks; and ample coal is delivered to the door three times a week.

In the bed-recess the light is set at the head of the bed; there are a large wardrobe-cupboard, two chairs, and a built-in dressing-table incorporating an electrical convector (air heater). The floor, like that of the living-room, is covered with linoleum and a rug, and the walls are light cream. The rooms are thus light and cheerful.

Beyond the living-room a small corridor leads to the backdoor. On one side the kitchenette contains a small electric breakfast cooker, ample cupboards and drawers, a storage cupboard with outside ventilator, and large drainage boards on each side of the sink. There is enough cutlery and china for the entertainment of visitors.

The bathroom-lavatory on the other side of the corridor contains a sitz bath (water is heated centrally), and a clothes horse for those who wish to do their own washing. Normally all laundry is done for the occupants, being collected on Thursdays and returned on Saturdays. Linen and, if necessary, clothes are provided; uniform clothes are of course carefully avoided.

All the rations are handed over each week to the occupants, except 1 oz. sugar and the meat ration. These are retained for the midday meals, which must be taken in the dayrooms, the aim being to ensure that at least one good meal is eaten each day.

The dayrooms are large and airy, and contain two electric fires—one in each of the alcoves—upholstered seats along the sides, tables for 6–8, an electric clock, and radio. Leading off each of them is a small servery, with an electric cooker, to which the food is sent for distribution from a central kitchen. Strangely, it may seem, the old people do not resent this enforced communal feeding; but they strongly resisted the suggestion that the dayroom meals should be abandoned in favour of a united meeting in the large assembly hall, now released by evacuees. A communal spirit has grown up among the cottagers, who meet in their dayrooms each evening in the winter to talk, or play cards or dominoes. Sometimes competitions are arranged, and in summer the bowling-green is the centre of social life.

Domestic help is given in the distribution of meals and the washing-up of dishes after the midday meal; but the cottagers voluntarily help in this work. Help is also available to those who find that housekeeping is getting a bit beyond them. No extra furniture is necessary, but cottagers are encouraged to make the cottages homely by bringing with them their own particular chattels. All like to adorn their windows with plants and flowers; but, perhaps because nearly all have been tenement-dwellers, there has been no demand for personal gardens.

If a cottager is off colour, she is visited by a nursing sister; if she proves to be really ill, she is removed to hospital, but if she simply needs some extra attention she enters the nearby home. Her cottage, if she was living alone, is retained for her, at least for a time. Those with failing health are admitted to the home; and since this is felt to be a step towards the end, the matron, who is responsible for both cottages and home, tries to leave it to the cottagers to judge for themselves when their housekeeping days are over. Since the home is near the cottages, admission does not mean the end of social life; the other cottagers constantly visit their friends in the home.

How has this scheme worked? Judging by the spontaneous praise of the cottagers, brilliantly. They appreciate the good houses and their freedom; they can come and go when they will, and are subject to no rule, except that they shall not be a nuisance to their neighbours. "The only suggestion I've got," said one old lady, "is that people should have these houses when they are younger."

Visits are encouraged, for the one dread in the minds of most is that they might be forgotten. The friends and relations, in turn, welcome the chance of a trip into the open country. So far no crafts have been developed in the village, but relatives often help with a little extra money; otherwise everything is found, and 2*s.* a week pocket-money is provided.

Cottages at Crookston.

The cost of the buildings, before the war, was £450 for a couple's house, and £345 for a single person's house; the furniture cost an additional £50 or so. The present-day overall cost to the local authority of each tenant is 51*s.* 11*d.* per week, including upkeep of the house, food, clothes, and pocket-money.

In Glasgow, as elsewhere, the authorities are indignant that these old people are denied their old-age pension. Under the Old Age Pension Act of 1906 anyone entering a rate-aided institution for maintenance only lost the right to his pension. This was perhaps reasonable enough when pensions were non-contributory and when there was a poor-rate. Now pensions are contributory and a block grant has supplanted the poor-rate. Repeated attempts to get the anomaly corrected have failed. Some encouragement to other authorities to follow Glasgow's lead might be provided by transferring the amount of the withheld pensions to the responsible authorities. It would, however, be better still—and a great deal more just—if the pensions were paid to the old people, who could then pay rent and feel that they were contributing to their own upkeep rather than relying on municipal charity. This anachronism extends at the moment even to hostels for old people. If these were controlled by the housing department, pensions would be payable; but since the housing department has no authority to provide care as well as shelter, hostels must be managed by the welfare department.

HOSPITALS AND HOSPITAL ANNEXES

In Glasgow, as elsewhere, more hospital beds for the aged, and particularly for female medical and psychiatric cases, are badly needed. Here, as in other centres, the load falls principally on the municipal hospitals. At Stobhill Hospital the elderly are deliberately not segregated from other patients during investigation, nor are they immediately divided into acute and chronic cases. The belief, now often expressed, that geriatric units should be established in acute hospitals is resisted on the score that treatment of the aged, though it may be open to special research, is not in itself a specialty but belongs to the general body of internal medicine. The estab ment of geriatric units, it is held, would only div still further the treatment of the aged from ger medicine. This divorce is so complete in many teac hospitals that most consulting physicians have experience, and thus no interest, in the problem ageing; while students who later, in practice, r remedy the ills of the aged are never trained for task.

The hope of many in Glasgow is that units for long-term sick will be established as part of, and st from, the acute general hospitals. Patients would transferred to these long-term units only after prelimi investigation in the acute general wards. This w ensure continuity of treatment, and also impress m and junior doctors with the importance of such u they would thus become more ready to serve in t

In Glasgow, as in many other centres, long-t patients are accommodated in institutions under welfare department. These institutions admit a "casuals," also receiving a number of non-sick eld people who require accommodation; and there is a reasonable case for retaining them under the wel department. At the same time, if, under the new the welfare institutions (which at the present time not designated as hospitals) remain under the l authorities while the hospitals, as is certain, pass of local control, close liaison will be almost imposs The solution may lie in transferring the "casuals," w these are greatly outnumbered by the ailing, to o institutions, and placing the existing institutions wh under hospital control.

Staffing of these institutions is nowhere easy. I large Glasgow institution a plentiful supply of l and efficient nurses has been obtained by recrui ex-Servicemen with previous nursing experience, but supply of female nurses still remains difficult. Equ the supply of Queen's nurses, who undertake as of their general nursing duties the care of a good num of elderly chronic sick at home, is also limited; recruitment to the service is diminishing at present. the other hand, Glasgow public-health department established a most successful scheme of home he Over 400 are employed, three-quarters of them dea with cases of general sickness, a large number of w are of the elderly infirm group; the remaining qua is allocated to maternity cases. It is already evi that this organisation is saving hospital beds by provi assistance to relatives. In addition, the helps l proved most useful in looking after elderly persons li entirely alone. So far the services of the helps h had to be limited to a certain period of time, experience is showing the scheme to be adaptable future needs, and it is hoped that it will become integral part of the organisation for the care of chronic sick.

FUTURE PLANS

The present aim is to link more closely the hosp with the long-term unit on the one hand, and with home and hostel on the other. Glasgow hospitals wo in particular, welcome any improvement in the "mod lodging-houses, since many of the patients readmit from these places—for example those with chro chest conditions—would not need to return to hosp so soon or so often if they had a little more care a attention outside. Perhaps the answer lies in hos controlled not by caretakers but by wardens. W the hospitals pass outside local control institutions int mediate between the hostel and the hospital may be up. The purpose behind all planning is to keep old peo on their feet for as long as possible and to enable th to remain independent.

One proposal is that clubs should be set up, alo the lines of the Peckham experiment. To their memb e clubs would afford a means of occupation and munity of interest; while for research-workers they ld provide unparalleled opportunity for studying scence. They could, moreover, fulfil other useful rposes: members could be trained in profitable fts; social services could be extended to members' mes; and the clubs could act as links between hospital d home. It is thought, too, that the provision of ysiotherapy might help to reduce the call on hospitals, essential condition of membership would be periodic ysical overhaul; and though older people might not ke to it as readily as the younger, it is anticipated at, once the ice was broken, this would not deter many m participating. Since the clubs would have to be se to members' homes, many would be needed to ver such a large city as Glasgow. It may be hoped, wever, that this objection will not prevent the establishnt of at least one or two pilot units.

Special Articles

HOSPITAL RECORDS

A Plea for Reform

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During the next few years there will be much dis-ssion about the form and nature of records to be kept y hospitals, health centres, school medical departments, nd practitioners in all arms of the National Health ervice. It is believed that in the new service hospital orbidity statistics will be collected on a national ale, with provision for central, or at first regional, nalysis. Many hospitals, aware of this possibility, re overhauling their records systems.

Inspection of the systems used in a number of large oluntary hospitals reveals a serious situation. The ct is that records, in most of our great institutions, ave not occupied their rightful position. This is no ere question of filing and indexing; the root of the rouble is deeper. If it be true (as medical students are ontinually being reminded) that a patient is not simply brain, a stomach, a complex of nerves, an assembly of ssues, but a whole individual, then it is a fundamental istake to record his medical history in a series of nconnected notes. As specialisation in medicine grows, nd as the unity and continuity of medical care is estroyed, so there is increasing need to integrate the ndings of each separate specialist and to reconstitute, n paper at least, the whole individual. In so far as he unit is not the whole individual, but rather some natomical fraction of him or some episode in his life, he human concept recedes and the record becomes a andful of jottings about a sick heart, a sick bladder, r a sick brain.

Some hospitals keep separately their records of npatients and outpatients, who are often the same people; nd the link between the two records is often tenuous. thers keep separately the records of patients dealt with y different wards and clinics. One of the largest ospitals in the country is at present considering a roposal that each medical and surgical "firm" shall naintain its own clinical record system. Many hospitals ave no department which can be described as the ecords department; records are sometimes a sideline f almoners, sometimes a sideline of stewards. Rarely re records regarded as worthy of specialisation. Several ndependent *staffs* may operate the records system—or example, outpatients may be registered in one place nd their records filed in another, while inpatient records re stored several blocks away. Sometimes members of these unconnected staffs are unaware of what happens to records outside their own offices. Never is this lack of coordination more apparent than when a record goes astray. Requests for a missing record travel from one person to another, with much fruitless searching, and finally no-one is really to blame. Even if the missing record should turn up among the magazines in the housemen's common-room, the person requiring it is so thankful to get it that he rarely institutes measures to prevent a repetition.

FILING THE NOTES

Again, in some hospitals records are held of so little account that their accessibility is not regarded as important. Often they disappear into the maw of a primitive filing system. Sometimes one finds that inpatient records are bound in volumes, each volume containing perhaps 100 notes of cases seen by a particular physician or surgeon. Within the covers of the volume the notes may be arranged in chronological order or they may not. When an old note is wanted, it is necessary to know a number of details, including the name of the physician or surgeon (who may have been dead for years), the date of the patient's admission, and the number of the note in the volume. The patient's name and present address, together with a vague notion of the year in which the patient last came to hospital, may be all the information one possesses. It becomes necessary to consult more indices and musty old registers in order to find a clue which will lead to the right volume. On finally emerging triumphantly with the book, one is condemned to carry round with the prize 99 unwanted notes. I have seen 20 bound volumes, containing 2000 notes, on the desk of a surgeon who wished to look through 70 cases of a particular disorder. The 1930 notes he did not need sat in front of him for several days; anyone else wanting to see any of them would have had to wait his turn.

Also it is too much to expect good notes to be made if the writer knows that they will be read by the patient. In some of our most famous hospitals the patient is handed his own notes, and naturally he whiles away the waiting time by reading them. He may even transcribe them and take the copy to be solved like a crossword puzzle with the aid of a dictionary. (Indeed I know of a case in which a note was returned by the local cleansing department, having been retrieved from the dustbin into which the baffled patient had hurled it.) When a patient is attending more than one department of a hospital and has separate notes for each—all of which he can read if he likes—he is apt to form a low opinion of an organisation which cannot build its several bricks into a respectable wall.

Organisation is not the only trouble. If the medical staff do not regard notes as valuable documents there is no incentive for the administration to plan their proper care. Notes belong to the hospital and should not be kept at private consulting-rooms for long periods. On the other hand, the hospitals should provide proper secretarial help so that visiting staffs can dictate notes before they leave the hospital; for if this is not done the doctors can hardly be blamed for pocketing the notes and dictating additions to their own secretaries at some convenient time.

To continue the catalogue of defects would be tedious. Enough has been said to show that a revised record-keeping system should be based on the patient as the unit, and that however many hospital admissions he may have had, however many different departments he may have visited, and however long the intervals, *all* the information should be kept together in ordered fashion, so that the record shall provide a complete account of *his whole hospital* experience. This account, as we have seen, can only be complete and uninhibited if its circulation is restricted to those responsible for the patient's care.

SUGGESTED SYSTEM

"Merely to collect in a single folder all the data on one patient does not accomplish the purpose of a unit record"[1]: the material must be so arranged that any particular kind of note is identifiable among the others, and the general outline of the history immediately apparent. With a record which covers numerous admissions and numerous outpatient attendances, this is far from simple. The choice lies between (1) a strictly chronological arrangement of the material, and (2) the grouping of all the notes of one type—e.g., pathological reports, radiological reports, and operation notes. This assembly of all the special reports of a single kind is tempting in that it makes it easy to follow progress in that particular line, but the temptation should be resisted. A front sheet which details the several admissions and periods of outpatient attendance, and the diagnoses, followed by a chronological record consisting of progress notes interspersed with special reports, provides the most practicable answer. This mixture need not be confusing if each of the component forms has a distinctive mark, enabling it to be recognised at a glance, and if each has its own place in the notes. A parti-coloured mass of papers is not desirable; all records should be made on white paper, and these can be distinguished by tabs "staggered" down the margin, or by coloured signals printed in a corner.

TABLE I—CASES OF GASTRIC DISORDER DISMISSED FROM HOSPITALS IN OXFORD AREA DURING 1945

—	Males		Females		Sex-ratio M/F
		%		%	
Gastric ulcer ..	22	3·6	9	2·1	2·4
Duodenal ulcer..	52	8·5	5	1 2	10 4
Other gastric disorders ..	535	87 9	415	96·7	1·3
Total ..	609	100·0	429	100 0	1·4

Elaborate pro-formas should not be indulged in too freely, since these tend to formalise note-taking, and, as many good judges think, encourage staffs to rely upon printed headings at the expense of narrative. The indispensable headings appear to be those for identification data, personal and family history, account of present complaint; physical examination, provisional diagnosis, and progress notes. Radiological, operation, anæsthesia, electrocardiographic, and other special reports, diet and prescription sheets, photographs, temperature charts, authorisations of various kinds, and correspondence will complete the normal record.

From a note thus assembled the registrar should prepare a summary, of which a copy should be furnished to the patient's private doctor. Lastly, from the notes and summary, a coded "transcription" should be made of the basic demographic and clinical data, to be used in a card-recording system. This may work on ordinary index cards, on hand-sorted punch-cards (holes round the edge, needled out on demand), on rod-sorted punch-cards (slotted cards, hand-operated sorting in a selector-box), or machine-sorted cards (machine-punching, electrical, or mechanical sorting and tabulating).

COLLECTING THE DATA

The transcription of much clinical data—for example, in a detailed survey of a particular disease—should be made by someone medically qualified. For pictures of the case-load and case-mortality, diagnostic frequencies, and age and sex distribution, transcription by lay workers, if they are properly trained, is usually satisfactory.

From good basic records card-systems can be up which will save the clinician hours of laborious Lately an obstetrician told me that he had set his to sort out from 10,000 case-notes all the cases of p prævia; every note had to be scrutinised. When the wanted notes would then be further examined several variables, after which correlations would attempted. Even if 200 notes an hour were (an unlikely average) this meant 50 medical man- on the first search. Had the notes been tran pari passu as suggested above, and cards punched machine-sorting, the wanted cases could have isolated in half an hour. The selected variables then have been tabulated for correlation in a few ho and the notes themselves "pulled" for more de inspection, if necessary.

The value of hospital records for clinical r needs no emphasis; but, as this is a plea for record-making, a straightforward example (with pretension to originality) may be conveniently ind here. Table I refers to 1038 cases of gastric dis "dismissed" from (i.e., discharged from or dying hospitals in the Oxford area during 1945. The m cards were extracted from a pack of 16,655 cards diagnoses) in $1^1/_2$ hours.

The table shows that for every 10 diagnoses of g disorder in women there were 14 in men. For e woman diagnosed as duodenal ulcer there were 10 4 and for gastric ulcer there were 2·4 men for every wo Every 12th man in the whole group had a duod ulcer, but only every 85th woman. These figures in further inquiry. The absolute numbers are small, true, and the argument for uniform records is strengthe by this fact. Bigger numbers are needed if solid infere are to be drawn. What is the national experience, how do regions compare in the matter of the ulcer ratio, for instance? What is the occupational distr tion? There are plenty of guesses, but no figures. as in this one simple instance, so it is in many n difficult problems: the mortality-rate from appendi is known but not the morbidity-rate; the cancer de rate per 1000 population but not the cancer incide rate; the number who succumb to rheumatic he disease every year but not the number who suffer live on in a state of permanent cardiac impairm These and many other questions can be investiga along with questions of symptom-frequency in ce diseases, treatment responses, operation results, an thetic reactions, and the like.

TABLE II—OXFORD AREA PATIENTS DISMISSED IN 19 SELECTED DIAGNOSIS GROUPS BY PAY-STATUS AND AVER DAYS' CARE *

Group	Circulatory disorders		Respiratory disorders		Digestion disorders		Injuri	
	No. patients	Average stay (days)	No. patients	Average stay (days)	No. patients	Average stay (days)	No. patients	A a st (d
Pay† ..	433	61·1	705	16 4	2762	10 2	1209	1
Non-pay	42	24 0	87	22 0	236	12 8	509	2
Pay status unknown	52	20 4	91	14 8	454	8·0	385	11
Total ..	527	54·0	883	16 4	3452	10·1	2096	17

* 10 patients, each with over 1000 days' care, are excluded.
† Includes private, full pay, part pay, and contributory-sche patients.

POSSIBILITIES OF HOSPITAL STATISTICS

There is also the medical-administrative aspect hospital statistics. In an analysis[2] of 576,623 patier

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[1] Kurtz, D. L. Unit Medical Records in Hospital and Clinic, New York, 1943.

[2] Deardorff, N. R., Fraenkel, M. Hospital Discharge Stu vol. i, New York, 1942.

TABLE III—OXFORD AREA: FRACTURE CASES DISMISSED FROM HOSPITAL, 1946

—	Males all ages		Females all ages	
		%		%
Motor-vehicle accidents ..	199	25·7	55	14·2
Falls, &c.	192	24·8	238	61·7
Other injuries	383	49·5	93	24·1
Total	774	100·0	386	100·0

TABLE IV—OXFORD AREA: PERCENTAGE OF FRACTURE CASES BY AGES DISMISSED FROM HOSPITAL, 1946

—	Males					Females				
	All ages	55–65	65–70	70–75	75 +	All ages	55–65	65–70	70–75	75 +
A	25·7	12·0	33·3	11·1	21·4	14·2	10·0	5·9	2·9	9·6
B	24·8	38·0	44·5	33·3	50·0	61·7	64·0	94·1	77·1	80·8
C	49·5	50·0	22·2	55·6	28·6	24·1	26·0	0·0	20·0	9·6
Total	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

A = Motor-vehicle accidents; B = Falls, &c.; C = Other injuries.

discharged from New York hospitals in 1933 a question was raised which, if it could be answered, would be highly relevant in Britain today. "To what extent do factors other than diagnosis influence length of hospital stay—that is, what reasons may cause patients with the same diagnosis to require hospital treatment of different duration?" There is an obvious relation between age of patient and length of stay, and there is also a finance relation. A table published in the New York study showed that "pay" patients (full or part pay) had a shorter overall average stay than "non-pay" patients. "Pay" patients stayed an average of 11 days each, "free" patients 16 days each, and "public charge" patients 21 days each. A survey of 60,743 Ontario patients in 1938 revealed that patients paid for by government and municipal authorities stayed longer than "paying" and "private" patients. According to the report[3] "average durations of care by sex, age, and diagnosis show uniformly that the duration of hospital care among those whose maintenance is paid for by the State is consistently and substantially higher than for patients who contribute to the cost of their maintenance." What is the British experience? The records which could have furnished it have not been kept. The Oxford area experience for 1946 is given in table II.

Because of the numerous patients in the "pay-status unknown" category, it is not possible to say whether non-paying patients stay consistently longer than paying patients, but in three of the four groups of disorders they appear to stay a little longer. The high average stay of paying patients with circulatory disorders is caused by a small number of chronics in local-authority hospitals.

The Oxford figures by themselves cannot be taken as representative of British experience. To a country which is about to convert all its inhabitants into non-paying patients, an extension of table II to national dimensions would be valuable. (This table, necessitating the sorting, counting, and tabulating of 6968 machine cards by diagnosis, pay status, and days of care, was prepared in $4^1/_2$ hours.)

There is a third direction in which hospital statistics can be helpful—i.e., in throwing light on the problems of everyday life. "Keep Death Off The Roads" is a commendable slogan, but tables III and IV suggest that "Keep Injury Out Of The Home" is equally desirable. These tables were produced from machine-card tabulations in less than one day.

THE THREE ESSENTIALS

I realise that the clinician's attitude towards a drive for better documentation and better statistics in hospitals may be, in part at least, defensive. Already having crowded wards, heavy outpatient duties, and much paper-work, he will give but a faint welcome to ideas for improved notes and scientifically designed transcriptions. Some, indeed, harbour a definite prejudice against the routine tabulation of data; doctors are not the only people who have a deeply rooted suspicion of statistics. But few will dispute the merits of the unit medical record system, and none, one may hope, will object to the rationalisation of record-*keeping* as distinct from record-*making;* the introduction of time-saving techniques for registering and filing records and producing them on demand; the employment of such commonplace aids to efficiency as folders and stationery of uniform size, designed for simplicity and speed in use; and the maintenance of diagnostic indices. To what, then, would hospital clinicians commit themselves if they consented to the modernisation of their hospital records? Only these three conditions are essential:

1. Consultants would require all members of their firms or units to maintain a high standard of note-taking and would personally "audit" notes on occasion; registrars would conscientiously summarise notes and supervise the note-taking of housemen; juniors would make it a matter of pride to take adequate, lucid, legible notes routinely, realising that by so doing they would be preserving factual data of cumulative value. Department heads would recognise that their contributions should fit in with the master records-plan.
2. All would recognise that record-*keeping* and analysis are specialised activities, involving complicated techniques for those immediately responsible, and comparable in this sense with those of the pharmacist, the almoner, and other medical auxiliaries. These activities necessitate the employment of a trained hospital records officer with a proper allocation of staff, space, and equipment.
3. Some hospital clinicians would serve on a records committee, meeting regularly for an operational check-up and to pass judgment on new ideas, all of which would be submitted to the committee before being put into action.

AMERICAN DERMATOLOGY

FROM A CORRESPONDENT

IN opening the 67th annual meeting of the American Dermatological Association, held at Murray Bay, Canada, on June 2–5, Dr. PAUL A. O'LEARY, the president, discussed the American methods of training dermatologists, and said that in the United States more ex-Service doctors had applied for postgraduate instruction in dermatology than for instruction in any other branch of medicine. His address was followed by 24 papers, each discussed at some length by several of the 84 members who attended. All these communications will doubtless be published in due course, but shortage of paper is retarding the speed of publication in the States, as in Britain, and is regarded by many authors as a most irksome handicap.

Papers by J. Gardner Hopkins on the treatment of symmetrical lividity and hyperidrosis of the feet, by F. G. Novy, jun., on a severe form of acne developing in the tropics, and by Everett C. Fox on thermogenic anhidrosis revealed the interest which American dermatologists have taken in some of the problems they encountered during the war. Several contributions, particularly one by H. L. Keim, A. E. Palmer, and D. L. Frisch concerning plasma proteins and dermatitis, illustrated their concern with biochemical findings. J. H. Lamb, E. S. Lain, C. Keaty, and A. Hellbaum submitted a paper on the steroid hormones in dermatomyositis, lupus erythematodes, and polymorphic light-sensitive eruptions, and it was evident that their investigation is likely to bring us much valuable knowledge.

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[3] Ontario Department of Health, Division of Medical Statistics: Survey of Public General Hospitals in Ontario, 1940.

J. F. Burgess, of Canada, contributed observations on the effect of vitamin E on collagenous tissue; his work may eventually connect with that of Lamb and his colleagues, and be useful both to the theorist and to the clinician. A different aspect of the biochemical approach to dermatology was shown by L. A. Brunsting and H. L. Mason in an inquiry into the relationship of porphyria and photosensitivity.

Interest in histology has not waned: H. Beerman's paper on hypertrophic Darier's disease and nævus syringocystadenomatosus papilliferus, C. W. Laymon and I. Fisher's paper on the diagnosis of necrobiosis lipoidica diabeticorum, and S. W. Becker's views on pigmented nævi were all ably discussed.

J. J. and W. D. Eller with J. W. Goldzieher reported studies of over 450 biopsies made to determine the cutaneous effects of local applications of natural œstrogens. They found that these caused epidermal proliferation. Comment on this communication was brisk, for apparently in America creams and ointments containing œstrogens are being used for purposes which are largely cosmetic. An eminent speaker summarised the opinion of most members when he said: "When a lady asks me if she should use creams of this nature I tell her that they will do her no good and may do her a great deal of harm." This is an obiter dictum which we may well adopt.

One authority used a method of presenting material which is not widely known in Britain. He had submitted a number of questions to several colleagues and had received a hundred replies. To display the answers he used lantern-slides, each of which showed the question followed by a statistical summary of the answers received. By this device the analyses of the answers to some half-dozen critical questions were rapidly conveyed to his audience, who were thus spared the fatigue usually engendered by the recitation of figures.

At the end of the meeting Dr. J. GARDNER HOPKINS was inducted to the presidency.

BIRTHDAY HONOURS

THE honours list issued on June 12 contains the following names of members of the medical profession:

P.C.

Sir GODFREY HUGGINS, C.H., K.C.M.G., F.R.C.S.
Prime minister of Southern Rhodesia since 1934.

K.C.B.

Surgeon Vice-Admiral HENRY ST. CLAIR COLSON, C.B., O.B.E., M.B. Lond.
Medical director-general of the Navy.

K.C.V.O.

Sir HUGH LETT, Bt., C.B.E., D.C.L., M.B. Vict., F.R.C.S.
Hon. secretary, King Edward's Hospital Fund for London.

Surgeon Rear-Admiral HENRY ELLIS YEO WHITE, C.V.O., O.B.E., M.D. Edin.

Knights Bachelor

WILLIAM NORWOOD EAST, M.D. Lond., F.R.C.P.
For services to the study of criminal psychology.

DAVID KENNEDY HENDERSON, M.D. Edin., F.R.C.P.
Professor of psychiatry, University of Edinburgh.

ERNEST LAURENCE KENNAWAY, D.M. Oxfd, D.SC. Lond., F.R.C.P., F.R.S.
Lately director, Chester Beatty research institute, Royal Cancer Hospital, London.

ALEXANDER MCCALL, M.D. Glasg.
For public services.

ARCHIBALD HECTOR MCINDOE, C.B.E., M.B. N.Z., M.S. Minn., F.R.C.S., F.A.C.S.
Civilian consultant in plastic surgery to the R.A.F.

Colonel GEORGE REID MCROBERT, C.I.E., M.D. Aberd., F.R.C.P., I.M.S.
Inspector-general of civil hospitals, Bihar; lately professor of medicine, Madras Medical College, and physician, Madras General Hospital.

THOMAS WILLIAM MEAGHER, M.B. Melb.
Lord mayor of Perth, Western Australia, 1939–45.

ROBERT ARTHUR YOUNG, C.B.E., M.D. Lond., F.R.C.P.
Consulting physician, Middlesex Hospital, London.

C.B.

Major-General WILLIAM FOOT, M.C., M.B. Dubl., K.H.P., R.A.M.C.

C.M.G.

JOHN MALCOLM, M.D. Edin.
Professor emeritus of physiology, University of Ota

Colonel PHILIP GRAHAM STOCK, C.B., C.B.E., M.B., F.R.C.P.
Medical officer, Ministry of Health.

C.I.E.

Colonel LLOYD KIRWOOD LEDGER, O.B.E., M.B., C.S., I.M.S.
Inspector-general of civil hospitals and directo public health, Central Provinces and Berar.

C.V.O.

GEOFFREY SYDNEY TODD, O.B.E., M.B. Sydney, F.R.C.P.,
Superintendent, King Edward VII Sanatorium, Midh

C.B.E. (Military)

Surgeon Captain ROBERT GREGORY HENDERSON, M.D. Ab R.N.V.R.

C.B.E. (Civil)

EDWIN ARTHUR BLOK, L.R.C.P.E.
Lately assistant director of medical services, Ceylo

GEORGE LINDOR BROWN, M.B., M.SC. Manc., F.R.S.
Member of the scientific staff of the Medical Res Council; for services to medical research in the F Navy.

HENRY ANSTEY COOKSON, M.B. Edin., F.R.C.P.E.
For public services in the county of Durham.

ERIC WILFRED FISH, M.D. Manc., D.SC. Lond., L.D.S.
Dental surgeon, St. Mary's Hospital, London.

CONRAD TRELAWNEY FITZ-GERALD, M.D. McGill.
M.H.O. for the department of public health and wel Trinity East, Newfoundland.

JAMES ANDREW GUNN, D.M. Oxfd, M.D., D.SC. Edin., F R
Chairman, British Pharmacopœia Commission.

SAMUEL THOMPSON IRWIN, M.CH. R.U.I., F.R.C.S.E.
Chairman, Northern Ireland Medical War Committe

ALDWYN BROCKWAY STOKES, B.M. Oxfd, M.R.C.P.
Lately member of the National Advisory Council o Employment of the Disabled.

KHONG KAM TAK, M.B.E., M.B.
For public services in the Malayan Union.

O.B.E. (Military)

Surgeon Commander EDWARD WILLIAM BINGHAM, M.B. D R.N.

Lieut.-Colonel CHARLES DAVID BRUCE, M.B. Edin., R.A.M.

Lieut.-Colonel FREDERICK GRACE SMITH, M.B.E.
Officer commanding, Ceylon Medical Corps.

O.B.E. (Civil)

VERNON FITZCLARENCE ANDERSON, M.D. Lond., C.M.S.
Senior medical officer, British Honduras.

Major HUBERT JOSEPH CURRAN, M.B. N.U.I., I.M.S.
Principal of the medical school, Darbhanga, Bihar.

Miss CATHERINE HARROWER, M.B. Glasg.
Member of the Glasgow burgh insurance committee.

DAVID WINN HOODLESS, B.SC. Lond., L.M.S.S.A., C.M.S.
Lately principal, Central Medical School, Suva, Fiji.

NORMAN HOWARD JONES, M.R.C.S.
Director, medical department, British Council.

Lieut.-Colonel ROBERT KELSALL, D.S.O., M.D. Lond.
Chairman, High Wycombe medical board.

KRIKOR SOLOMON KRIKORIAN
Senior medical officer, Palestine (honorary).

Miss SOO KIM LAM, L.M.S.
For public services in the Malayan Union (honorary).

DAVID JAMES MASTERTON MACKENZIE, M.B.E., M.B. Edin.
Director of medical services, Bechuanaland Protectorate.

WILFRED ERIC STANLEY MERRETT, B.M. Oxfd, C.M.S.
Acting principal of the medical school and lecturer in physiology, Nigeria.

PATRICK JOHN MONAGHAN, M.B. Lond.
Chief medical officer, Western Samoa.

Lieut.-Colonel WILLIAM THOMAS-TAYLOR, M.B. Belf., I.M.S.
Deputy director-general, Indian Medical Service (Stores).

M.B.E. (Military)

Major JOHN COLSTON BABBAGE, M.B. Manc., R.A.M.C.

M.B.E. (Civil)

RISHNALAL VITHALDAS ADALJA, M.B.
For public and social welfare services in Kenya.
aptain NUGENT DAVY JEKYLL, M.B. Camb., I.M.S.
Agency surgeon and medical officer, Chitral State Scouts, North-west Frontier Province.
OBERT SCOTT REID, M.B. Glasg.
Admiralty surgeon and agent.
ATRESTON HEWLEY WHARTON, M.R.C.S.
Medical superintendent, Leprosy Hospital, British Guiana.

A.F.C.

ing-Commander ROBERT MAYCOCK, M.R.C.S., R.A.F.

Kaisar-i-Hind Medal

iss CAROL JAMESON, M.D. Stanford, F.A.C.S.
Vice-principal, Missionary Medical College for Women, Vellore, Madras.

Reconstruction

NURSES AND STATE REGISTRATION

OUR CORRESPONDENT REPLIES

(OUR leader last week entitled Responsibility of the Nursing Profession draws the following comment from the author of the article published in this column on June 7.)

THE NEED FOR AN EXTERNAL STANDARD

Discussing the suggestion that every training school might be allowed to develop its own curriculum and give its own certificate under a system of central approval and recognition of training schools you say that "the chief objection to such a plan is that it might intensify the snob differences which—though the common State examination has done much to dispel them—still linger between different schools." The nurse from a famous London voluntary hospital, you maintain, would have a much better standing, when it came to applying for a senior post, than the nurse from a relatively obscure school; the training schools already differ far too widely in their standards.

But here surely is confusion of two different things. Considerations of snobbery may be relevant if it is alleged that social status rather than merit determines admission as a student, but to suggest that it is likely to intensify "snob" distinctions if some schools are encouraged to go ahead and surpass others, and the students thereby attain prestige, is—let us be quite clear about this—to argue for a levelling down to a dull uniformity of mediocrity. This form of argument is only too common today, and it is already recognised in many quarters to be responsible for serious blunders in the field of secondary education. Progress implies difference, and the remedy is so to arrange the machinery as constantly to raise the standard of the backward without introducing a drag upon those that lead. The very fact that after twenty-seven years of State registration as now operated it can still be said that the training schools "differ far too widely in their standards" is evidence of the bankruptcy of the present system. It is far from clear that "the common State examination has done much to dispel them." Surely in the educational field we are not to aim at a system which shall rein back the leading schools in order not to prejudice the prospects of those who are not so fortunate as to gain admission to them? Rather a campaign should be waged against this popular misapplication of democratic thinking whenever and wherever it rears its head.

You may say, however, that you were not advocating uniformity, but, as you put it a little further on, urging that the public "deserve to know that a S.R.N. has carried out a given set of duties, just as they deserve to know that a doctor has had to cover certain well-recognised ground before he is allowed to register." Two things need be said on this. First, beware of the comparison with the doctor on the point of registration vis-a-vis the public. It is well to remember Miss Nightingale's vigorous and formerly well-known observations on this subject; she was wide awake to the dangers of this analogy. Secondly, though there is undoubtedly a need for some guarantee of a standard external to the training school, it is by no means clear that the present system achieves a desirable result. It does enable the nurse who comes from the little-known training school to claim that she is at any rate S.R.N. But if the S.R.N. is attained only by a process of cramming, as it often is, is it right and desirable that the external standard should count for more than the considered opinion of the training school? What of the girl who has concentrated on her patients rather than on cramming for "the State"? It is relevant to ask whether the present system does not achieve even this doubtful result at too heavy a cost in losses by the wayside, and only by diverting attention away from "training" to "examination tests."

It should not be taken for granted that a diversity of standards in different training schools will automatically lead to a lowering of standards in the less advanced schools, with a corresponding loss of prestige attaching to their certificates of proficiency. We are not comparing the present system with one in which common standards are non-existent (as they were before 1919), but with an alternative system which replaces the central examination by new machinery better adapted than the present to secure an all round upward movement. Standards, and effective standards, there must certainly be.

A UNIFORM GROUNDING FOR ALL?

Your leader refers also to the importance of making sure that all entrants get a thorough and uniform grounding in bedside nursing. So far so good; all will agree about the importance of this, but you then seem to lean towards the idea that all entrants should begin in the ranks and be selected for further training on their merits. The idea of a two-year "basic course" has been widely and influentially advocated, and it is a separate aspect of the subject which itself requires more serious consideration than it has so far received. There are perhaps two main difficulties and dangers.

First, there is the point touched on in your leader—that educated and intelligent girls would be put off if asked to undergo a simple practical course comparable with that now offered to the assistant nurse. You say that some senior public-school girls readily agreed that they would find practical work stimulating as a change, and agreed too on the importance of equal opportunity for all. This reaction is entirely intelligible, but the point cannot be so easily dismissed. The headmistresses and careers mistresses of our schools—and intelligent parents too—are already inclined to look on nursing as a career for those not quite equal to the more exacting standards required by careers such as medicine or teaching. Anything that tends to harden this attitude will adversely affect the recruitment to nursing of the most able girls. If a two-year basic course obligatory on all entrants increased the numerical entry it might well be at the cost of a fall in quality, a tendency which is already apparent and which it is of the utmost importance to correct. We need the numbers—is there a way out of this impasse? The problem and the difficulty surely spring from the conception of over-all uniformity, which since 1919 has dominated our thinking: allow diversity, and there will then be schools calculated to appeal to the able as well as others adapted to those of a more practical or domestic type.

The second danger is of a narrowing down of the conception of practical bedside nursing. It is beginning to be supposed that a nurse can be trained in all that really matters in a relatively short time, and that the more advanced part of a nurse's training consists of the acquisition of a theoretical background and a knowledge of various special subjects, which can safely be relegated to a more advanced course. This is surely open to the gravest doubt—does it not imply a false conception of the very essence of good nursing? In our best training schools the two things proceed together, but right through the emphasis falls on a progressive development of those qualities of personality—intuition, observation, understanding, and power to comfort the patient—which in the last resort determine the quality of the nurse. From first to last the essential thing about a nurse's training is the bedside, and bound up with it a progressive transfer to the nurse of responsibility for the patient's welfare; all else should be subservient to this end. To confuse these fundamental things with the acquisition of a knowledge of "practical nursing"—i.e., the simpler bedside techniques which alone can be adequately absorbed in a shortened course—is indeed to open the door to a lowering of standards in the essentials, and to diverge radically from the central tradition of British nursing at its best.

To say this is not to ignore the need for some modification of the present arrangements, nor to deny that a simpler shorter course is all that many candidates can profitably absorb. The catch in the reasoning occurs only at the point where it is suggested that all should qualify by the one route. The difficulty can be met and both objectives achieved as soon as the conception of uniformity is replaced by that of diversity.

Public Health

Smallpox

CONTACTS remain under surveillance at Barnsley, Bilston, Staffs, and Wakefield. The last patients were removed on June 1 and the cropping period for a new generation has been entered, but no further cases had been reported up to June 17.

At *Barry, Glamorganshire*, a woman, aged 28, was removed as a case of suspected smallpox on June 13, and the usual precautions were taken. The diagnosis is still in doubt.

Wakefield.—The diagnosis in the initial case has now been confirmed by the recovery of variola virus on egg culture.

Sheffield.—The last case was removed on May 21 and there are good reasons for believing that the outbreak has terminated.

Coseley, Staffs.—The period of surveillance of contacts expired on June 16 without further incident. The outlook here is hopeful.

Infectious Disease in England and Wales

WEEK ENDED JUNE 7

Notifications.—Smallpox, 7; scarlet fever, 730; whooping-cough, 2050; diphtheria, 196; paratyphoid, 16; typhoid, 2; measles (excluding rubella), 13,535; pneumonia (primary or influenzal), 407; cerebrospinal fever, 63; poliomyelitis, 22; polioencephalitis, 2; encephalitis lethargica, 4; dysentery, 53; puerperal pyrexia, 128; ophthalmia neonatorum, 75. No case of cholera, plague, or typhus was notified during the week.

Of the smallpox cases, 4 were notified at Bilston, Staffs, 2 at Barnsley, and 1 at Wakefield.

Deaths.—In 126 great towns there were no deaths from enteric fever, 1 (0) from scarlet fever, 2 (0) from diphtheria, 1 (0) from measles, 11 (2) from whooping-cough, 71 (9) from diarrhœa and enteritis under two years, and 2 (1) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 235 (corresponding to a rate of 21 per thousand total births), including 31 in London.

In England Now

A Running Commentary by Peripatetic Correspond

HAVING been summoned to the Royal Garden
we set off from our suburb soon after lunch in a
Daimler, in an aura of moth-balls and envy. The f
seemed to be associated with my pre-war "mo
attire" and topper; the latter with our neigh
who could be seen peeping from behind every curt
the road.

It was pleasant to stroll about the sunny lawns c
Palace feeling rather well dressed, and with none c
feeling usual in such circumstances that the prole
are observing and disapproving. The King in
uniform walked with Princess Elizabeth slowly th
the crowd, being introduced to selected swells and
ing those they know. The Queen and Princess Mar
did the same in another part of the garden. Both p
were unobtrusively shepherded by suave and eff
officials of the court. This interesting genus of "
room boy," in common with editors and many p
logists, delights to exert its beneficent influence
behind the scenes rather than in the rough and tu
of life. There seems to be an increasingly good ca
this modus operandi in modern life.

Rather to our surprise the Faculty seemed t
extensively represented. Apart from the royal physi
and others of that calibre, who could be seen from
consorting with "Winnie" and the other celeb
in the paddock, a galaxy of lesser lights were disco
in the refreshment tent making considerable in
on the iced cake (real icing!) which was subsequ
agreed by all to constitute a proper priority or
attention. A disappointing break with tradition
the absence of strawberries and cream, but a po
and exotic novelty was the coal-black band of
Gold Coast police, who finally played us out to
strains of God Save the King at six o'clock. Lat
the local, we voted it a very pleasing alternative t
normal afternoon's work.

* * *

Falmouth—there's a fine town for you. Big o
going ships in the docks, quite still while the cla
metal never stops; tall houses and warehouses
out of the sea itself, with steps leading down to the
oily water of the harbour; tugs and ferries hooting
fussing and ignoring the liners which tower above th
the pub, which has seen better days, its gallery pu
out across the narrow street; the swarthy Indian
Glasgow-Irish, the Fez, and across the water
smooth lines on the horizon of the distant fields
hills, their colours especially beautiful in early s
because of the young corn and the reddish-b
earth.

But all this is in the guide-books. Step away from
traffic for a moment and climb one of those tort
streets which lead up through the old town to the s
Visitors who venture this way soon return, most of
with an uneasy feeling that slums like these ought
to be found on the Cornish Riviera. But there they
and as bad as any to be found in a northern city, ex
for the sun and stone and strange precipices. Tum
together in a fantastic disorder, one house above ano
attics where cellars should be, crazy steps clim
between high walls past drunken gas-brackets,
Italian hill-town shows unforgettable pictures in ston

Sitting in the warm sun of March I saw an old
slowly and laboriously puffing his way up the st
my greeting gave him an excuse to stop, and smilin
told me how much Falmouth had changed during
65 years his memory had retained. "Three
I've seen, and each one worse 'n last"—but how pro
he spun the yarn of that night when the bomb lan
uninvited outside his house at three o'clock in
morning, and covered his bed with glass.

Gone are the days when one could buy as much m
for Saturday dinner as one now gets in a month. S
the children looked happy enough playing with the d
in the streets; healthy and dirty, their shouts ech
behind me as I followed my winding road to the st
below. Here's the rub: out of these houses, unfit

ogs to live in, come people vigorous and lively and aceful; “patchwork” rebuilding would be impossible this forest of stone. Must the old town be razed to e ground and replaced by rows of utility houses, or ould the example of Carcassonne be followed, leaving dead beauty, emptied of its wild-living children and its wn-ups sitting on the doorstep in the sun and talking the neighbour? No doubt, this being Cornwall, and en *England* (though the *Cornishman wouldn't thank* ou for telling him so), a compromise will be found, the ms slowly becoming less dark and dirty, the houses dually losing their impossible dream-like quality. less perhaps the first atomic bomb. . . . Well, anyhow. 's a fine town, and the people who live there are quite htly proud of it.

* * *

They had eased their steeds from a breath-taking llop and now were jogging quietly along together. ey both seemed unconscious of the fact that the ound beneath them was pitching to and fro as if from ne volcanic upheaval, and that a damsel in distress d released herself from a monster which had been rforming ruderies on a tender portion of her anatomy d undaunted was about to mount a camel.

“I'd like to see a whale,” remarked one of them flectively. “What *about a bicycle ride?*” said his mpanion. They changed their steeds and rode a arter of a mile. The girl rowed beside them; she asn't good with her oars, and the sliding seat kept ming off its rollers. “It's a great consolation to ow we are in a rough sea,” she said, “I was sick all is morning.” They decided that a trick cyclist was eded to study the problem. There were people who ankly said without shame “I've been sick.” Others vented all kinds of excuses: “I slept in a draught st night and I've got a chill; a couple of aspirins will on put me right.” Others again wouldn't give in; ey came down to meals and went away looking green; went to the cinema and were suddenly sick on the or. “Interesting problem, sea-sickness,” said the an who wanted to see a whale. “I'll have to go and ange for dinner,” said his friend.

They got off their bicycles and walked away, staggering s they went, for the ground still heaved beneath their et.

“I hate surrealism,” said one of them, inconsequentially, it's so adolescent. This”—he waved his hand to dicate the broad wastes of mid-Atlantic—“is so real.” e door of the ship's gymnasium shut behind them.

* * *

Sitting and thinking—in the intervals of just thinking which is occasionally the anæsthetist's lot, I realised ow beautifully your surgical peripatetic correspondent May 31 had classified us. He has even moved me to tempt a similar classification of surgeons, lest the onderful?) day should come when the positions are versed and *our* secretaries have to telephone the surgeon give him time, place, and details of the little job we e asking him to do on *our* patients.

* Never rude or sarcastic (not even to nurses). Doesn't ant to control the drip. No gross errors of technique. Safe n lipomas and bunions.

** Even temper. Reasonably punctual. Doesn't give us n an anatomy *lecture every time*. Supplies postoperative rlick's for whole surgical team.

*** Seldom appears to be in a hurry. Deigns to come to his n telephone when possible. Gentle below the diaphragm. oesn't demand the fourth plane of the third stage for all dominals.

**** Instant assumption of responsibility for spasm and/or ughing and/or cyanosis and/or movement. He knows, and know, that this was caused by my preoccupation with (1) the full” cylinder which has turned out to be empty; (2) the ancet; (3) the probationer's legs. For lady anæsthetists ad: (1) ditto: (2) *Vogue*; (3) whatever may be the male uivalent; I wouldn't know.

Each lot of course possess the virtues of the less starred tegories besides those of their own class, and needless say anyone not possessing the basic virtues has not en one star—that is, he has been struck off our list ltogether.

Letters to the Editor

THE STUDENT AND THE ALMONER

SIR,—It has often been suggested that medical students should spend some part of their training under the supervision of a general practitioner in order that they should learn something of the personal and domestic problems which form the social environment of illness as it primarily hits each one of us. Many of us who are in general practice are interested in the idea, but are all too well aware of the difficulties involved.

Has it ever been considered possible to utilise the social services already available in all the teaching hospitals? During the time of medical or surgical clerking why not assign the student for a certain period to the department of the hospital almoner? Let the student take charge of a case specially selected by a trained and experienced almoner. Let him study the whole social set-up of the case, investigating especially those factors which may have contributed to the development of the illness, and those problems which the illness has produced for the patient and his family. Finally let him visit the patient after he has returned to his home.

Such a scheme would give students invaluable insight into the personal and domestic difficulties met constantly in general practice, and would help them to realise the extent to which illness, as met with in the home, is primarily a social question in a large number of cases. Even if the complexities of the curriculum make it impossible for students to perform these social services for more than a single case, I feel it would still give them experience of a sort which is now obtainable only when they go into general practice.

London, S.W.10. A. E. BERYL HARDING.

SUCCESSFUL REVACCINATION

SIR,—I have read with great interest the various recent articles on smallpox vaccination in THE LANCET, particularly those by Dr. Broom (March 22) and Dr. Mitman (April 5). Both have served a good cause by calling attention to the difficulty in interpreting the “immune reaction” and by pointing out the danger of regarding such a reaction as ipso-facto evidence of immunity to smallpox. However, the suggestion by Dr. Broom that certain individuals are “*insusceptible*” to vaccination and should be certified as such, and the assertion by Dr. Mitman that the immune reaction is only a reaction of sensitivity, appear to me to represent misconceptions which are potentially dangerous and therefore call for further analysis and comment.

If one rearranges Dr. Broom's data so as to show the *percentage* of individuals manifesting each type of response to vaccination, one obtains the following figures:

	Years since last vaccination					
Reaction	*0–2*	*2–5*	*5–10*	*10–15*	*15–20*	*20*
Primary and accelerated	47%	57%	68%	71%	71%	83%
Immune	40%	21%	9%	0%	3%	<1%
Nil	13%	22%	23%	29%	26%	16+%
Control	9%	13%	11%	11%	14%	6%

It is clear that the percentage of “susceptibles” (primary plus accelerated reactions) correlates directly with the interval since last vaccination (as one would expect), whereas the percentage of immune reactors shows an inverse correlation, as one would also expect if the respective types of reaction mean what they are usually thought to mean. On the other hand, neither the group showing “no reaction” nor the various subjects exhibiting a “control reaction” show any such correlation, direct or inverse, but instead vary throughout all groups within a rather narrow range. This would suggest that both types of reaction are independent of immunity, and depend upon one or more unrelated and relatively constant factors.

The inference from these data, and the one which appears to accord best with the other known observations regarding vaccination, would seem to be as follows:

1. The *primary reaction* results when vaccinia virus invades and multiplies vigorously in a completely susceptible host.

2. The *accelerated reaction* represents an infection which is more rapidly brought under control by a partial host immunity which may vary considerably in degree and which in turn must be considered in relation to the invasive potency of the particular virus preparation employed.

3. The *immune reaction* occurs when the host-immunity level is sufficient to suppress the particular virus infection in question before it gets fairly started: thus the chance of producing such a reaction is favoured not only by a very high immunity level in the host but also by a relatively low degree of infectivity of the virus.

4. The immune reaction may be closely simulated by a reaction due to a sensitivity which, as Scott and Warin recently reported,[1] is apparently elicited by the constituents of vaccinia virus, much as the reaction to heated diphtheria toxin may simulate the Schick test.

5. The "nil" reaction—i.e., absence of any reaction—shows no correlation with immunity or susceptibility, and must be regarded as indicating only that effective penetration of the host tissue did not take place; here revaccination is indicated no matter how many "failures to take" the patient has already experienced. Certification of such individuals as "insusceptible" will not prevent them from subsequently contracting smallpox when exposed.

The number of "immune"—or, if you will, "uninterpretable"—reactions may be reduced by the use of a more potent vaccine, as has been shown by Horgan and Haseeb [2] and others. Furthermore, Horgan and Haseeb stress the danger of obtaining weak reactions to revaccination if a single scratch technique is used. The multiple-pressure technique of vaccination, if properly performed, has been widely observed to give more consistent "takes" than the scratch method. This may be due to the increased chances of penetrating to a suitable depth if multiple separate breaks in the skin are made, as noted recently by Mole.[3] Thus the multiple-pressure method may have additional advantages to those already pointed out by Parish.[4]

Boston, Mass. GEOFFREY EDSALL.

STEVENS-JOHNSON SYNDROME

SIR,—The recent articles in THE LANCET were of great interest here since they arrived during the convalescence of the case reported below, which at the time was regarded as an unusual case of erythema multiforme.

A soldier, aged 21, was admitted on March 28, 1947, complaining of sore throat and cough with watery sputum for 6 days. For a month he had had a mild dry eczematous dermatitis of both forearms, but during the previous 2-3 days a different rash had developed, consisting in small circular scaly erythematous patches which coalesced in places. These were numerous on the forearms and there were a few on the trunk. On the day after admission a severe stomatitis, conjunctivitis, and balanitis developed. The mouth was covered with a peeling greyish membrane, and the pharynx was red and injected. Three swabs from the mouth showed no Vincent's organisms, and from the throat *Streptococcus viridans* was grown. The conjunctivitis was very severe; swabs showed numerous pus cells, but no organisms were isolated. The glans penis was red, and the skin was weeping and peeling. A white blood-cell count at this stage showed 19,500 leucocytes, of which 90% were polymorphs, 8% lymphocytes, and 2% monocytes. Sputum examination showed numerous pus cells, and no one organism was predominant on culture.

The patient was very ill and toxic. He could only swallow fluids, and even this was difficult. On examination of the chest moist râles were heard all over both sides. The temperature was swinging between 101°F and 103°F. On the second day the skin lesions became bullous with purplish edges, and a diagnosis of erythema multiforme was made. The temperature subsided almost to normal by the 7th day, although the mouth and eyes were still severely affected. The bronchitis was still severe, a pint of frothy mucopurulent sputum being produced each day. The skin lesions had increased in number and were chiefly on the back and arms. The lips were grossly swollen and cracked, and the patient could hardly speak.

By the 26th day he was almost well. The conjuncti was improving and all that remained of the skin lesions brown pigmented patches. A stricture of the foreskin developed as a result of the inflammation.

Swabs taken from the bullous skin lesions gave no or on culture; nor did swabs from the penis. It was not to decide whether there was a pure urethritis owing severe inflammation and swelling of the glans and pre

The patient had an uninterrupted convalescen when last seen six weeks after discharge from h he was well, except for the occurrence for the fir of psoriasis on his arms and trunk. The pigme of the skin remained. Penicillin was administered the early stages of the disease, but did not se influence its course.

6 New Zealand General Hospital, Japan. D. R. LAURE

FATAL CEREBRAL INJURY IN BOXE

SIR,—The following case, investigated by per of Major-General R. J. Palmer, D.S.O., Commissi the South African Police, is of interest in illustrat possibility of fatal injury to boxers.

A 23-year-old professional boxer participated in a fight under the auspices of the Board of Control for Prof Boxing and Wrestling, which had satisfied itself t requirements framed under the Act in force were o and that the tournament was carried out strictly in acc with the Act. An honorary medical officer of the examined the boxer before the fight and testified that medically fit to go into the ring. After the fight the said that the blows were all legitimate and there was foul in them.

The boxer was knocked down in the first round b at the count of five. At the beginning of the fourt he was again knocked down but was on his feet just be referee could count ten. Half a minute later he was s heavy blow on the left side of the jaw which knocked h He was unconscious for the next six days except for three brief lucid intervals.

Immediately after the knock-out he was admitte hospital where intracranial hæmorrhage was diagnose emergency trepanation was performed and a right su hæmorrhage drained. As the patient did not rally a operation was performed a week later and more su blood was evacuated. However, death ensued about a fo afterwards. Post-mortem examination revealed so blood-clot adherent to the inner surface of the dura as well as the presence over the left cerebral hem of purulent meningitis, which was found to be staphylococcal infection.

A case of subdural hæmorrhage in a 15-year-ol who had been knocked out while boxing was re by Voris.[1] When burr holes were made in each p occipital region, a liquid subdural hæmatoma of mo size, with well-developed neomembranes, was re on the left side.

Johannesburg, S. Africa. E. J

CONTINUOUS INTRAVENOUS INFUSION

SIR,—Dr. Walton's article (May 17) gives a t reminder that the irritating difficulty of maint the constant flow of a drip transfusion is not alway to resistance in the veins. Walton states that no for slowing and arrest could be found; but it c shown that the screw clip on the rubber tubing cont the inflow of the interceptor is the trouble. The u bility of this part of the apparatus is readily demons by observing the outflow from a simple rubber attached to a reservoir, and constricted by a screw Under these circumstances there is no *constancy* in the rate of flow or in the change of rate. Generall flow lessens, but after decreasing it may increase a The variations appear to be due to the rubber tu and not to slipping of the screw clip since there perceptible movement of the screw head during slo this can be corrected only by rotation of the through several degrees.

Further proof that the slowing is due to the cli tubing is afforded by the observation that if the is regulated instead by a capillary resistance the

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1. Scott, R. B., Warin, R. P. *Lancet*, April 19, p. 536.
2. Horgan, E. S., Haseeb, M. A. *J. Hyg., Camb.* 1944, 43, 337.
3. Mole, R. H. *Lancet*, May 3, p. 597.
4. Parish, H. J. *Brit. med. J.* 1944, ii, 781.

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1. Voris, H. C. *J. Amer. med. Ass.* 1946, 132, 686.

ins constant. This method of control was suggested nally by Marriott and Kekwick,[1] who also empha- that a screw clip on a rubber tube does not allow istant flow of fluid.

Department of Medicine; M. H. ROSCOE.
ral Infirmary, Manchester.

ACADEMIC FREEDOM

R,—I think that Dr. Richard Doll (May 17) and others effectively disposed of Professor Polanyi's philo- ical arguments regarding the future of science. But ould like to raise a few further points, and also to est an alternative way of controlling scientific work he future.

rofessor Polanyi presents us with the picture of this being, the scientist, perched on his seat of know- e far removed from the coarse realities of the world oday. Let this mundane world outside use his pure wledge as they will. For *even if this means mass* nction of the human race in atomic warfare, the ntist must remain aloof in his ivory tower, uninfluenced material considerations. Unfortunately, if whilst ying this pipe dream he should discuss his particular e of the jigsaw of knowledge with colleagues working he same field, he may find himself transcended to ore mundane tower in company with Dr. Nunn May. he object of all this phantasy is clear. Polanyi eats from the fact that scientists are increasingly g forced by the implications of their work to realise t they have a social function, good or evil. With social function go social obligations and the realisa- that ultimately their work is meaningless unless ely linked with that of the society in which they and work. Perhaps more important still, they are easingly coming to realise that the two apparently osite poles of pure and State-applied science can be thesised. For the scientist in fully participating as active member of democratic society exerts the hest form of control over his own work in a planned iety.

hose who, like Professor Polanyi, obscure this real e are, consciously or otherwise, accentuating the os in our era.

ondon, S.W.15. H. C. PRICE.

DENTAL CARIES

IR,—Dr. Neumann's letter of June 7 strikes me as most valuable and convincing summary of evidence brought together. When years ago I asked the late lliam Bulloch, the distinguished bacteriologist, as to value of toothbrushes and dentifrices for preventing ay, he said "they only help to spread the trouble." e evidence then is that, apart from some slight metic value, the many thousands of pounds spent these are useless.

halfont St. Peter, Bucks. LEONARD HILL.

A RECORD LOW HÆMOGLOBIN

IR,—We were interested in the letter of Dr. Karani l Dr. Szekulesz in your issue of June 7 because we l recently seen another case of extreme anæmia.

n May 19, 1947, a woman, aged 63, was admitted to this pital in a comatose condition. Complaint was of increasing kness for eight months. She was extremely pale, with a on-yellow tint of the skin, but was reasonably nourished. was restless and her respirations were deep and irregular: tongue was smooth and shiny, hair and nails normal. ere was slight œdema of the ankles. The liver was just pable below the costal margin and the spleen impalpable. art, chest, and nervous system normal. Temperature 2°F; pulse-rate 90 and respirations 28 per min. B.P. 110/80 a. Hg.

The blood picture on admission was: Hb 1·5 g. per 100 m.; colour-index 1·5; P.C.V. 5%; M.C.V. 150 c.µ; red ls 330,000 per c.mm.; M.C.H.C. 30%; reticulocytes 0·5%. ere was a faint icteric tinge of the serum. Blood film showed crocytosis, anisocytosis, poikilocytosis, and polychromasia. e bone-marrow withdrawn by sternal puncture showed negaloblastic reaction with several early megaloblasts.

Half a pint of packed cells (blood-group A2) was given by w intravenous drip on admission and subsequently daily for the next three days, with dramatic improvement in the patient's condition. 'Anahæmin' 4 c.cm. was given parenterally on May 20 and 21 and twice weekly since then. Penicillin 50,000 units intramuscularly thrice daily was given for the first eight days prophylactically.

On May 27 the blood picture was as follows: Hb 7·45 g. per 100 c.cm.; colour-index 1·32; P.C.V. 27%; M.C.V. 114 c.µ; red cells 1,925,000 per c.mm.; M.C.H.C. 27·6%; reticulocytes 10%. Temperature was then 97·4°F, pulse-rate 84 and respirations 20 per min.

This is undoubtedly a case of pernicious anæmia which had been allowed to go untreated. The condition was aggravated by the fact that the patient has gross external hæmorrhoids which bleed intermittently. Her general clinical improvement is maintained at the time of writing.

Southern General Hospital, P. BARRON
Glasgow. R. McL. ARCHIBALD.

PROPYL THIOURACIL

SIR,—In their paper of May 17 Dr. Wilson and Dr. Goodwin have compared the action of propyl thiouracil introduced by Astwood et al. in 1945[1] on account of its higher potency and possible lesser toxicity, with the effect of thiouracil and methyl thiouracil.

I have compared in 6 patients the effect of methyl and propyl thiouracil (the latter kindly supplied by Messrs. Genatosan Ltd.). I noticed some interesting points of distinction between the two products which, I believe, are worth communicating.

I can confirm Wilson and Goodwin's observation that the lag period between start of treatment and response was not shorter with propyl than with methyl thiouracil. In one patient who had been on iodine before and who was given up to 250 mg. of propyl thiouracil per day, it was a month before subjective improvement and definite slowing of the heart-rate set in.

Astwood found that in the rat propyl thiouracil was ten times more potent than methyl thiouracil; and Wilson and Goodwin conclude that the former is about four times as potent as the latter. Nevertheless, they had to give 25–75 mg. of propyl thiouracil as daily maintenance dose—dosage similar to that advocated by Astwood and Vanderlaan[2]—whereas the normal maintenance dose of methyl thiouracil is 25–100 mg. per day. By varying the doses and interchanging methyl and propyl thiouracil in my cases it appeared that doses smaller than 25–75 mg. of propyl thiouracil are liable to cause relapses and that the potency of propyl thiouracil is only about two to three times that of methyl thiouracil. From my own, limited, experience I have come to the conclusion that 150–250 mg. of propyl thiouracil per day is necessary to control the acute case, and I think that such a dose should be recommended with this compound, according to the severity of the case. As 400–600 mg. of methyl thiouracil per day has previously given me similar good results, especially if spread over the day in small doses,[3] propyl thiouracil seems again to be only two to three times as potent as methyl thiouracil in the dosage necessary for treatment. There were no toxic reactions among the small number of cases treated by me.

Two striking differences between the two thiouracil derivatives could be noted. The first, also observed by Wilson and Goodwin, was that no noticeable thyroid enlargement developed after propyl thiouracil with the doses employed. This may be due to the dosage, but a conspicuous reduction in the size of the thyroid gland was noted in 3 patients when they were switched over from a maintenance dose of 100 mg. of methyl thiouracil to 75 mg. of propyl thiouracil; the difference in dosage appears too small to account for this observation. I believe that the absence of thyroid enlargement is important, since the large goitre which sometimes develops after methyl thiouracil may cause pressure symptoms, especially in cases of retrosternal goitre.[3]

The second point, not mentioned by Wilson and Goodwin but very pronounced in all my cases, was the

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[1] Marriott, H. L., Kekwick, A. *Lancet*, 1940, ii, 193.

[1] Astwood, E. B., Bissell, A., Hughes, A. M. *Endocrinology*, 1945, 37, 456.

[2] Astwood, E. B., Vanderlaan, W. P. *J. clin. Endocrinol.* 1945, 5, 424.

[3] Ucko, H. *Lancet*, 1946, i, 833.

QUESTION TIME

Medical Certificates

r. John Morrison asked the Minister of Health if he ld give a list of all the certificates required by Government rtments which a doctor might be called upon to sign on lf of a patient.—Mr. A. Bevan replied: Medical certifi- may have to be produced by patients to Government rtments under the following enactments or for the follow- rposes. This list is not necessarily exhaustive.

Under the Births and Deaths Registration Acts, 1836–1926—to certify cause of death to the Registrar.

To assist in determining a claim to war pension or allowance.

Under the Lunacy and Mental Treatment Acts and the Mental ency Acts.

In support of claims to benefit under the National Health ance Act, 1936, and the contributory Pensions Acts, 1936–41.

In support of sick absence by a Government department as oyer.

Under the Blind Persons Acts, 1920 to 1938, to support pplication for old-age pension at 50.

Under the Essential Work Orders, Control of Employment ated Persons) Order, 1943, and Control of Engagement Orders pport of a claim to leave or change the employment.

Under the Road Haulage Wages Act, 1938, the Catering es Act, 1943, and the Wages Councils Act, 1945, in support ermit to be employed at sub-standard wage-rates.

Under the Coal Distribution Order, 1943, and the Control uel (Restriction of Heating) Order, 1947, to obtain additional lies of fuel and exemption from heating restrictions.

Under the Disabled Persons (Employment) Act, 1944, for tration.

Under the Corsets (Manufacture and Supply) (No. 14) ctions, 1946, to assist in obtaining surgical corsets.

Under the Welfare Foods Order, 1946, to enable expectant ers to obtain food benefit.

Under the Rationing Orders or otherwise to enable invalids btain special authority for supplementary rationed food and to invalids, expectant mothers, and others to obtain special tment with regard to goods which are the subject of Government rol.

Under the Control of Motor Fuel Orders to assist claimants dditional petrol allowances on medical grounds.

Under the National Service Acts, 1939–1947, in support of aim for exemption from, and to justify failure to comply with, isions of the Acts.

Under the Cremation Act.

Notification of Rubella

r. S. Hastings asked the Minister whether, in view of the easing birth-rate and the clear evidence that german sles in the mother could produce serious defects in the born child, he would make this a notifiable disease, so that cautions could be taken to prevent its spread to those t liable to be adversely affected by it.—Mr. Bevan lied: The effects of this disease in pregnancy are being stigated in conjunction with the Medical Research ncil, and perhaps my hon. friend will let me have the dence he refers to. I should prefer to await the results of investigation before considering the matter further.

On the Record

Replying to a question, Mr. A. V. Alexander stated that dical examinations in the Naval Forces included miniature iography of the chest when a person is entered, or as n as practicable afterwards, and thenceforth periodically far as staff and equipment allow. A "follow-up" system luded full-scale films and special observation treatment hospital of cases of doubt; all drafting of persons concerned stopped for such period. Over 90% of Army recruits re examined by mass radiography to detect primarily the sence of pulmonary tuberculosis. As soon as enough ff and equipment were available all recruits would be so amined. In the Royal Air Force all recruits had a chest ray as a matter of routine. Further chest X-rays were anged as required. The facilities would be developed ther as and when skilled personnel became available. inter-Service committee on medical documentation had ently been appointed to consider the possibility of intro- cing a common system for the three Services, on the most -to-date lines, bearing in mind war experience not only in s country but also in Germany and the United States.

Empire Reciprocity in Social Insurance

Mr. Charles Smith asked the Minister of National Insurance at steps had been taken by His Majesty's Government make reciprocal arrangements with the Dominions with view to ensuring that elderly persons were not disqualified from pensions in this country on the ground that they had been resident in the Dominions.—Mr. James Griffiths replied: A preparatory conference of officials, representing the Governments of the United Kingdom, Canada, Australia, New Zealand, South Africa, Eire, and Southern Rhodesia, with an observer from Burma, sat in London last month to examine the principles on which reciprocity in the field of social insurance might be based. I am glad to say that the conference was able to frame a unanimous report. This will be submitted to the governments concerned and will I hope provide a basis for the consideration in due course of agreements for reciprocity between individual countries whose social service schemes have the necessary common ground for such arrangements.

Employment of Epileptics

Mr. H. W. Bowden asked the Minister of Labour if he was aware that there were numbers of epileptics registered as unemployed in the United Kingdom; that many were unable to obtain employment because of their disability; and if he would consider ways of getting these people to work in the open air under medical supervision.—Mr. George Isaacs replied: The latest available figures indicate that about 1350 epileptics are now registered as unemployed. The problem of finding suitable employment for epileptics has recently been the subject of special study in my department, in conjunction with the medical authorities. There are many occupations, including some in the open air, which are suitable for them, and every effort is being made to place the less severely disabled of them in such jobs with sympathetic employers, and some of the more severe cases have already been placed in employment under sheltered conditions.

Lister Institute

Mr. S. P. Viant asked the Minister of Health whether it was intended that the Lister Institute of Preventive Medicine should be controlled by his department when the National Medical Service Act came into operation; and what was the present relationship between the institute and his department.—Mr. Bevan replied: The Lister Institute is a non-profit-making institute which, like other manufacturers of therapeutic substances, holds licences from the Minister of Health under the Therapeutic Substances Act to manufacture certain substances to which the Act applies, and by special arrangement provides for the Minister supplies of lymph required for public vaccination against smallpox. The National Health Service Act will not affect the relation of the institute to the Ministry.

Colonial Medical Research Service

Sir Ernest Graham-Little asked the Secretary of State for the Colonies why candidates for the proposed Colonial Medical Research Service had been kept waiting with promises of engagement, but without definite appointments and without salaries, in many instances up to six months.—Mr. Creech Jones replied: I am aware that it has taken much time to settle the conditions and terms of service of the proposed Colonial Research Services, but that has been due largely to the very novel problems raised by the attempt to fit officers in an exceptional position into the established practices of the public services. I cannot accept the suggestion that a large number of officers have received promises of appointment from a responsible authority and have then been kept waiting indefinitely for their actual appointment.

Food for Invalids

Mr. L. D. Gammans asked the Minister of Food for what reasons his department overruled the recommendation of her family doctor that a patient should receive extra meat and butter by substituting milk which, in her case, was actually harmful; why this decision was taken without consultation with her medical attendant; why two months' delay took place between the issue of the certificate and its refusal by the divisional food office; and what steps he proposed to take to prevent a recurrence of such a delay with its possible harmful effects.—Mr. J. Strachey replied: This case was considered twice during the two months by the Special Diets Advisory Committee on different certificates from the family doctor, but she was unable to produce any reasons for the suggestion that the usual allowance of milk would be harmful or that there were any special reasons for an allowance of butter and meat for this particular

system for the ascertainment of truth, though costly, s unsurpassed and should be preserved. Sir Maurice ly said that the two callings were united in the splendours their antiquity; no one in either profession wished to leave [illegible] cause those uninterested were quickly eliminated by examiners. Toasting the Society, Lord Moran ed that the essential difference between the outlooks ctor and lawyer lay in the fact that though both were ned with the truth, the doctor answered questions ly, supporting his replies with objective data, whereas lawyer sought that aspect which was most favourable to client. Dr. Norwood East spoke of the society's growing gth and of the need to maintain its high standard, and C. Thackray Parsons paid tribute to it for helping the n in the dock by studying the roots of crime.

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iversity of Oxford

On June 7 the degree of D.M. was conferred on Margaret ies.

iversity of Cambridge

On June 7 the following degrees were conferred:

M.D.—J. W. D. Bell, G. S. Graveson, J. H. Humphrey, H. S. [illegible], *Man Wong.
M.Chir.—R. L. Canney.
M.B., B.Chir.—* G. H. P. Drake.

* By proxy.

Public Health Laboratory Service.—Dr. R. M. Fry has been inted university director of this service and Dr. Joan eard assistant-director. The service is associated with department of pathology and the director will assist the fessor of pathology in research and teaching.

University Health Service.—The university is inviting lications for the whole-time posts of senior and junior th officers whose chief duties will be the medical examina- n of undergraduates. The posts will carry yearly salaries £1000 and £700.

yal College of Surgeons of England

At a meeting of the council held on June 12, with Sir red Webb-Johnson, the president, in the chair, it was unced that *a supplemental charter had been granted to* college, giving power, among other things, to coöpt itional members of the council, to conduct a special l fellowship examination in ophthalmology and otolaryn- gy, to grant a fellowship in dental surgery, and to institute ties in the college. The following were coöpted members the council for the ensuing year:

H. Guy Dain (general practice), G. F. Stebbing (radiology), E. Negus (otolaryngology), A. D. Marston (anæsthetics), George k (ophthalmology), R. V. Bradlaw (dental surgery). L. Carnac tt, subject to the result of the council election (gynæcology obstetrics).

Prof. R. Milnes Walker was re-elected a member of the t of examiners, and the following examiners were elected the ensuing year:

Primary fellowship.—Anatomy: Sir Cecil Wakeley, Prof. H. A. s, Mr. E. C. B. Butler, Mr. James Whillis. Applied physiology pathology: Prof. R. J. S. McDowall, Prof. Geoffrey Hadfield, W. G. Barnard, Prof. Samson Wright.
Diploma of L.R.C.P., M.R.C.S.—Elementary biology: Mr. ld Rushton, D.SC., Mr. J. H. Elgood, Mr. Alan Fisk, Mr. rick Segrove. Anatomy: Prof. Mary Lucas Keene, Mr. A. Moore, Dr. D. V. Davies. Physiology: Professor Dowall, Prof. D. T. Harris. Midwifery: Miss Alice Bloomfield, A. O. Grey, Mr. Norman White, Mr. H. G. Kirwan-Taylor. ology: Dr. J. F. Taylor, Mr. Lennox Broster, Dr. H. W. Mr. R. J. McNeill Love.
Diploma in Public Health.—Preliminary: Dr. Ian McCracken; I, Dr. J. D. Benjafield; Part II, Dr. C. O. S. B. Brooke.
Diploma in Ophthalmic Medicine and Surgery.—Part I, Mr. J. H. art, Mr. G. J. O. Bridgeman; Part II, Mr. T. M. Tyrrell.
Diploma in Psychological Medicine.—Part I, Dr. Denis Brinton.
Diploma in Laryngology and Otology.—Part I, Mr. Charles Keogh, Geoffrey Bateman; Part II, Mr. J. H. Cobb.
Diploma in Medical Radio-Diagnosis.—Part I, Prof. F. L. Hop- d, D.SC.; Part II, Mr. J. L. A. Grout.
Diploma in Medical Radiotherapy.—Part I, Professor Hopwood; t II, Mr. G. F. Stebbing.
Diploma in Anæsthetics.—Dr. W. A. Low, Dr. E. S. Rowbotham.
Diploma in Child Health.—Dr. Wilfrid Sheldon, Dr. A. D. C. Bell.
Diploma in Physical Medicine.—Part I, Dr. Philippe Bauwens, A. M. A. Moore; Part II, Mr. N. St. J. G. D. Buxton, Dr. k Cooksey.
Diploma in Industrial Medicine.—Part I, Dr. Arthur Massey; t II, Dr. William Blood.
Diploma in Tropical Medicine and Hygiene.—Sir Philip Manson- , Dr. Sydney Smith.

Diplomas of fellowship were granted to the following:

I. McA. McArthur, A. S. Bullough, Robert Pettigrew, K. G. Rotter, W. Lipmann Kessel, Philip Shemilt, R. E. Horton, St. J. M. C. Birt, V. Crawford, G. R. Crawshaw, M. H. Kinmonth, F. J. Gillingham, B. Cockett, R. E. Shaw, H. M. Lewis, M. T. Phelis, J. G. Taylor, F. T. Wheeldon, K. W. Wilkinson, B. B. Milstein, D. J. Robertson, S. G. Tuffill, D. P. Choyce, Daniel Anthonisz, D. B. Brown, R. T. Campbell, Maitreyee Chaudhuri, L. P. Clark, R. L. Cooke, J. R. Curtis, E. T. Dick, J. L. Dowling, Marjorie O. Dunster, S. M. Ghosh, N. O. Gibbon, William Girdwood, A. J. P. Graham, R. T. Grime, W. G. Henry, J. P. Heriman, Charles Hollenberg, Boris Lewin, G. M. Lewis, E. T. McCartney, S. T. McCollum, Donald McIntosh, A. M. Mair, H. L. C. Maitland, P. E. Marchand, R. P. Melville, H. D. Moore, E. J. Nangle, S. M. Nawab, G. E. Nevill, J. S. Peters, S. F. Reid, R. B. Scott, R. A. Stephen, H. D'A. Sutherland, R. A. R. Taylor, G. J. Walley.

The following diplomas were granted, jointly with the Royal College of Physicians:

D.A.—D. V. Bateman, O. H. Bekin, C. H. Boyd, W. H. F. Boyd, P. R. Bromage, E. K. Browning, Roger Bryce-Smith, J. E. Bulow, Dennis Carter, A. A. Cilliers, R. B. Clayton, F. E. Clynick, S. W. Coffin, E. R. Coleman, P. B. Connor, C. J. Corcoran, Giovanni Cura, R. M. de Gregory, A. B. Eastwood, I. C. W. English, J. T. Forbes, Andrew Fraser, Eileen McC. Gibson, L. J. Goggin, John Gordon, A. H. Grace, P. W. S. Gray, Harry Grenville, J. H. G. Halliday, J. K. Harper, A. W. Hind, A. C. Holms, H. R. Hudd, Gough Hughes, R. McD. S. Keir, James Lapraik, C. H. Levick, J. K. Lewis, Mary E. Lloyd, R. E. Loder, J. M. MacCormack, R. M. Mackenzie, R. L. McMillan, S. A. Mason, J. G. Matheson, E. T. Morch, P. H. Moore, W. B. Neil, G. S. Ostlere, W. J. Patterson, Joseph Psaila, H. J. Richardson, Hilda Roberts, J. D. Robertson, F. R. Russell, C. F. Scurr, Eugene Thomas, T. C. Thorne, C. E. Tudor, Ambrosine Vaughan, Patricia E. Wallace, Mary Watson, H. L. J. Wilson, G. P. Williams, T. M. Williams, T. N. P. Wilton, E. H. Winterbottom, Luise Wislicki, R. B. Wright.

D.M.R.D.—R. L. T. Hill.

D.C.H.—Sunilkumar Ray.

Commonwealth Travelling Fellowship.—Sir Hugh Cairns, Nuffield professor of surgery in the University of Oxford, has been elected the first Arthur Sims travelling professor. The announcement of the endowment of this chair was first made last November (*Lancet*, 1946, ii, 737), and its title is now to be associated with the name of the donor, Mr. Arthur Sims, a New Zealand industrialist.

Sir Hugh Cairns is a medical graduate of the University of Adelaide, and his main duty as travelling professor will be to visit the principal medical centres of Australia and New Zealand, to deliver lectures, and to take part in research and postgraduate teaching. It is hoped that it will be possible for him to visit the other Dominions during his year of office.

Royal College of Obstetricians and Gynæcologists

At the meeting of the council held on May 31, with Mr. W. Gilliatt, the president, in the chair, it was announced that Field-Marshal Jan Smuts had been elected an honorary fellow. To mark the grant of the royal charter of incorporation the four surviving signatories to the articles of association, whereby the college was founded, were also elected to the honorary fellowship: Prof. J. M. Munro Kerr, Prof. C. G. Lowry, Sir Ewen Maclean, Sir William Fletcher Shaw.

The following were elected to the council to replace those retiring:

Dugald Baird, Alice Bloomfield, G. I. Strachan (*to represent the fellows*); J. A. Stallworthy, A. M. Sutherland, R. James Wotherspoon (to represent the members).

An Australian regional council has been set up to act as a representative committee of the council of the college in discussions and negotiations affecting the practice of obstetrics and gynæcology in Australia. Dr. F. A. Maguire (Sydney) *has been appointed chairman, and* Prof. B. T. Mayes (Sydney) secretary.

The following were admitted to the fellowship:

M. D. Black, J. S. Hovell, Jerusha Jhirad, T. N. MacGregor, Robert Newton, G. D. Shaw, G. S. Smyth, H. S. Waters, Bryan Williams.

The following were admitted to the membership:

Duncan Ballantine, Margaret R. Biggs, W. S. Campbell, J. B. Cochrane, S. J. Cohen, H. V. Corbett, Albert Davis, J. R. Dickinson, Bessie Dodd, Morag Dods, R. C. Gill, Jean L. Hallum, R. F. Lawrence, T. H. Lawton, J. M. McBride, R. A. E. Magee, M. K. O'Driscoll, S. S. F. Pooley, L. J. Quinn, R. B. Salter, P. C. Thomas, Kathleen M. F. Worrall, J. L. Wright.

Indian Medical Service

The Service's annual dinner was held in London on June 12, under the chairmanship of Sir Bennett Hance; the guests were Lieut.-General Sir Alexander Hood, director-general, Army Medical Services, Lieut.-General T. O. Thompson, D.M.S. India, and Mr. William Gilliatt, P.R.C.O.G. Sir Bennett Hance summarised the Service's work for India, and recalled that this was the last dinner which would be held while the Service was still in being. Sir Alexander Hood paid tribute to its contribution to the whole field of tropical medicine; the high standing of the Service was, he said, due not only to the efforts of those officers whose names had become internationally known but to the *steady* work of the ordinary

Royal Appointments

Air Commodore Thomas McClurkin has been appointed honorary physician to the King in place of Air Vice-Marshal K. Biggs who has retired. Air Vice-Marshal Duncan McLaren and Air Commodore F. J. Murphy have been appointed honorary surgeons in place of Air Vice-Marshal A. E. Panter and Air Vice-Marshal T. J. Kelly who have retired.

R.A.M.C. Memorial

On June 12 the Queen was present at a service held in Westminster Abbey in memory of all ranks of the Royal Army Medical Corps who died in the war. Afterwards the Queen, who is colonel-in-chief of the R.A.M.C., laid a wreath below the memorial window, which was rededicated by the Dean of Westminster.

Postponement of Appointed Day

As the appointed day for the start of the National Health Service has been postponed from April 1 to July 5, 1948, local health authorities can be given more time for the preparation of their proposals. The Minister of Health has therefore substituted the following as the last dates for the submission of their proposals instead of the list given in our issue of March 8 (p. 307).

Oct. 31, 1947.—Care of mothers and young children, midwifery, health visiting, home nursing, prevention of illness, care and aftercare, domestic help, duties under Lunacy and Mental Treatment Acts and Mental Deficiency Acts.

Dec. 31.—Health centres.

Tuberculosis Association

The joint annual conference of the association and the Tuberculosis Society of Scotland will be held at the department of zoology, King's Buildings, Edinburgh, from July 16 to 19. The speakers will include Dr. H. A. Pattison (Rehabilitation in the U.S.A.), Mr. T. Holmes Sellors (Assessment of the Results of Thoracoplasty), Dr. H. van den Berg (Control of Results in B.C.G. Trials), Dr. J. G. Scadding (Pneumonias associated with Epidemic Respiratory Infections), Dr. V. Reilly (Pathology of Amyloidosis), Dr. W. M. Borthwick (Genito-urinary Tuberculosis), Prof. V. Monaldi (Endocavitary Aspiration in the Treatment of Pulmonary Tuberculosis), Mr. Norman Dott (Skeletal Traction, Surgical Decompression in the Management of Pott's Paraplegia). Dr. Alexander MacLean and Dr. B. R. Clarke will also open a discussion on the Causes for the Breakdown of Discharged Quiescent Cases.

Births, Marriages, and Deaths

BIRTHS

BARWOOD.—On June 8, at Woking, the wife of Dr. Antony Barwood—a daughter.

COOPER.—On June 7, at Edgware, the wife of Mr. Stanley Cooper, F.R.C.S., Gold Coast—a son.

DUPRÉ.—On May 31, at King's Langley, the wife of Dr. Peter Dupré—a daughter.

FROOME.—On June 10, at Norwich, the wife of Dr. Kenneth Froome—a daughter.

GIMSON.—On June 7, in London, the wife of Dr. Leslie Gimson—a daughter.

HANNAY.—On June 9, at Wimborne, Dorset, the wife of Dr. J. W. Hannay—a son.

KING.—On June 10, in Dublin, Dr. Elizabeth King, wife of Dr. Jeffrey D. King—a daughter.

LEWIS.—On June 5, at Cardiff, the wife of Dr. C. W. D. Lewis—a daughter.

MOORE.—On June 11, at Guildford, the wife of Captain J. T. Moore, R.A.M.C.—a daughter.

WOLFE.—On June 4, at Cardiff, the wife of Mr. H. R. I. Wolfe, F.R.C.S.—a son.

MARRIAGES

BAKER—HOSTE.—On June 7, at Bournemouth, Robert Buckley Baker, M.B., surgeon commander R.N., to Margaret Hoste.

BUCHAN—HENDRY.—On June 14, in London, John Forster Buchan, M.B., to Mary Mabel Hendry.

KENCHINGTON—SWAFFIELD.—On June 11, at Bromsgrove, Noel Scott Kenchington, M.R.C.S., to Barbara M. Swaffield.

PICKERING—BINNIE.—On June 6, in London, Paul Pickering, B.M., to Anne Binnie.

RUTTER—HUNT.—On June 7, at Cardiff, Frank William Eden Rutter, M.R.C.S., to Mary Elizabeth Hunt.

TILSLEY—HOUGHTON.—On June 10, at Sheffield, David Alan Tilsley, M.R.C.S., to Freda Houghton.

DEATHS

FINDLAY.—On June 14, at Farnham, Surrey, Leonard Findlay, M.D., D.SC. Glasg., F.R.C.P., aged 69.

GEPP.—On June 11, at Shrewsbury, Maurice Gepp, L.R.C.P., aged 87.

HATTON.—On June 12, at Claygate, Helen Mary Hatton (née Serjeant), L.R.C.P.E.

HOWELL.—On June 6, at Shaldon, S. Devon, William Boyman Howell, M.D.

MACKINTOSH.—On June 12, in Glasgow, Donald James Mackintosh, C.B., M.V.O., LL.D., M.B. Glasg., D

Diary of the Week

JUNE 22 TO 28

Tuesday, 24th

MIDDLESEX HOSPITAL, W.1
4.30 P.M. Sir Jack Drummond, D.SC., F.R.S. The Nu
Value of Bread. (Sanderson-Wells lecture.)
PADDINGTON MEDICAL SOCIETY
8.45 P.M. (St. Mary's Hospital, W.2.) Dr. L. Zeitlin
in Medicine. (Presidential address.)
LONDON SCHOOL OF DERMATOLOGY, 5, Lisle Street, W.C.2
5 P.M. Dr. W. J. O'Donovan: Occupational Dermatitis.
EDINBURGH POST-GRADUATE BOARD FOR MEDICINE
5 P.M. (Royal Infirmary.) Dr. T. N. MacGregor: Sex H
in Theory and Practice.

Wednesday, 25th

FACULTY OF HOMŒOPATHY
5 P.M. (London Homœopathic Hospital, Great Ormond
W.C.1.) Dr. John Paterson: Homœopathic Phil
Brought up to date.
LONDON SCHOOL OF DERMATOLOGY
5 A.M. Dr. C. W. McKenny: Technique of X-ray T
(Part II).

Thursday, 26th

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
5 P.M. *Prof. Arnold Sorsby: The Control of Blindness.*
FACULTY OF RADIOLOGISTS
8 P.M. (Children's Hospital, Ladywood Road, Birm
Prof. Robley D. Evans, Dr. J. Hamilton: Thera
Use of Radioactive Isotopes.
MEDICO-LEGAL SOCIETY
8.15 P.M. (26, Portland Place, W.1.) Sir William Norwood
Psychiatry and Degrees of Murder. (Presidential ad

Friday, 27th

ROYAL SOCIETY OF MEDICINE
10 A.M. (Royal Sussex County Hospital, Brighton.) *Lar
and Otology.* Miss Winifred Hall, Mr. John McGi
Association of Otitis Media with Acute Non
Gastro-enteritis.
2 P.M. Mr. V. E. Negus: Paralysis of the Larynx. Mr.
Archer: Subacute Maxillary Sinusitis.
FACULTY OF RADIOLOGISTS
11 A.M. (Birmingham Children's Hospital.) *Therapy.*
B. W. Windeyer, Dr. P. B. Mumford, Dr. Bernard
Dr. J. F. Bromley: Organisation for Superficial
Therapy.
2 P.M. *Diagnosis.* Prof. J. M. Smellie, Dr. J. C. Bishop, Mr.
Sampson: Bronchiectasis in Children.
ASSOCIATION OF CLINICAL PATHOLOGISTS
9.30 A.M. (Dunn School of Pathology, Cambridge.) Dr.
Thompson: Chiari's Thrombosis of the Hepatic
Dr. M. Bodian: Pulmonary Hæmosiderosis. Dr.
Cook, Dr. B. P. Marmion: Outbreaks of Gastro-e
of Unknown Ætiology at Leicester and Oxford, 19
Dr. H. Sikl: Lesser Known Histological Metho
Routine Use in the Laboratory. Dr. R. M. Haines
Eye in Tuberous Sclerosis. Prof. J. S. Mitchell a
A. M. Barrett: Radiosensitivity of Tumours.
4.15 P.M. Dr. J. E. McCartney: Use of Electron Microsc
Bacteriology. Dr. David Nabarro: Retrospect of
Pathology. (Presidential address.)

Saturday, 28th

ROYAL SOCIETY OF MEDICINE
10 A.M. (Royal Sussex Hospital.) *Laryngology and O*
Clinical meeting. Miss M. R. Dix, Mr. C. S. Ha
Pure Tone Audiometry in Young Children.
FACULTY OF RADIOLOGISTS
10 A.M. (Queen Elizabeth Hospital.) *Therapy and Dia*
Dr. Brian Taylor, Dr. T. Lodge, Mr. A. L. d'Abre
C. J. L. Thurgar, Dr. Peter Kerley: Carcinoma
Bronchus.
ASSOCIATION OF CLINICAL PATHOLOGISTS
9.30 A.M. (Dunn School of Pathology, Cambridge.) D
Hynes: The Leucocyte Drift. Dr. J. Ungar: An
Properties of Pertussis Vaccines. Dr. S. Sevitt:
Hæmolysin Test for Streptococci. Dr. F. Vapico: Si
cation of Diagnostic Methods in Clinical Bacteri
Dr. A. Renshaw: Blood Protein Variations in Rheu
Disease. Dr. J. V. Wilson: Blood Viscosity as an
of Activity in Chronic Rheum
D.SC., and Dr. R. J. Garner:
of Glucose. Dr. C. E. Dukes:
SOCIETY FOR ENDOCRINOLOGY
10 A.M. (Guy's Hospital Medical School, S.E.1.) Mr.
Callow, D.PHIL., Mr. C. J. O. R. Morris, PH.D., Prof.
Marrian, Mr. C. W. Emmens, PH.D., Mr. G. A. D.
wood, PH.D., Dr. P. M. F. Bishop: Assay of U
Steroids.

A NEW HYPODERMIC SYRINGE.—The 'Balco' sy
composed of a metal nozzle and a glass barrel and pl
has been devised for sterilisation by heat when fully assem
the makers claim that it withstands temperatures u
200°C. In trials it was undamaged by repeated b
and autoclaving. The syringe is manufactured by
Ballbrook Surgical Instrument Co. Ltd., 9, Black
Street, Salford 3.

)GRESS AND PRESENT ASPECTS OF MEDICAL SCIENCE *

Sir LIONEL WHITBY
C.V.O., M.C., M.D. Camb., F.R.C.P., D.P.H.
REGIUS PROFESSOR OF PHYSIC IN THE
UNIVERSITY OF CAMBRIDGE

scipulus est priori posterior dies—each day is the ar of yesterday; and yesterday, the second world was associated with that spectacular progress in in aspects of medicine which always appears as a compensation for lives that are inevitably sacrificed. r what will happen tomorrow, none can tell until has been made. We live in an era when legisla- may alter the whole fabric of the practice of medicine, in due course we shall see how "changes fill the f alteration with divers liquors."

the moment the world is hungry for security— y-to-day economy, in employment, in social services, n the anxieties which illness brings. This may be asic stimulus which lies behind the great movement rds organised research, which urges the lifting of the al standard of medical knowledge, and which calls ıe provision of a medical service capable of making npetent opinion readily available to rich and poor

ch time will be required to create the new order. island is woefully short of medical man and woman r, of equipment, of hospital accommodation, and rsing and domestic staff. These cannot be created ight, and until they are available no State medical ce can operate according to the expectations of the c. When expensive services are free, the use made em is always magnified.

t the country and, to a considerable extent, the ger members of the profession are in the mood to ve this State service; the latter will do their best ake it work. Many returned warriors, weary with ong years of a relatively narrow medical life, are and anxious to rehabilitate themselves for the of providing the country with specialists, the ed men, and the good doctors which the National th Service will need.

SPECIALISM

me there appears to be some danger in the lavish alism which is so freely publicised. Among all the ssion, particularly ex-Servicemen, there is a very ral ambition to be in specialist employment. Shall erhaps, like a Gilbertian navy, be all admirals and r from a galaxy of specialists with none to do the work, the work in the home?

surfeit of specialists leads to unintelligent general cine. The pain in the belly, or any other common tom, tends to present itself not as a problem for iosis but simply as one to be referred for specialist on. Will our general practitioners of the future me no more than sorters of cases? Under Army itions, some evidence of this was apparent. The ngerer, the scrimshanker, was often referred to the ialist as a safety cover, when the old-fashioned nental medical officer—the keen observer, the student uman nature—would have prescribed a couple of ber nines and duty.

multitude of specialists often means that a patient many doctors but not one he can really call his own; one to whom humanity is as important as the expert ion. Let us hope that nationalisation will not inate the oft-ridiculed bedside manner, which in t means a capacity for gaining the confidence of the patient, so that a full and relevant history of background is obtained and cooperation in investigation and treatment is ensured. Should the personal touch go out of medicine, the soul of the profession will pass with it, whatever equipment and facilities are provided.

THE DOCTOR'S LIFE

Much has been said about making the life of the doctor more easy, with shorter hours and longer holidays, more leisure, and financial security for all his working days as well as his old age. This certainly cannot happen overnight, and one wonders how many really desire such things, at the price of independence, or who wish to forgo the stimulus of the gamble of life with the opportunity to make of it what you will. Our profession, all of those who have the instinctive call to be doctors, expect and often glory in the overwork, the perpetual service at all hours if need be; that is all part of the game. The late night call may be a nuisance and something to grouse about, but it brings the thrill always associated with the unknown.

In my view the good doctor—and most are good—will continue to serve the public as before, in spite of being nationalised. It is only the mediocre doctor, the lazy man, the man whose heart is not in his work, who will receive an undue reward for a service in which he can watch the clock.

MEDICAL EDUCATION

We cannot tell whether the profession will continue to attract men of the same calibre and quality—men who have the right background and whose upbringing has inculcated the habit of true service. When a calling is no longer independent and individual, some of its attraction has gone. But it is certain that at least the standard of learning and knowledge will be maintained, and may, by and large, rise, since a long-overdue organisation is being created for postgraduate education in all the university centres. This can be counted a great advantage.

With the expansion of teaching and with the positive development of our university centres will come a proper recognition of the vast contribution which this country has quietly and unobtrusively made, and will continue to make, to the science and art of medicine. Hitherto, in Europe, the German and Austrian centres have been regarded as the mecca to which those in search of advanced medical education should go; whereas Britain, more from diffidence than desert, has been regarded as old-fashioned. It is to be hoped that some of our old-fashioned methods will long continue, and more especially the humane approach.

Even so, we are, once again, woefully short of first-class teachers, and it will take time to create the number required.

RESEARCH

Homines dum docent discunt—men learn as they teach. The great university teaching centres will naturally develop a vigorous policy of research, no longer dependent on the chance financial endowments of enlightened individuals. The university centres will be the focus of each region and should bring into close contact the whole medical population of the region. In theory this should be very beneficial, for the scheme brings into the orbit of research not only the patient with advanced illness but also the clinical material at general-practitioner level representing disease at an earlier phase. Add to this the information supplied by the apparently normal—e.g., in the prophylactic examinations of university students—and there is scope for research covering all aspects of disease, and a medical community willing and interested in supplying all the material. Yet even here caution is necessary. With the perfection of such technical procedures as mass radiography, the value of which was shown by war experience, not only is the abnormal detected but also trivial deviations from normal. Too great an emphasis on such deviations, another danger of specialism (reminding one of the nusiform sac), confuses the boundary between health and disease, and often causes needless anxiety.

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* ctor Isaac Gilchrist lecture delivered at the University of Aberdeen on May 7.

The war itself proved the quality of our research-workers, but likewise revealed how few we had. This is now recognised by the Government, who are pursuing a positive policy to increase the numbers.

ANTIBIOTICS

The war period showed what can be done by concentrated effort, team-work, and coördinated planning. Of this there can be no better examples than the antibiotics, the chemotherapy of parasitic diseases, and atomic energy.

Penicillin

Fleming's (1929) discovery of penicillin ranks very high in the romances of medicine and clearly shows what part the individual can play in great scientific advances. The story is well known. One day, out of the smoke-laden air of the Borough of Paddington, there descended on to a plate of *Staphylococcus aureus*, which Alexander Fleming was cultivating, a single spore of *Penicillium notatum*. Next day, in the region of the mould, the observer noticed the inhibition of the growth of the staphylococcus. Most of us would have discarded the plate as a reproach to our bacteriological technique. Pasteur said: "Chance favours the trained mind"; and who can doubt that the mind of Fleming was trained and tuned? But more than that, Sachs wrote: "It is not the facts observed but the conclusions drawn from them that determine the progress of science." And Fleming's conclusions in 1929 were in principle all that we nowadays are accustomed to expect from penicillin.

Yet the exploitation of the discovery remained in abeyance for twelve years, and it required the stimulus of war, and the cooperation of chemists, bacteriologists, mycologists, and engineers, and the resources of the commercial world, to give us penicillin in the quantity and in the forms in which we use it today.

Careful study has shown that penicillin consists of at least four substances of varying activity, and of these no more than one has been synthesised. Nature is still a cleverer chemist than man, but man is ingenious at exploiting nature's gift by various routes of administration, in different forms such as pastes, pastilles, and sprays, and in ensuring stability. With the perfection of this work, the culmination of a single observation, a material has been given to us which comes very close to Ehrlich's dream of a non-toxic active antibacterial agent; one of the most powerful remedies against a common mortal infection; a substance which greatly reduced the mortality and morbidity from wound sepsis during the war, and bids fair to succeed with considerable frequency in bacterial endocarditis—a disease which hitherto has defied all methods of control, quite apart from cure.

With the appreciation of the potentialities of penicillin, we have seen the same reaction as when the virtues of sulphanilamide were first recognised. There has been a rapid and frenzied search through a huge range of moulds, bacteria, yeasts, and actinomycetes for an antibiotic which would cover the gaps left by penicillin or which might be superior to it. Numerous moulds have been found to produce antibiotic substances. Some have been dignified by names such as spinulosin from *P. spinulosum*, citrinin from *P. citrinum*, fumigatin from *Aspergillus fumigatus*, and patulin from *P. patulum*—the last enjoying a meteoric rise to fame and an equally rapid fall when a properly controlled experiment showed that it was not the heaven-sent cure for a common cold.
None of these antibiotics has proved of practical
none can attempt to rival penicillin.

Likewise with the antibiotic which Dubos
obtained from autolysed cultures of the soil
B. brevis. This was found to be a mixture of two
peptide substances known as *tyrocidin* and *gr*
Both have proved toxic, and only gramicidin, a
material of crystalline structure, has been su
to limited trial by local application.

Streptomycin

The past few years have seen the discovery
preliminary assays of even another antibiotic
has attracted wide interest, in that it appears to
the door to the treatment of tuberculosis. Strepto
derived from the soil actinomycete *Actinomyce*
has a wide range of activity, apparently filling in
of the gaps which penicillin cannot cover; it is
in vitro against a whole series of gram-negative b
including *Br. abortus*, *Ps. pyocyanea*, proteus, salmo
and *Past. tularense*. But in the human subject tul
is the only disease, so far, in which its value is un
acknowledged. Preliminary trials in competent
suggest that the reaction-rate is fairly high, and
delayed toxic or other sequelæ may occur, whils
capacity of an organism for becoming strepton
resistant is fairly rapidly developed. It seems
that where streptomycin and penicillin overlap ther
be no question of the former replacing the latter.

As to tuberculosis, there can be no doubt of the ac
of streptomycin in vitro and in vivo, but there a
to be very definite limitations. Activity is great
the acute miliary forms of the disease, in which spect
cures, often of limited duration, have been obtain
clinical states hitherto always fatal, including
culous meningitis. But in the common chronic cas
forms of tuberculosis the effect is poor, and even wi
acute disease the arrest or cure has often been a
plished only to leave distressing cerebral sequ
whether due to the disease process or to the ma
itself is not yet certain.

It appears, therefore, that streptomycin does
provide that for which the whole world has long
looking—a simple and easy cure for tuberculosis.
as the action of the sulphonamide drugs is inh
by the presence of pus, the action of streptomy
apparently inhibited by caseation or the barriers
are formed simultaneously.

But at least a hint has been given that tuberc
may one day be controlled. At present the cure o
disease with its protean manifestations and many var
seems unlikely to be accomplished with one single ren
but other substances have been found to have
action, and these too may be capable of further exp
tion. For example, the sulphone group undoub
inhibit the tubercle bacillus in vitro, and though
are far too toxic for general use in the human su
they are available for topical application. There is
the claim that diethyl stilbœstrol has some reta
action on the growth of the tubercle bacillus, a fact
fits well with the long-recognised observation that t
culous women often improve during pregnancy.
then are three lines of approach to the problem of t
culosis, and progress may result from improven
in any or all.

Resistant Micro-organisms

But, despite these great advances in the contr
bacterial diseases, and however great such advances
be in the future, medical science must always prog
It is a remarkable fact that no sooner is the cu
control of one disease accomplished than new prob
appear to arise forthwith. At one time it seemed
gonorrhœa could be almost controlled with the sulp
amides, but nowadays it is recognised that a

portion of cases, many more than hitherto, are lphonamide-resistant." Is this an example of the horism "Make haste to use a new remedy while it is effective," or is it that bacteria are really capable of pid adaptation ? The latter is probably the truth. due course penicillin-resistant staphylococci may come common, whereupon the whole search must gin again. Likewise with streptomycin, to which stance appears to be quickly established.

ANTIMALARIAL DRUGS

Thanks to chemotherapy and efficient methods of munisation, many of the major horrors of war have en largely controlled. In 1939–45 the incidence of phoid and typhus was commendably low; tetanus s a rarity, and the wards were no longer filled with the nk and corruption of gangrene and sepsis. Indeed, matic recovery, no longer retarded by chronic infection, metimes outpaced psychological repair.

Among the most important successes of chemotherapy re the advances made in the prophylaxis and treatment of protozoal diseases. In the Far Eastern campaigns, here casualties from disease were at one time ten nes as numerous as those caused by lethal weapons, e medical services can be considered to have been e most important branch of the general staff. With the rld quinine supplies largely in enemy hands, the rk of our chemists in producing and perfecting e antimalarial drugs—mepacrine, pamaquin, and later 'aludrine'—can be said virtually to have won the rma campaign. The shade of Ehrlich must have joiced at these successes, for chemotherapy may be id to have been born on the day on which Ehrlich's ind connected two simple facts—that methylene-ue stained the malaria parasite, and that methylene-ue was harmless to the human body. Ehrlich tried ethylene-blue for the treatment of malaria; but, ough he obtained a hint of success, the effect was viously inferior to that of quinine. Nevertheless the emical structure of mepacrine is more closely related methylene-blue than to quinine.

SURGERY

Estimates of the efficiency of medical and surgical eatment in the late war are not yet complete, but there n be no doubt that wounded men had at least twice e chance of survival of their predecessors. This is tributable partly to the new methods of immunisation d treatment, and also partly to the high standard of rward surgery, performed by the teams led by young it experienced surgeons who removed devitalised and maged tissue before infection was established and who d their reparative work within a short time of wound-g. None of these measures would have been effective d there not also been a prompt and efficient service aking blood-transfusion available in even the most rward areas. Relatively few died of oligæmic shock, d with this hazard largely controlled there was oppor-nity for the surgeons to do their work and for chemo-erapy to do much to banish the grisly spectre of sepsis.

But even so, and because of the wounded man's reater chance of immediate survival, other dangers nd new knowledge came to light. It was appreciated at so-called neurogenic shock was not a trivial matter, nd that a severely wounded man who had been sanguinated to the point of oligæmic shock or had ffered extensive tissue damage, more especially by ushing, ran a grave risk of remote renal failure.

BLOOD-TRANSFUSION

Under war conditions it was to be expected that great dvances would be made in blood-transfusion. And n fact the civilian and Service blood-bank organisations ere developed so that stored blood and blood substitutes ere freely available in almost any place and in any country, whatever the climate. These facilities have been projected into the regional centres of our coming National Health Service.

Fractionation of Blood

Much progress was made in the perfection of blood substitutes, particularly in the dehydration of human plasma, and the general use of this material should now reduce the mortality from simple hæmorrhage arising from accident or childbirth. But the shape of things to come was notably forecast by the brilliant work of Cohn and his team (1944) on the fractionation of blood. One foresees in the future the deliberate transfusion of a stable selected fraction of blood appropriate to each patient, rather than the mixed bag which whole blood supplies, and which with ordinary methods of preservation may be deficient in the more ephemeral elements. Much has yet to be done to ensure the survival of cellular elements, of which, so far, only the red cells can be preserved for a reasonable time. Much benefit will accrue from the by-products of fractionation work, including the various types of fibrin in the form of film, foam, and plastics. These provide a most physiological method for controlling local hæmorrhage under hitherto difficult conditions.

Rhesus Factors

The wide practice of transfusion, of massive transfusion, and of multiple transfusions has led to a fuller understanding of the virtues and limitations of this form of therapy, and at the same time has revealed unsuspected hazards. By good fortune or otherwise it was discovered early in the war that the high reaction-rate to multiple transfusions and transfusions to pregnant women was due to the immunising potentialities of corpuscular factors. Simultaneously it was appreciated that these so-called rhesus factors were inherited, and that complications might arise under certain conditions of mating which gave a logical explanation of icterus gravis neonatorum and other familial hæmolytic manifestations in the newborn. With the pathology understood, a rational line of treatment for these highly fatal conditions has naturally been developed, which has proved of value in reducing mortality, but not, unfortunately, in influencing the incidence of morbidity in the form of kernicterus.

Intensive study of the rhesus factors has revealed their complexity, the wheels within wheels. Beginning with two factors, rapidly passing to four and then to eight, there still appear to be even more variations within the eight main groups; so that comprehension of the finer technicalities is almost confined to geneticists and specialists.

It appears that the red corpuscle is extremely individual. The more it is studied, the more factors are revealed; and, since all are inherited, the blood of an individual may eventually be found to be as characteristic as his fingerprints. How many new factors will have immunising properties remain to be determined, but no-one nowadays can give multiple transfusions, or can transfuse a woman, with the same simple tests for compatibility which were regarded as a sufficient safeguard before the war.

Much indeed has been learnt about hæmolysins, revealed or latent, complete or incomplete. With the more delicate new tests the pathology of certain obscure anæmias has become more clear, whilst the recognition of "inapparent hæmolysis" has explained the ineffectiveness of transfusion in some blood dyscrasias. With red-cell concentrates the transfusion of anæmic patients whose cardiac musculature is weakened has become a less anxious procedure.

ANÆMIA

In the field of anæmias no really spectacular advance in treatment has been made since Minot's discovery of the virtues of liver in 1926. Throughout the intervening twenty years much study has failed to reveal the exact nature of the liver principle—or principles, for they appear to be many. Crude extracts and proteolysed liver are still acknowledged as containing something which the purified extracts have not. More recently the discovery of the hæmatinic and other actions of folic acid has forged another link in the baffling mystery of blood-production and has opened up a promising field for research and investigation.

NUCLEAR PHYSICS

We live in an epoch-making age, the atomic age, at the crossroads of civilisation. Atomic energy, or nuclear physics, exploited for destructive purposes with incredible rapidity under the stimulus of war, promises immense potentialities for the advancement of medicine—what Chadwick (1947) has called a "safe" development of atomic energy, because the materials which we require can be produced in an apparatus incapable of being used for destructive purposes. With quite small apparatus the transmutation of elements is a commonplace; and radioactive isotopes of almost any element can be obtained. These isotopes, used as so-called "tracers," offer a field for the study of body processes, body metabolism, and organ function, which will take many years to exhaust.

Radioactive Iron.—For example, Fe_{59} and Fe_{55} are used by the body in exactly the same way as ordinary Fe_{56}, but because of their radioactivity their whole course through the body, and their fate, can be traced with measuring instruments. Radioactive iron has been used to determine blood volume in surgical shock, the relative survival in the blood-stream of fresh and stored blood, and the preference of the blood-forming tissues for iron derived from hæmolysed cells to that supplied from without, even when given in large quantities.

Radioactive sodium chloride has been used to determine the rate of distribution by the blood-stream and to measure the lymph volume of particular organs.

Radioactive carbon, nitrogen, and phosphorus have a tremendous application in the study of body metabolism. With radioactive phosphorus, for example, much has already been learnt about the metabolism of the different nucleotides in normal and in tumour cells and the effect of irradiation thereon, the formation of phosphatides in the liver, and the origin of milk phosphorus.

Even preliminary work has shown to what an astounding extent the chemical substances in all tissues are replaced during the life span. It is thought that within the space of ten years every molecule present in the living body of man will have been replaced by a new molecule synthesised within the framework of the living cells. Some radioactive isotopes have been used therapeutically—for example, radioactive phosphorus in the treatment of polycythæmia vera, leukæmia, and certain cancers. Of these only the first has shown any great promise.

Radioactive Iodine.—Certain elements are selectively absorbed by different tissues—for example, calcium and strontium by bone, and iodine by the thyroid gland. Radioactive iodine reaches the thyroid gland within a short time of ingestion; it then gives off rays which generate high-speed electrons, and these affect the neighbouring tissues within a few millimetres—an effect which is ultimately the same as that produced by X rays. But the advantages are that the irradiation is internal and does not therefore affect the overlying skin, whilst the irradiation itself is evenly distributed throughout the whole gland. Theoretically, therefore, radioactive iodine should produce better results than X rays, and this is borne out by clinical reports.

Radioactive cobalt is an excellent substitute for radium, in that it has a steady output of gamma radiation which provides a source of radiation with an intensity five times greater than most of the beam units now available.

RADIOTHERAPY AND CHEMICAL REACTION

Irradiation therapy has long provided the only
tive to surgery, with which it may be combined,
treatment of malignant disease. With new m
providing new and more powerful beams whi
relatively little damage to superficial or overlying
the scope and effectiveness of ray therapy bid
advance, perhaps even to achieve the successes
radiotherapy has accomplished in malignant
of the skin and mucous membranes. Neverthele
as well to appreciate what radiotherapy actually
for therein probably lies the hope of controlling m
disease in the future.

Rays bring about profound biochemical alterati
a cell, particularly the nucleus. Among other t
the synthesis of thymonucleic acid and ribonuclei
is inhibited (Mitchell 1943), and these substance
important constituents of chromosomes in the meta
Inhibition may pass to inanition and so to death. Ir
tion is therefore no more than a crude method of br
about a delicate chemical reaction. Simple ch
changes should be capable of more subtle contro
far, chemotherapy has had its greatest triump
bacterial and protozoal diseases, where, thoug
mode of action of the various agents is differe
drugs interfere to some extent with the metaboli
reproductive power of the living organism.

The same principles should be capable of appli
to the fixed cells of the body even to the extent of
ling order into the disordered growth of cancer
A pointer has been given by the remarkable control
stilbœstrol, a simple sex hormone capable of syn
can exert in the case of prostatic cancer.

NITROGEN MUSTARDS

No-one would have even dreamed that whe
inventiveness of our chemists, stirred by the destr
competition of war, devised mustard-gas, one o
most devastating methods for causing disablemen
death, a new chapter was being opened in the hist
malignant disease. In the 1914–18 war the or
conception of mustard-gas was that hydrochloric
was liberated and so produced the well-known ve
action. Other effects were also noticed, such a
action on the hæmopoietic system, the gastro-inte
tract, and electrolyte balance. Work on musta
was revived with the onset of the second world
Many new and potent chemicals were made. In
was attracted to the cytotoxic effects of both nit
and sulphur mustards, and it was soon apparent
proliferating cells were more susceptible than
cells. This naturally suggested therapeutic possib
for these compounds.

The sulphur mustards, because of their intense che
reactivity and undesirable side-effects, cannot be
clinically. On the other hand, with the nitrogen
tards a whole series of compounds with differing react
can be obtained by varying the grouping attache
the third valence of the nitrogen atom, thus openin
pharmacological possibilities comparable to the ran
sulphonamide variants available for bacterial dise
Threshold doses of nitrogen mustard appear to ha
specific effect on cell nuclei, especially dividing
in a manner comparable to the effect of irradia
Minimal effective doses inhibit mitosis; thoug
mitosis has begun at the time of exposure, the proc
completed normally. Large doses cause nuclear
mentation and chaotic chromatin dispersal. Del
toxic effects occur mainly in the blood-forming org
and lead to lymphopenia, leucopenia, thromboc
penia, and eventually a depression of erythropo
Favourable effects have been obtained in polycythæ
vera and in Hodgkin's disease (Jacobson et al. 1
In the latter, symptoms have been quickly allevia

ilst enlargement of the lymph-glands, spleen, and liver s rapidly declined. Clinical remissions have varied duration from one to eighteen months. The leukæmias d lymphosarcoma do not appear to respond.

So far the nitrogen mustards, like irradiation, have led to cure Hodgkin's disease. But the hint of neficial action is of tremendous import, for literally ndreds of variants await synthesis and evaluation, and may well be that the success which has previously tended the evolution of chemotherapy by chemical teration of a parent compound may also be seen with e β-chloro-ethyl amines.

THE WAY AHEAD

Thus, though progess in the past quinquennium has en outstanding for the breadth of the advancing front, e appear, as always, to be on the threshold of remarkle developments. When one problem is solved or omises to be so, more and more confront us. New fficulties arise as the face of medicine changes and with e changing aspects and manifestations of disease. hy is it, for example, that gastric and duodenal ulceran have so greatly increased; why is it that leukæmia now five times more common than hitherto (Sacks and eman 1947), and likewise many forms of cancer? is not all a matter of improved diagnosis. What is the lation of these patent facts to our increased civilisation, r habits, and our mode of life? It may be that my ccessor in this lectureship, in five years' time, will ve the answer to some of these questions and will mplete the story of the evolution of some of the promisg work upon which I have touched today. *Sic itur astra*—thus do we reach the stars.

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NITROGEN MUSTARDS IN HODGKIN'S DISEASE

REPORT ON 21 CASES AND 4 OF OTHER RETICULOSES

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The pharmacology of the nitrogenous vesicants, or itrogen mustards, has been summarised by Gilman and hilips (1946). Injected into animals in toxic doses hese compounds provoke an early transient rise in the lood-hæmoglobin content and the red-cell count, ollowed by rapid anæmia and leucopenia (Cameron 942). Loss of weight and diarrhœa occur, and at ecropsy scattered hæmorrhage in the gut is seen. xamination of the bone-marrow reveals that the white ells are more depleted than the red. The leucotoxic ction is mainly on the polymorphs and their precursors; he lymphocyte series is affected, but to a lesser extent Cameron and Rydon 1942).

In many respects the effects produced in animals by hese drugs are similar to those caused by X rays, and t was therefore suggested that the nitrogen mustards night prove useful in the treatment of malignant lisease. Gilman and his associates were the first to use hese compounds clinically. They gave tris β-chloroethyl amine hydrochloride ("tris" form) intravenously o patients with advanced malignant disease. Their esults, together with those of other groups of workers using this compound or methyl-bis β-chloro-ethyl amine hydrochloride ("bis" form), have been summarised by Goodman et al. (1946) and Rhoads (1946). Jacobson et al. (1946) investigated the effect of the bis form on neoplastic diseases of the hæmopoietic system. All these workers found that definite beneficial effects were obtained in Hodgkin's disease, and that some cases of lymphosarcoma, giant follicle lymphoma, and polycythæmia rubra improved. Damage to hæmopoietic tissue did occur, but was for the most part temporary.

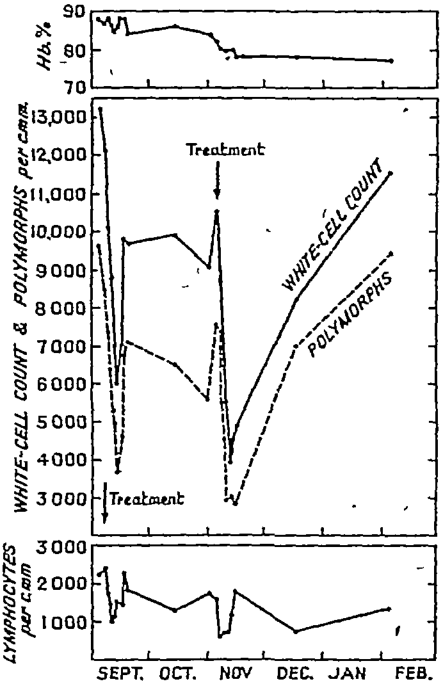

Fig. 1—Typical blood-count responses to two courses of treatment with bis form of nitrogen mustard in Hodgkin's disease.

After the American reports had been received we used the nitrogen mustards in 25 patients: 21 of them had Hodgkin's disease in an advanced stage, some recurrent after radiotherapy; and 4 had other reticuloses. The diagnosis in all cases was confirmed by biopsy.

METHOD OF ADMINISTRATION

Because local thrombosis was said to follow more commonly after injection of the tris form of the drug, we gave at first the bis form. The drug was dissolved in 10–20 c.cm. of saline and injected intravenously. The usual dose in the first course of treatment was 0·4 mg./kg. of body-weight. The first patients treated were given an injection of 0·1 mg./kg. of body-weight on four consecutive days; later we gave instead two injections each of 0·2 mg./kg. at 24-hour intervals. This dosage routine was used for both forms of nitrogen mustard, and with the latter technique the period of vomiting was shorter. A few patients were treated by intravenous drip, each dose being dissolved in 500 c.cm. saline, but the method showed no advantage over direct injection in obviating local thrombosis. Courses were repeated after an interval of 6–8 weeks, at a larger dose of 0·3 mg./kg. on each day. Two patients received four daily injections of 0·2 mg./kg., but this dose led to a severe leucopenia and has not been repeated.

TOXIC EFFECTS

Nausea and vomiting occurred at some period in all cases except one. It began during or shortly after injection, varied in severity, and lasted 24–48 hours, continuing longer after the tris than after the bis form. Thrombosis at the site of injection occurred in 6 patients, 2 of whom were receiving the tris form.

The most important toxic effect was leucopenia, most cases showing this within 3–21 days of treatment. In most cases the white-cell count fell to 1500–5200 p c.mm. Neutrophils particularly were reduced. Lymp

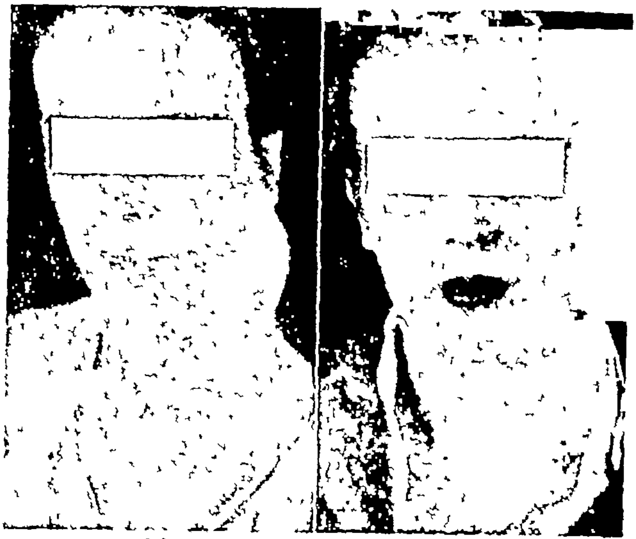
(a) (b)

Fig. 2—Enlarged cervical nodes in Hodgkin's disease: (a) before treatment; (b) 3 weeks after treatment with 22·4 mg. of bis form of nitrogen mustard.

cytes were less affected, and in a few cases increased in number. Exceptional cases included one with a white-cell count of 1300 per c.mm. before treatment; after treatment this was increased. In 5 patients there was a serious diminution in white cells; 2 of them, mentioned above, received double the usual dose of the bis compound, and their white-cell count fell to below 1000 per c.mm. and took about a fortnight to return to normal. The other 3 had the usual dose of the tris form, and in them the very severe leucopenia was accompanied by anæmia, thrombocytopenia, stomatitis, and petechial hæmorrhages. The hæmoglobin fell in one case to 30%, white cells to 200 per c.mm., and platelets to 14,000 per c.mm. The number of platelets fell in all cases treated with the tris form. The bis form did not affect the platelet-count appreciably with the doses used. All patients received iron, and in most cases the hæmoglobin was not diminished by more than 5%. A typical blood response is shown in fig. 1.

RESULTS

The period of observation varied from three to eight months. There was a striking improvement in the patient's general condition, the temperature usually became normal within 24 hours, lassitude disappeared, and weight was gradually gained. Greatly enlarged cervical nodes were reduced in size within a few The response in one patient is seen in fig. 2. radiograms of mediastinal nodes showed a diminution. Fig. 3 shows the effect produced in case a fortnight after the first course of treat a second course led to further improvement in patient. An enlarged spleen was present in 4 pati and in all it became impalpable after treatment.

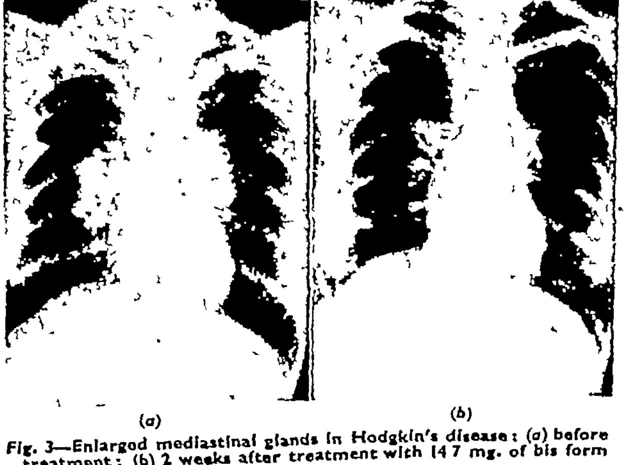
(a) (b)

Fig. 3—Enlarged mediastinal glands in Hodgkin's disease: (a) before treatment; (b) 2 weeks after treatment with 14·7 mg. of bis form of nitrogen mustard.

Even the most advanced cases showed some be One patient, who had X-ray treatment seven years viously, on admission showed emaciation, pyrexia, cerebrospinal symptoms. After three courses of the form the neurological condition improved, the fever appeared, and she gained $3^1/_2$ st. in weight. In ano patient jaundice cleared temporarily. When he d lymphadenomatous mass was found in the pancreas

All the 21 patients improved after the first course, b many of them required further treatment for recurre of symptoms. Of the 13 patients who had two cours 12 showed improvement after the second course; an of the 4 who had three courses only 2 were improved It is possible, therefore, that the disease responds readi at first but then gradually becomes more resistant t the drug.

The results of treatment with the bis form are sum marised in the table. The 5 patients treated with th tris form have been under observation for three month only; so they are not included. The effect of the tri form on the manifestations of the disease was simila to that of the bis form.

RESULTS OF TREATMENT OF HODGKIN'S DISEASE WITH
FORM OF NITROGEN MUSTARD IN 16 PATIENTS

Sign or symptom	First course			Second course			Third course		
	Total	Imp.	Not imp.	Total	Imp.	Not imp.	Total	Imp.	Not imp
Enlarged nodes ..	14	12	2	10	7	3	3	1	1
General debility ..	11	10	1	4	3	1	2	2	0
Weight-loss ..	11	11	0	4	4	0	..	..	..
Fever	10	7	3	6	5	1	3	1	2
Enlarged spleen ..	4	4	0	2	2	0	1	1	0
Pain	2	1	1	3	1	2	1	0	1
Skin rash ..	1	1	0	1	0	1	1	0	1
Jaundice	..	..	..	1	1	0	..	..	..
Totals ..	53	46	7	31	23	8	10	5	5

Comparison with Radiotherapy

Comparison of these results with those of deep X-ray therapy at the Holt Radium Institute is of interest The improvement in general condition, nodes, and othe signs was produced more quickly with nitrogen mustard than with X rays but was of shorter duration. In a random batch of 20 cases of generalised Hodgkin's disease undergoing radiotherapy, the mean period of remission after one course of therapy was 9·5 months, whereas most of the cases treated with nitrogen mustard required a second course in about two months; a few had an interval of four to six months between treatments. Vomiting is more likely and more severe after nitrogen mustard than after radiotherapy. There is no skin or mucosal reaction with intravenous nitrogen mustard, but local thrombosis at the injection site has been noted in a few cases. Leucopenia is certain and sometimes severe after nitrogen mustard, whereas after radiotherapy, it occurs only when extensive areas are treated and can be controlled by stopping treatment.

It seems worth while to explore the possibilities of combining radiotherapy with nitrogen-mustard therapy, and this investigation has been started.

Results of Treatment in Other Reticuloses

Four other patients were treated: these included two es of lymphosarcoma, one of which improved; one e of reticulum-celled sarcoma and one of mycosis goides did not show any improvement.

CONCLUSIONS

The nitrogen mustards are useful in the palliative eatment of extensive Hodgkin's disease, the manifestions of which are consistently diminished. The mptoms can still be alleviated by nitrogen mustard cases where radiotherapy has been abandoned.

Leucopenia seems to be the limiting factor, so far as sage is concerned.

The tris form of the drug has shown no better results han has the bis compound. Moreover, diminution of ucocytes and of platelets is more severe after the tris rm.

Radiotherapy is to be preferred as a first treatment Hodgkin's disease; for, though the improvement ith X rays is slower, it is maintained longer and the de-effects are less serious.

We are indebted to the chief superintendent, Chemical fence Experimental Station, Porton, for the supplies of trogen mustard used in this investigation.

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GLYCOSURIA IN RECRUITS

INCIDENCE AND CLASSIFICATION

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DURING the war several papers were published in merica on the incidence and significance of glycosuria recruits to the Armed Forces. Spellberg and Leff (1945), amining 32,644 recruits, found 37 cases of glycosuria, whom 9 (24·3%) had true diabetes mellitus. Blotner nd Hyde (1943a and b), analysing 367 cases of glycosuria iscovered during the examination of 45,650 men, onfirmed diabetes mellitus in 208 (56·6%). Wolman 1946), examining 77,293 men, found 324 cases of elituria, in whom diabetes mellitus was confirmed in 1 (6·5%). The wide variation in these figures is explained part by the fact that many cases of glycosuria had lready been rejected before reaching Spellberg and eff's and Wolman's induction stations, and by the ifference in age-groups. Spellberg and Leff were dealing lmost entirely with men aged 18–35, whereas Blotner nd Hyde included age-groups up to 45 years, and it is ell known that the incidence of diabetes mellitus rises teeply with age. Further, Spellberg and Leff's cases ncluded a relatively high proportion of negroes, in whom iabetes mellitus is less common.

This work led us to survey the cases of glycosuria iscovered by a single urine test at the British medical oards and referred by them to various laboratory entres in London for further investigation. Between 939 and 1944 there were 956 such cases referred, lycosuria *being* confirmed in 782. We have *no idea* of he total number of Service personnel examined, or whether all cases of glycosuria were referred, and so these figures throw no light on the problem of percentage incidence of glycosuria in this sample of the population between the ages of 18 and 45, which are also the ages for life assurance. Nor do we know the sex-distribution, though undoubtedly many more men than women were examined, and of the 956 cases referred for glycosuria only 6 were women. We are concerned here only with the significance and classification of these glycosurias. The numbers are sufficiently large to make the conclusions of the investigation of interest and importance, as it shows that 80% of these glycosurias were non-diabetic. In 8% in our series a single blood-sugar curve gave a doubtful result, and these curves should have been repeated for a conclusive result. But this repetition was often impossible in the circumstances, and a clear answer has to be given at once to the war question: "Is this glycosuria negligible and innocent, or actually or potentially diabetic?"

TABLE I—MINOR VARIANTS OF SUGAR LEVELS IN RECRUIT AGED 32

Test and date	Fasting		½ hr.	1 hr.	1½ hr.	2 hr.
July 8, 1940 Venous-blood sugar (mg./100 ml.)	90	Glucose 50 g. administered	160	130	140	130
Urine sugar (%)	0·3		..	2·2	..	0·2
July 17, 1940 Venous-blood sugar (mg./100 ml.)	109		145	75	85	65
Urine sugar (%)	0·1		..	0·5	..	0

TABLE II—MINOR VARIANTS OF SUGAR LEVELS IN RECRUIT AGED 38

Test and date	Fasting		½ hr.	1 hr.	1½ hr.	2 hr.
Nov. 26, 1943 Capillary-blood sugar (mg./100 ml.)	104	Glucose 50 g. administered	173	154	144	122
Urine sugar (%)	0		Trace	1	..	Trace

All the 956 cases referred for glycosuria had urine tests and blood-sugar estimations done, and all but 58 were submitted to a full sugar-tolerance test. The technique used in these examinations varied slightly in the seven different centres. The blood-sugar was estimated on capillary blood in 352 cases, and on venous blood in 535 cases: by the method of Folin and Wu in 632 cases and by MacLean's method in 255 cases. In the remainder the technique used cannot be ascertained. Glucose 50 g. was given for the test in all cases.

DEFINITIONS

Before attempting a classification of this sort it is necessary to define what is meant by the normal and various types of abnormal blood-sugar curves. On this matter there is no absolute consensus of opinion among different workers in different countries, but the standards differ so little that most workers would agree from the results of a single blood-sugar curve whether a patient was diabetic or not. On the other hand, it may be extremely difficult to pronounce him normal, and it is sometimes essential to carry out repeated tests under controlled conditions before coming to a diagnosis.

We therefore had to establish certain definite but somewhat arbitrary figures for this classification. They are standards commonly used in England and at least demonstrate the situation clearly. The classification is based on three concepts:

(1) The normal blood-sugar curve has a fasting level below 120 mg./100 ml., does not rise above 180 mg./100 ml. after the ingestion of glucose, and returns to a normal fasting lev within two hours. During this time there is no sugar in t urine.

Holder of research grant from Messrs. Boots Pure Drug Company.

(2) The normal renal threshold for sugar is 180 mg./100 ml.

(3) After the ingestion of glucose the blood-sugar level in venous blood is 10–50 mg./100 ml. lower than in capillary blood as a result of absorption by the tissues. All figures given in defining these groups are for capillary blood; where venous blood has been used the critical limits have been reduced by 10 mg./100 ml.

CLASSIFICATION

The 782 cases of glycosuria were then divided into four groups arising out of the above definitions.

	No. of cases
(1) *Diabetes Mellitus.*—These show a fasting value which may be normal or raised, a post-glucose rise above 180 mg./100 ml., and a failure to return to 120 mg./100 ml. or lower within two hours	141 (*18%*)
(2) *Renal Glycosuria.*—The blood-sugar curve is normal, but the urine contains sugar, proving a low renal threshold for sugar ..	510 (*65%*)
(3) *Oxyhyperglycæmia or Lag-storage Curve.*—These curves show a normal fasting level, a rapid post-glucose rise above 180 mg./100 ml., but a return to normal fasting value within two hours	108 (*13·8%*)
(4) *Unclassified.*—(*a*) Minor variants: these show either a fasting or a two-hour figure between 120 and 130 mg./100 ml., being normal in other respects	37 (*4·7%*)
(*b*) Major variants: these curves present peculiarities outside the previous three groups	24 (*3·1%*)
	820

The total of 820 is due to the fact that 38 cases (1 diabetic, 20 oxyhyperglycæmic, and 17 slight variants) showed a low renal threshold besides their other abnormality.

As said before, the exact figures adopted for the delimitation of these categories are somewhat arbitrary; but, though some will disagree with them, they gain support from the literature.

Joslin and others (1941), using venous blood, say a normal fasting level should be between 70 and 120 mg./100 ml.; a fasting level between 110 and 130 mg./100 ml. should be regarded as suspicious; and a fasting level above 130 mg./100 ml. "as sufficiently abnormal to warrant a diagnosis of diabetes mellitus"; that the postprandial rise should not be above 170 mg./100 ml., and that it is important that the level should return to normal within two hours.

John (1944), on the other hand, accepts a return to 120 mg./100 ml. or lower in two and a half hours as sufficient to exclude diabetes mellitus.

Blotner (1946) records the results of 479 sugar-tolerance curves in 1383 cases of glycosuria in Service personnel, and classifies 52% as diabetic on criteria which are not entirely clear to us. He appears to define a normal curve as having a fasting blood-sugar level below 130 mg./100 ml. and a peak below 165 mg. in $^1/_2$–1 hour. If the peak is about 165 mg. the patient is potentially diabetic, and if above 170 mg. actually diabetic. In his analysis he seems to pay little attention to the fall of the curve and does not define what the two-hour figure should normally be.

Wolman's (1946) criteria are more precise, and his definition of the normal blood-sugar curve agrees with ours.

Joslin and others (1941) sum up the situation by saying: "Some depend most on the height of curve obtained, others on the length of it, and still others on both. The last attitude is undoubtedly the safest, but even then we regard formal sugar-tolerance tests as often unsatisfactory."

(1) *Diabetes mellitus* was demonstrated in 141 (18%) of the 782 cases. A few of these were declared diabetics on whom the test was carried out for confirmation. The rest were found on routine examination, and most had no inkling of their condition. It would have been interesting to establish the age-distribution of the diabetic cases, but unfortunately this was not noted in 47% of the cases. Of the other half, 54 were over thirty years of age and 20 under thirty, again demonstrating the rapid increase in the incidence of diabetes advancing years.

(2) *Renal glycosurias* present no difficulty and easily recognised by a full blood-sugar curve, accompanying urine tests, or by a single blood- estimation, with urine samples taken immediately and after this test. Some Americans recognise glycosuria only when sugar is passed in the fasting but this seems to us a curious attitude, because with a renal threshold of, say, 130 mg./100 ml. h sugar-free urine when fasting but develop glyco after the ingestion of glucose, though their blood level never rises to the normal average threshol 180 mg./100 ml. Of our 510 patients with renal glyco 203 passed sugar when fasting, 283 only after the inge of glucose, and in 24 this question was not determ Moreover, the renal threshold is not always the sam the rise and fall of the curve, and one commonly that sugar is passed at lower blood-sugar levels d the descent of the curve.

(3) *Oxyhyperglycæmia*, or lag-storage, curves repr the rapid absorption of glucose from the small inte and are the type of curve often seen after ga enterostomy (Lawrence 1936). It is not recognis an entity by the American authorities; but, thoug blood-sugar concentration at $\frac{1}{2}$–1 hour may be as as 250–300 mg./100 ml., the rapid return to no blood-sugar levels within two hours excludes dia mellitus.

(4) *Unclassified* cases present difficulties which n in some cases be cleared by repeated sugar-tole tests. We have subdivided the group into minor major variants, with a feeling that further investig would prove most of the minor variants to be no In most cases one would have liked more inform than was available about their previous diets, fa histories, and general physical condition. Sweeney (first demonstrated the effect of previous diet on tole of sugar; but other factors, such as sepsis, liver dis or thyrotoxicosis, may impair carbohydrate metab either temporarily or permanently. Occasional tech errors cannot be entirely eliminated. In some ca one can postulate as probable causes of the abnorm such things as pylorospasm and trickery; it is kn that some conscripts took adrenaline before their ex nation, to produce glycosuria and raised blood-s levels. In some cases it is impossible to give a dogm opinion on a single curve or, rarely, after repeated bl

TABLE III—MAJOR VARIANTS OF SUGAR LEVELS IN FO RECRUITS

Case	Test and date	Fasting		$^1/_2$ hr.	1 hr.	$1^1/_2$ hr.	2 hr.	$2^1/$
1	Sept. 24, 1943 Venous-blood sugar (mg./100 ml.) ..	105	Glucose 50 g. administered	222	210	163	128	
	Urine sugar (%) ..	0		0	Trace	0	0	
	„ acetone ..	Trace		0	0	0	0	
2	April 15, 1943 Capillary-blood sugar (mg./100 ml.) ..	115		115	115	121	188	1
	Urine sugar (%)	Trace		..	1·1	1·6	2·5	2
3	June 13, 1943 Blood sugar (mg./100 ml.) ..	228		250	188	128	122	1
	Urine sugar (%) ..	3		2·1	2·1	2·3	2·3	2
4	Nov. 10, 1939 Venous-blood sugar (mg./100 ml.) ..	210		185	105	105	..	..
	Urine sugar (%) ..	1·8		0·6	0	0	..	..

gar curves. It is hoped to consider these abnormal rves in more detail later when more information may available; meanwhile a few examples with possible planations are given. The importance of repeating d following up these abnormal curves cannot be overnphasised.

(a) *Minor Variants.*—Examples are given in tables I d II. In table I both tests demonstrate renal glycosuria; it, whereas the first curve does not return to normal two hours, the repeated curve, ten days later, is normal all respects.

In table II the patient shows renal glycosuria and ain a curve which does not quite return to normal in o hours. The abnormality is slight, but it was known at both parents of the patient had diabetes mellitus, d therefore the curve might in this case represent cipient diabetes. Certainly the sugar-tolerance test this patient should be repeated in 6–12 months.

(b) *Major Variants.*—Four examples are given in ble III. Case 1 shows a normal fasting blood-sugar vel, with a trace of acetone in the urine. After the gestion of glucose the blood-sugar level rises above e normal upper limit of 170 mg./100 ml. and only returns normal in two and a half hours. This type of curve commonly seen as a result of starvation, and the traces acetone in the urine when fasting support this diagnosis. he renal threshold is somewhat raised in this case. ase 2 shows renal glycosuria and delayed absorption sugar such as may result from pyloric obstruction or ne administration of ergotamine. Cases 3 and 4 suggest ickery, most probably by taking adrenaline. Case 4 as tested again next day, when a completely normal urve without glycosuria was found.

SOME OTHER RESULTS

One or two other points have been brought out by his investigation. When samples of venous blood have een used for the blood-sugar estimations, a surprisingly rge number of curves never rise above 120 mg./100 ml. here are only two such "flat curves" where capillary lood was used. Hypoglycæmic levels were seen with onsiderable frequency, but unfortunately we do not now whether these were associated with symptoms of ypoglycæmia or not; presumably they could not have een severe. Blood-sugar estimations on capillary blood howed levels below 70 mg./100 ml. in 9 cases, and on enous blood below 60 mg./100 ml. in 18 cases. Only our of these figures were fasting values, the remainder ccurring $1\frac{1}{2}$–$2\frac{1}{2}$ hours after glucose. One patient, in hom glycosuria was not confirmed, showed extremely ow levels throughout: his fasting blood-sugar level as 57 mg./100 ml.; after the administration of glucose 0 g. it was 61 mg./100 ml. at 45 min., 51 mg./100 ml. t 90 min., and 50 mg./100 ml. at 135 min.

Our incidence of diabetic glycosuria (18%) agrees losely enough with 24·3% of Spellberg and Leff (1945); Volman's (1946) 6·5% is somewhat lower, but all differ idely from 56·6% of Blotner and Hyde (1943b). We nd it difficult both to assess their standards and to gree with their classification. They classify cases as iabetic, or potentially so, if the blood-sugar level at $/_2$–1 hour after the glucose is 165–170 mg./100 ml. and if ugar is found in one or more samples of urine, and we an note no clear emphasis placed on the fall of the curve r on the two-hour figure. Thus it appears that they ould classify many cases as diabetic, either actual or otential, whom we would confidently regard as noniabetic. We have tried to apply their standards to our urves, whereby all our oxyhyperglycæmias and some enal glycosurias become "diabetic," raising the incidence f diabetes mellitus from 18% to 38%, and lowering the enal glycosurias from 65% to 59%, from which it will e seen that even then their percentage incidence of iabetes mellitus still far exceeds ours.

SUMMARY

In routine examination of recruits 782 cases of glycosuria were analysed and divided into four groups according to their blood-sugar curves. Except for 6 women, all the tests were made on men aged 18–45.

The interpretation of the curves often required some latitude and more clinical information than was available, but in classifying this type certain arbitrary limits had to be imposed. Thus, though not entirely satisfactory, it is hoped that this survey is of interest in revealing the relative frequency of the various forms of glycosuria, and particularly in showing that only 18% were diabetic, the remainder being almost entirely due to a low renal threshold.

Our thanks are due to Drs. J. D. Robertson, H. Scott Wilson, R. S. Ralph, D. Stark Murray, T. H. C. Benians, E. Irene Clark, and Martin S. Spink, who kindly placed their results at our disposal.

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LABORATORY DIAGNOSIS OF INTESTINAL AMŒBIASIS

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PATHOLOGISTS in this country when confronted with an occasional investigation, or medical officers arriving in the tropics for the first time, will find in the textbooks only brief accounts of the practical aspects of the laboratory diagnosis of intestinal amœbiasis. It is to supplement such accounts that this article is written.

Much of the information is compiled from notes left behind by Lieut.-Colonels B. G. Maegraith and G. T. L. Archer, R.A.M.C., former assistant directors of pathology, West Africa Command, and from personal experience at a military hospital laboratory, W.A.C., through which passed about 45,000 stools for examination in eighteen months.

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The most frequently observed stool of acute amœbic dysentery is composed of bloodstained semi-solid or liquid fæces in which are scattered small pieces of mucus and small blood-clots. The blood is often dark (occasionally chocolate-coloured) and the mucus tinged dirty brown, quite unlike the white mucus of bacillary dysentery. The reaction is usually acid to litmus, whereas that of bacillary dysentery is alkaline. The stools of amœbic dysentery are always foul-smelling.

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A loopful of warm physiological saline is placed on a warm slide, a loopful of the selected mucus added and emulsified, and a coverslip pressed down to get the preparation evenly spread on the slide. The best loops to use are made of thick iron wire about 1 mm. in diameter.

As a routine the whole area under the coverslip should be quickly scanned with the $^2/_3$ in. objective. It is important to cut down the light when searching for or examining amœbæ. Suspected parasites should then be examined with the $^1/_6$ in. objective. The identification of amœbæ with the low-power objective always presents some difficulty to the inexperienced, though the introduction of a special stain (see below) has rendered the task easier. Until the observer builds up his experience it will be as well if he conducts his initial examinations by examining every slide with the high-power objective. When an amœba is encountered he can then examine it under the low-power objective and assess its characteristics at this magnification. Only practice will render him proficient in performing the low-power search followed by the detailed high-power differentiation.

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Vegetative *E. histolytica* is generally 20–30 µ in diameter, which is also the average size of *E. coli* or a macrophage. *E. nana, I. buetschlii,* and *D. fragilis* are all about 10 µ in diameter and may cause confusion with *E. histolytica minuta,* the smaller variety of *E. histolytica,* which should be considered as pathogenic.

The pseudopodia of *E. histolytica* are finger-like projections which are pushed out "explosively." The whole body of the amœba (both ectoplasm and endoplasm) may flow into the pseudopodium, and it is this which gives the amœba its progression, which is ribbon-like and has been aptly described as like a "slug moving at express speed." This is quite distinct from the motility of *E. coli* and the macrophages. In both the latter the pseudopodia are very blunt and may constitute what looks like a bulging of a large segment of the limiting membrane, and the appearance may suggest itself as the slow movement of a bag of wriggling w Sometimes *E. histolytica* may, for the time bein non-progressive, possibly owing to cooling of the men or to its being caught up by fæcal debris. How if the observer waits he will probably see an expl protrusion of a finger-like pseudopodium in a which prevents confusion with *E. nana* and *I. büet* both of which have well-defined and rather bl pseudopodia which are only sluggishly extended. the other hand, *D. fragilis* does push out finge pseudopodia explosively. The following characteri however, differentiate it from *E. histolytica:*

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In *E. histolytica* the ectoplasm is structureless, co tutes from a quarter to a third of the total volume o amœba, and is very different from the finely gra endoplasm. This is also found in *E. nana, I. buets* and *D. fragilis,* but not in *E. coli,* where there is so ectoplasm that it is often difficult to distinguish bet the two components of the cytoplasm. The m phage may have a clear cytoplasm with a large nu but more often there is cytolysis with a ragged cytop surrounding pyknotic nuclei.

In contradistinction to all other amœbæ foun fæces, the nucleus of *E. histolytica* is invisible or is poorly seen in saline preparations, except when endoplasm is flowing into a pseudopodium. If obse the refractile appearance of the nucleus will be that fine thread-like nuclear membrane, studded with chromatin dots with a central single-dot karyos The nuclear membrane and chromatin dots of *E.* are coarse, and the karyosome is eccentric. *E.* has a fine nuclear membrane, very often broke segments, with a single or large karyosome, pl anywhere in the nucleus, sometimes against the nu membrane; *I. buetschlii* has a nuclear membrane chromatin granules, but the karyosome is large vesiculated, often giving the appearance of a "dil pupil"; *D. fragilis* has one or two nuclei with nuclear membranes, multiple chromatin dots inside nucleus but not in the external membrane, and l karyosomes consisting of clusters of granules. macrophage nucleus, unless degenerate, occupies al a quarter of the whole cell; it is not ring-like but s and densely packed with chromatin.

E. histolytica is the only amœba which ingests cells. Macrophages, however, often exhibit inge red cells but also invariably show bacteria, food parti and leucocytes. All amœbæ may show ingested bact and often starch, and *I. buetschlii* has the large c vacuole which indicates the presence of the glyco mass.

Rounded-off Amœbæ.—If the stool has become c or the patient has the clinical condition well na "walking diarrhœa," rounded-off forms may be pre in large numbers. Rounded-off amœbæ are degener with little or no activity, are irregular in shape or rou have sluggish pseudopodia, and are sometimes diffi to differentiate from macrophages. A rounded amœba may be coaxed into activity by heating a m loop (the one used in preparing the microscope specim and holding it to the under surface of the slide as it on the microscope stage. (Ideally a warm stage sho be used.) Often this device is successful, and an explos extrusion of a pseudopodium may give the clue to ar curves. It is hoped to consider these abnormal ves in more detail later when more information may available ; meanwhile a few examples with possible lanations are given. The importance of repeating d following up these abnormal curves cannot be over-phasised.

(a) *Minor Variants.*—Examples are given in tables I d II. In table I both tests demonstrate renal glycosuria ; t, whereas the first curve does not return to normal two hours, the repeated curve, ten days later, is normal all respects.

In table II the patient shows renal glycosuria and ain a curve which does not quite return to normal in o hours. The abnormality is slight, but it was known at both parents of the patient had diabetes mellitus, d therefore the curve might in this case represent ipient diabetes. Certainly the sugar-tolerance test this patient should be repeated in 6–12 months.

(b) *Major Variants.*—Four examples are given in ble III. Case 1 shows a normal fasting blood-sugar el, with a trace of acetone in the urine. After the gestion of glucose the blood-sugar level rises above e normal upper limit of 170 mg./100 ml. and only returns normal in two and a half hours. This type of curve commonly seen as a result of starvation, and the traces acetone in the urine when fasting support this diagnosis. e renal threshold is somewhat raised in this case. se 2 shows renal glycosuria and delayed absorption sugar such as may result from pyloric obstruction or e administration of ergotamine. Cases 3 and 4 suggest ckery, most probably by taking adrenaline. Case 4 s tested again next day, when a completely normal rve without glycosuria was found.

SOME OTHER RESULTS

One or two other points have been brought out by is investigation. When samples of venous blood have en used for the blood-sugar estimations, a surprisingly ge number of curves never rise above 120 mg./100 ml. ere are only two such " flat curves " where capillary ood was used. Hypoglycæmic levels were seen with nsiderable frequency, but unfortunately we do not ow whether these were associated with symptoms of poglycæmia or not ; presumably they could not have en severe. Blood-sugar estimations on capillary blood owed levels below 70 mg./100 ml. in 9 cases, and on nous blood below 60 mg./100 ml. in 18 cases. Only ur of these figures were fasting values, the remainder curring $1^1/_2$–$2^1/_2$ hours after glucose. One patient, in hom glycosuria was not confirmed, showed extremely w levels throughout : his fasting blood-sugar level as 57 mg./100 ml. ; after the administration of glucose g. it was 61 mg./100 ml. at 45 min., 51 mg./100 ml. 90 min., and 50 mg./100 ml. at 135 min.

Our incidence of diabetic glycosuria (18%) agrees osely enough with 24·3% of Spellberg and Leff (1945) ; olman's (1946) 6·5% is somewhat lower, but all differ idely from 56·6% of Blotner and Hyde (1943b). We nd it difficult both to assess their standards and to ree with their classification. They classify cases as abetic, or potentially so, if the blood-sugar level at r 1 hour after the glucose is 165–170 mg./100 ml. and if gar is found in one or more samples of urine, and we n note no clear emphasis placed on the fall of the curve on the two-hour figure. Thus it appears that they ould classify many cases as diabetic, either actual or otential, whom we would confidently regard as non-abetic. We have tried to apply their standards to our rves, whereby all our oxyhyperglycæmias and some nal glycosurias become " diabetic," raising the incidence diabetes mellitus from 18% to 38%, and lowering the nal glycosurias from 65% to 59%, from which it will e seen that even then their percentage incidence of iabetes mellitus still far exceeds ours.

SUMMARY

In routine examination of recruits 782 cases of glycosuria were analysed and divided into four groups according to their blood-sugar curves. Except for 6 women, all the tests were made on men aged 18–45.

The interpretation of the curves often required some latitude and more clinical information than was available, but in classifying this type certain arbitrary limits had to be imposed. Thus, though not entirely satisfactory, it is hoped that this survey is of interest in revealing the relative frequency of the various forms of glycosuria, and particularly in showing that only 18% were diabetic, the remainder being almost entirely due to a low renal threshold.

Our thanks are due to Drs. J. D. Robertson, H. Scott Wilson, R. S. Ralph, D. Stark Murray, T. H. C. Benians, E. Irene Clark, and Martin S. Spink, who kindly placed their results at our disposal.

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LABORATORY DIAGNOSIS OF INTESTINAL AMŒBIASIS

K. R. HILL
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entity of an *E. histolytica*. If this is unsuccessful, and active amœbæ have not been found in other examina ons of the same stool, these facts are reported as: Rounded-off amœbæ seen—identity unknown, please peat." "Presumptive *E. histolytica*" should never reported, for it is impossible to be exact about the entity of amœbæ in their rounded-off state. Such nœbæ disintegrate and die; they do *not* form cysts.

ADJUNCTS TO DIAGNOSIS

Aqueous Smears (Hakansson [1]).—An aqueous prepara on similar to the saline one is made. All vegetative rms of amœbæ are destroyed within 5–15 min., but e modes of destruction afford a good differentiation etween *E. histolytica* and *D. fragilis*. *D. fragilis* in queous smears has an explosive extrusion of its endo lasm within about 15 min., immediately followed by sealing at the point of extrusion by the ectoplasm, aving a faultless transparent sphere. *E. histolytica* nd *E. coli* rupture explosively, but there is never mplete emptying of the endoplasm; nor is there storation of the ectoplasmic shell. *E. nana* and *buetschlii, on the other hand, distend to a maximum,* hen they burst and crumble.

Wet Film Stain (Beemer [2]).—This consists of two lutions:

Solution A

Brilliant cresyl blue	0·2 g.
Sod. citrate	1·1 g.
Sod. chloride	0·55 g.
Hyd. perchlor. (sat. soln.)	0·1 c.cm.
Water	100 c.cm.

Solution B

Eosin	1 g.
Water	100 c.cm.

his stain has been used in my laboratory with success, pecially in the training of medical officers and labora ry technicians. A loopful of solution A and a loopful solution B are mixed on a slide, the selected piece of ucus is emulsified in the stain, and a coverslip is applied. ctive amœbæ take up the particles of cresyl blue, with he result that they are easily picked out as blue-green bjects under the low-power objective. Motility seems o be unimpaired by the stain, and amœbæ have been ound active under the coverslip seven hours after the reparation has been made and left on the bench in a Vest African laboratory.

Chronic Intestinal Amœbiasis

Under this heading are included cases of chronic mœbic dysentery and of the complications of amœbiasis, uch as liver abscess, convalescent cases, and carriers ho may be handlers of food.

NAKED-EYE EXAMINATION OF STOOL

More often than not the stool in these cases will be ormed and of normal appearance. However, super cial shreds of mucus and blood may be detected on lose examination. If the stool is loose it is often f the "pea-soup" variety or light chocolate-coloured. nvariably it has a *foul smell.*

MICROSCOPICAL EXAMINATION

The same procedure is used as for acute amœbic ysentery, with the addition of an iodine preparation nade with the following solution:

Iodine	1 g.
Pot. iodide	2 g.
Water	100 c.cm.

Often specimens from this type of case contain no lood and no mucus, and in such a case several examinations of different parts of the outside of the fæces are made. Time is better spent on multiple examinations of a specimen of fæces than on concentration methods for cysts. Further, in cases of suspected amœbic dysentery it is imperative to examine several specimens, and as a routine it is suggested that specimens be examined every second or third day for ten days. For convalescent cases, after a full course of treatment lasting 3–6 weeks, stools should be examined daily for the week before discharge, then once monthly for three months, and then once every six months as conditions indicate.

The Exudate.—The commonest findings are scanty red cells and a few leucocytes, but the appearances may vary from no exudate at all to those described under acute intestinal amœbiasis. The presence or absence of Charcot-Leyden crystals is not considered significant.

Cysts in Saline Preparations.—Cysts are very easily picked up with the $^2/_3$ in. objective. In general, cysts of *E. histolytica* are perfectly round but they vary in size, measuring anything from 5–20 μ in diameter. Cysts of *E. coli* are usually bigger, 10–30 μ in diameter and are round or oval, but sometimes one side alone is flattened. As a rule *E. nana* and *I. buetschlii* are irregular and smaller, with a diameter of 5–15 μ.

One characteristic feature of *E. histolytica* cysts in the unstained preparation is that the nuclei are nearly always invisible whereas those of *E. coli* and *I. buetschlii* are easily seen. The nuclear visibility of *E. nana* is poor. The cytoplasm of *E. histolytica* is clear and homogeneous, and that of *E. coli, E. nana,* and *I. buetschlii* coarsely granular, but *I. buetschlii* has a large highly refractile vacuole denoting the site of the glycogen mass.

About 90% of *E. histolytica* cysts show highly refractile chromidial bars which are usually broad and blunt. About 10% of *E. coli* exhibit chromidial bars, which are generally acicular. However, I have seen acicular chromidial bars in *E. histolytica* and blunt bars in *E. coli. E. nana* and *I. buetschlii* have no chromidial bars, but *E. nana* occasionally shows long filamentous rods.

Besides the above cysts there may be present in the saline preparation many cyst-like structures, such as *Blastocystis hominis,* of vegetable origin. Some forms of blastocystis will resemble protozoan cysts so closely that even the expert may be in doubt about their identity. Such cases are usually those in which the peripheral granules have been lost, or displaced into the centre, with the result that they resemble chromatoid bodies. Further, the presence of *Blastocystis hominis* in large numbers, even if recognised, increases the difficulties of the search for cysts of *E. histolytica,* particularly if these are scanty. Fortunately, with the use of the aqueous preparation, the blastocystis can be eliminated, as it rapidly distends, loses its refractability, and appears dull and dead compared with the glistening protozoan cysts.

Cystic forms of *D. fragilis* are never found, but the vegetative form in the resting phase in saline has a perfectly circular outline and may resemble a cyst of *E. histolytica.* However, such forms disintegrate very quickly in the fæces; hence, if the specimen is left 15–30 min., *D. fragilis* will have disappeared, leaving the true cysts behind if they are present.

Cysts of the ciliate *Balantidium coli* are very large, being about 50 μ in diameter, and textbook illustrations so faithfully reproduce the microscopical picture of such cysts and of the cysts and ova of other parasites, with their distinctive internal structures, that there should be no likelihood of confusion with cysts of *E. histolytica.*

Oil globules in the fæces—e.g., liquid paraffin—are easily identified by their multiplicity, their variable size, *their very high refractability,* and their failure to stain with aqueous iodine.

Cysts in Iodine Preparations.—The iodine preparation can be made directly from the fæces, as for the saline preparation, or iodine solution can be run under the coverslip of the saline preparation. This latter method is especially useful if a doubtful cyst is in the field of the microscope and its exact identity is to be established. This entails dexterity (which can be acquired) and luck, for the application of the iodine usually sets the field moving.

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[1] Hakansson, E. G. *Amer. J. trop. Med.* 1942, 22, 325.
[2] Beemer, A. M. A. Army Pathology Laboratory Service: Current Notes, 1945, no. 14, p. 3.

The nuclear characteristics are similar to those described for the respective vegetative forms but are more clearly outlined. *E. nana* and *I. buetschlii* very often show a large mass of chromatin which tends to obscure the whole nucleus. *E. histolytica* has 1–4 nuclei, *E. coli* 1–8, *E. nana* 1–4, and *I. buetschlii* 1 (sometimes 2), the exact number being ascertained by focusing up and down on the slide.

The cytoplasm of *E. histolytica* when stained with iodine is seen to be finely granular, whereas that of the three other cysts is coarsely granular (most marked in *E. coli*).

The iodine stain tends to bring out the glycogen mass, when present, in all four cysts, but it should be noted that a glycogen mass may not be present, and chromidial bars do not stain with iodine.

The glycogen mass of *E. histolytica* is always a faint brown indefinite patch tending to disappear as the cyst attains maturity—i.e., 4 nuclei. The glycogen mass in cysts of *E. coli* is large and deeply stained, tending to push the nucleus to the edge and so flatten it. It reaches its maximum at the 2-nuclei stage and has disappeared at the 4-nuclei stage. *E. nana* shows a small poorly stained glycogen mass at the 2-nuclei stage, but *I. buetschlii* always presents a large, clearly outlined, and almost black mass—hence its generic name.

The diagnosis of *E. histolytica* is often not easy and in general can only be made by carefully deliberating and summating all positive findings. For example, there is often great difficulty in differentiation between *E. coli* and *E. histolytica* up to the 4-nuclei stages:

(1) *Cysts with 1 nucleus and central karyosome:* though the karyosome of *E. coli* is said to be eccentric, it is obvious that, if the cyst is turned so that the karyosome is viewed in direct line with the centre of the nucleus, the karyosome will appear to take a central position and will resemble that of *E. histolytica*. Differentiation, however, would be made on the visibility of nuclear detail and the presence of chromidial bars in the saline preparation, and on the cytoplasmic granularity and nuclear membrane structure, as previously outlined in the iodine preparation. The glycogen mass at this stage is indeterminate.

(2) *Cysts with 2 nuclei*, showing very often a large glycogen mass pressing and flattening the nuclei to the sides, are characteristic of *E. coli*. If the glycogen mass is absent (as it may be), the diagnosis hinges on the other differential findings described above.

(3) *Cysts with 4 nuclei* sometimes show one, two, or three centrally placed karyosomes and the remainder eccentric. However, the presence of only one eccentrically placed karyosome is almost peculiar to *E. coli*. The karyosome of *E. histolytica* is always central and never eccentric; that of *E. coli* is eccentric but may appear to be central.

In the above description the cysts of *Giardia lamblia* have not been included; but, since iodine preparations always reproduce most faithfully the illustrations in textbooks, there should be no difficulty in identification.

ADJUNCTS TO DIAGNOSIS

Provocative Emetine.—The following procedure is very efficacious and should be more often used in ambulatory cases:

> The night before the examination, two to three hours after the last meal, the patient is given emetine hydrochloride gr. 1 intramuscularly. Next morning a saline purgative—e.g., mag. sulph. $^1/_2$ oz.—is administered, and the first, second, and third stools are examined for amœbæ.

As an alternative to emetine hydrochloride, emetin muth iodide (E.B.I.) gr. 3 may be given by mouth. drug is likely to cause vomiting, which, however, prevented by the giving of phenobarbitone gr. $^1/_2$ a before the administration of the E.B.I.

Sigmoidoscopy.—This procedure, though necess admission to hospital for two or three days, well the trouble expended. The following is a modifi of the procedure originally suggested by D'Anton

> The evening before the test, provocative emetine (or E.B.I. gr. 3) is given at 8 P.M. and is followed by sulph. $^1/_2$ oz. at 11–12 P.M. Next morning at 6 A.M. (o a half hours before sigmoidoscopy) a litre of warm p logical saline is given as an enema. This is returne another litre is given, a specimen from the last portion enema being retained on evacuation for examination. and enema specimen are examined by direct-smear pr tions. Sigmoidoscopy is then performed, suspicious of the mucosa are swabbed, and smears are made for examination from the swabs.

Summary

The laboratory diagnosis of acute amœbic dys is described.

In saline preparations the salient characteristi *E. histolytica* are progressive motility and ingesti red cells.

For the occasional difficult differentiation be *E. histolytica* and *D. fragilis* aqueous preparatio recommended, and for ease in identification an teaching purposes a method of wet staining is desc

Rounded-off forms of vegetative amœbæ cann identified with any exactitude. They should a be reported as: "Rounded-off amœbæ seen—id unknown—please repeat."

The diagnosis of chronic amœbic dysentery (incl carriers and convalescents) is made with saline iodine preparations for the identification of cysts.

Multiple examinations of several specimens several days are considered to give better results concentration methods.

As adjuncts to diagnosis the use of provocative em and sigmoidoscopy are described.

I wish to thank Dr. R. Mowbray for his advice in w this paper, and also Lieut.-Colonels Maegraith and A though the opinions here expressed are the author's own

INTRAPLEURAL HÆMORRHAGE FOLLOWING ARTIFICIAL-PNEUMOTHOR REFILLS

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In refilling an artificial pneumothorax the dangers which the operator has in mind are tho causing an air embolus or of puncturing the lung creating a spontaneous pneumothorax. Seldom, if does the possibility occur to him of causing se hæmorrhage by driving a needle into the chest yet to one unaccustomed to artificial pneumoth refills this must seem one of the likeliest accid It is the purpose of this paper to show that it is n uncommon as appears to be thought.

Alexander (1937) dismisses it by saying that artery may be punctured, and Kayne et al. (1 mention it as a possible complication, and state open thoracotomy may be necessary to check hæmorr so caused.

Incidence.—Not less than 5000 refills are carried yearly at this hospital, almost equally divided betw

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3. D'Antoni, J. S. *Amer. J. trop. Med.* 1942, 22, 319.

ANALYSIS OF 7 CASES OF INTRAPLEURAL HÆMORRHAGE AFTER ARTIFICIAL-PNEUMOTHORAX REFILLS

Sex	Pain		Temperature	Treatment	Result
	At refill	Later			
M	No	Later same day	2nd day 100·4°F	3rd day: asp. 50 oz. bl., w.o. 4th day: asp., w.o., followed by repeated asp., first 3 producing bl.st. fluid	A.P. lost through obliteration of pleural space
M	No	After 24 hr.	No rise	2nd day: asp. 14 oz. bl., w.o.	Pleural space remained dry; good A.P.
M	No	Later same day	No rise	1st day: asp. 12 oz. bl., w.o. 5th day: asp. 20 oz. bl.st. fluid, w.o. 7th day: asp. bl.st. fluid, w.o. 9th day: asp. bl.st. fluid, w.o.	A.P. maintained, but some obliteration of space at base; pleural space dry
M	Yes	None until 30 hr. later	No rise	1st day: asp. 70 oz. bl., w.o. 2nd day: asp. 14 oz. bl., w.o. 5th day: asp. 12 oz. bl.st. fluid, w.o. 8th day: asp. 9 oz. bl.st. fluid, w.o.	Pleural space remained dry; good A.P.
M	No	Ten minutes after refill, continued 24 hr.	3rd day 99°F	8th day: asp. 5 oz. bl., w.o.	Gradual obliteration of pleural space, but refills on discharge; pleural space dry
F	Yes	Continued 6 hr.	1st day 99·4°F 2nd day 100·2°F Mild pyrexia for 2 weeks	12th day: asp. 5 oz. bl., w.o.	Pleural space remained dry, but A.P. lost through obliteration of pleural space
M	Yes	Continued 12 hr.	Same evening 99°F	1st day: asp. 1 oz. bl., w.o.	Pleural space remained dry; good A.P.

w.o. = wash-out with saline; asp. = aspiration; bl.st. = bloodstained.

es and females. The technique is one commonly d, in which a Morland needle, diameter 2 mm., ected to an appropriate *pneumothorax* apparatus, hrust through an intercostal space near the upper gin of a rib, usually without previous anæsthetisan, save at the induction and the two succeeding ls. This method is practically painless in most es if a sharp needle is used.

During the past three years 6 cases of bleeding (5 in men, a woman) have been recognised at this hospital, an dence of 1 in 2500. In all the cases but one there s a free pleural space without adhesions; in one pleura was adherent to the mediastinum. Another e, in a male, was noted by one of us (A. K. M.) in about 0 refills in six years. A further case, also in a male, s admitted from a tuberculosis clinic, but no estimate sible of the incidence there; this case is not included the present series.

Diagnosis.—In making a diagnosis the presence of in during a refill has been helpful. In 3 cases the tient noted or recalled that the refill was definitely inful, one of these cases being the only one in which cal anæsthetic was used. In 2 of these cases the in diminished directly the needle was withdrawn, and 1 case disappeared immediately only to recur thirty rs later.

In all cases pain was experienced later the same day, ve in one case where it did not develop within thirty urs. The pain is similar to that experienced at the et of a pleural effusion—i.e., a dull ache, never very vere, and quite different from the pain experienced at ill. Malaise, such as is seen with the onset of a ural effusion, is usually absent, and this proved very pful in making a clinical diagnosis.

In 4 cases there was a rise of temperature before pirations were carried out. In 1 case this took place e same evening, but in the remaining cases it took ace some time during the next three days. In those ses that were aspirated immediately there was no rise f temperature, and it seems probable that this was revented by early aspiration. A brisk rise of temperaure usually followed the aspirations but soon settled.

Treatment.—In these cases treatment is important. n all our cases aspirations were carried out immediately e hæmothorax was diagnosed. When aspirations were performed, the pleural space was washed out with saline, and this was continued until the return fluid was clear. In some cases difficulty was experienced in carrying out the first aspiration owing to flakes of fibrin covering the end of the cannula when suction was applied. After the first aspiration the patient was screened daily, and if any fluid reappeared this was aspirated and, if blood was present, was washed out as described above. This may have to be done several times, as bleeding may continue.

In 3 cases the condition was recognised within twenty-four hours, in 1 case after forty-eight hours, and in another case after seventy-two hours. In the remaining 2 cases it was not discovered until the eighth and twelfth days, after pleural exploration.

The accompanying table shows that in 4 cases aspiration was necessary only once, whereas in the remaining 3 cases up to five aspirations with saline wash-outs were necessary before the pleural space was free from bloodstained fluid.

Results.—A follow-up of these cases shows that no artificial pneumothorax was lost in those cases that were aspirated within forty-eight hours. There was partial obliteration in 1 case, but the patient still had an adequate collapse on discharge eight months later.

Where the aspirations were delayed more than forty-eight hours, obliteration of the pleural space took place in all cases, in 2 of which the pneumothorax was lost completely. In the remaining case there were definite radiological appearances of an incipient obliterative process at the base, but a follow-up of this case showed that the collapse was still satisfactory and controlling the tuberculous lesion three months later.

Our most recent case with this complication illustrates the more common points.

A man, aged 42, had a refill at 10 A.M. The refill was definitely painful the whole time the needle was in the chest, but the pain was not bad enough to warrant the removal of the needle. After he had risen from the couch, the pain, though less, persisted.

He was seen at 12.30 P.M. still complaining of diffuse pain in the axilla round the site of the refill. As he still had pain at 6 P.M. he was screened, and a small effusion was seen in the costophrenic angle. The same night the temperature reached 99°F.

Next morning he was again screened, and the fluid was found to have increased slightly. The same day 1 oz. of blood was aspirated and the space washed out with saline. After this the pleural space remained dry and the patient had no further discomfort.

At thoracoscopy later a small thread-like artery was seen branching about the site of the refills, and a larger vein crossed this area. There seemed ample reason to suppose that a hæmorrhage might arise from puncture of one of these vessels.

DISCUSSION

The presence of the blood in the interpleural space is not likely to be due to the damage of an intercostal vessel, as the needle is purposely inserted near the upper margin of a rib, and in pleural hæmorrhage it is probably due to a vessel subpleurally placed. On many occasions there is bleeding from a small surface vessel after an artificial-pneumothorax needle has been withdrawn, and there is every reason to believe that the same might happen from a surface vessel on the parietal pleura, which is very much more vascular than the skin.

The signs and symptoms produced by this complication may be minimal and would probably only be noticed where the patient is under direct observation, as in a sanatorium. Even then they may be so slight that it might be considered a refill "reaction," and no further investigation might be carried out.

Pain on the insertion of the artificial-pneumothorax needle should arouse suspicion. Waterston (1934) states that puncture of an artery produces severe pain, which tends to radiate along the course of the artery; such pain is usually attributed to injury to the intercostal nerve. The importance of this syndrome lies in the fact that obliteration of the pneumothorax space usually follows, unless the blood is aspirated without delay. Indeed the injection of blood into the pleural space has been recommended as a method of securing symphysis of the pleural layers. We are of the opinion that, once there has been any intrapleural bleeding, fibrin is deposited on the pleural surface, with the resulting risk of losing the pneumothorax through an obliterative pleurisy.

SUMMARY

In 15,000 refills there were 6 cases of intrapleural hæmorrhage. A 7th case in 3600 refills was seen elsewhere.

Pain was present in all the cases.

In 4 cases the pleural space became obliterated.

To avoid obliteration of the space early aspirations and wash-outs are essential.

Bleeding may continue for several days.

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"... There are shortages of food, clothing, and housing.... But our standard of life does not consist in these things alone. Security of employment; higher average earnings, longer holidays, and holidays with pay; the schools, technical colleges, and universities fuller than ever before; a social insurance scheme coming into operation stage by stage; a State medical service available to all about to be set up, and a nation which the statistics show to be healthier than ever before—these are not the indications of a collapsed standard of living, although I agree they are not all things of which the middle classes are always able or always inclined to take full advantage. Our aim ... is to make the State educational system and the State medical service better than anything that can be obtained privately.... They must be made so good that the middle classes will use them in preference to private services for which they have to pay over again." —Sir HARTLEY SHAWCROSS, the Attorney-General, speaking at Croydon on June 20 (*Times*, June 21).

PENICILLIN IN SURGICAL TREATME
OF PASTEURELLA SINUSITIS

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HUMAN infection by *Pasteurella septica* is uncom
but among animals pasteurellosis is widespread, a
is therefore likely that in man the infection is dir
or indirectly derived from an animal source. Reg
(1938) states that *Past. septica* has been isolated
human saliva and sputum, and Kapel and Holm (
suggest that the organism may sometimes inhabit
human respiratory tract besides those of the ra
pig, cow, and cat. Topley and Wilson (1946) cite the
of an animal-house attendant who carried *Past. se*
in his nose for several months without showing
symptoms of illness. Proof of direct infection has
recorded in certain cases of infection following an
bites (Boisvert and Fousek 1941, Allott et al.
Cooper and Moore 1945).

CASE-RECORD

A farmer, aged 27, who had been in contact with do
animals all his life, was first seen by one of us (K. H.) i
spring of 1943, when he complained of frontal headach
right middle turbinectomy temporarily relieved his symp
On March 27, 1945, he returned because the frontal hea
had persisted and become more severe, being conti
and accompanied by a greenish purulent nasal discharg

There was tenderness over the right frontal sinus an
coming from the right frontonasal duct. Radiograph
closed a very large and very opaque right frontal
extending back over the orbit. Bacteriological examin
of the pus produced a culture of a small gram-neg
bacillus partially sensitive to penicillin.

On May 19, 1945, the patient was admitted to hos
A frontal-sinus catheter was passed and fixed in pos
and through it penicillin 2000 units was injected dail
ten days. There was no improvement, and a swab o
pus again yielded a pure culture of a small gram-neg
bacillus partially sensitive to penicillin.

On the 28th a course of intramuscular penicillin was b
100,000 units being given in each period of twenty-four h

On June 1, 1945, a right radical external fronto-ethm
operation was performed, disclosing a bilocular cavity.
anterior cavity into which the frontal-sinus catheter had
put did not show any pus, though the lining was very poly
The other loculus, with a tiny opening oozing pus, exte
back over the orbit, and the pus in it was under pres
The sphenoids were opened and ethmoids exenterated.
new wide frontonasal duct was skin-grafted. A small cat
was left in each loculus, the ends were brought out thr
the wound and sutured, and through them 5000 unit
penicillin was injected daily.

Bacteriological examination of a swab taken during
operation showed that the gram-negative bacillus was
present.

On June 6 the sutures were removed, and a swab taken
the wound was sterile. The catheters came out acciden
on the 9th, and local administration of penicillin ceased.
the 13th intramuscular penicillin was discontinued,
bacteriological examination of a nasal swab proved it st

On the 15th the patient was discharged feeling well,
a healed wound and no pain. When he was seen on the
his condition was satisfactory. During his stay in hos
there was no rise of temperature above normal, and
maximum pulse-rate was 80 per min. In January, 1947,
patient was well and without symptoms.

BACTERIOLOGICAL FINDINGS

Morphology.—On primary isolation the organism, labe
"A. W.," was a small coccoid gram-negative rod about
long, arranged singly and without definite bipolar stain
There were a few long thread-like forms present. This app
ance led to its being regarded as possibly belonging to
hæmophilus group, but its reaction to penicillin and

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ology cast some doubt on this assumption; so mice inoculated. The mice died in less than twenty-four and at necropsy their blood and spleens showed very umbers of organisms with the bipolar staining charac- o of *Past. septica.* Cultures from them gave rise to forms he same morphology as that noted on primary isolation. organisms were not acid-fast and no spores were seen. ty was absent when cultures grown at 37°C and 22°C ested.

ural and Other Characteristics.—Colonies after eighteen growth on blood-agar were shining, confluent, greyish- , and translucent. They were of creamy consistence asily emulsified. There was no hæmolysis and no ing of the blood-agar. Growth was enhanced by the on of blood or serum to the medium. On both, a good turbidity developed in twenty-four hours; it was much ed after a week's incubation and gave rise to a heavy deposit which was easily emulsified. There was a growth on MacConkey plates in twenty-four hours.

following sugars, of a large number tested, were ated (acid only): galactose, glucose, mannitol, sorbitol, ylose. Slight acidity occurred in arabinose. There was teration of litmus milk, and the methyl-red test was ive. Indole was produced. There was reduction of lene-blue.

organism was killed by heat in 5 min. at 56°C, but ed exposure to 0·5% phenol for 60 min. at room tem- ure. Its coefficient of resistance to penicillin, measured e broth method and with standard (Oxford) staphylo- s as control, was 128.

ology.—An agglutinating serum giving a titre of 1/640 repared by intravenous inoculation of a rabbit with d doses of an emulsion of the organism A.W. killed by g at 56°C for 30 min.

glutination tests were set up against four strains of *septica* obtained from the National Collection of Type res, one of each of Cornelius (1929) serological types included. Of these, no. 1737 (N.C.T.C.—C type III) gglutinated to a titre of 1/640, whereas nos. 948 (N.C.T.C. pe II) and 1875 (N.C.T.C.—C type IV) gave a titre of

sorption tests were carried out with emulsions of strains and 1737 (Cornelius type III) and the antiserum A.W. absorbed sera were used in agglutination tests against ons of A.W. and 1737, and gave the following results:

	Serum A.W.		
ganism	*Unabsorbed*	*Absorbed A.W.*	*Absorbed* 1737
A.W. ..	1/640	—	1/80
1737 ..	1/640	—	—

is evident from these tests that the strains A.W. and (Cornelius type III) are closely allied but not serologically ical, and that A.W. also bears some relation to Cornelius II and IV.

e patient's serum taken four weeks after his discharge hospital gave a negative agglutination reaction with the a A.W., a not unusual finding in these cases.

DISCUSSION

ere was no osteomyelitis of the bone surrounding infected sinuses, though Cooper and Moore (1945) tion that extension to bone is common in infected of dogs and cats. Adenitis was not demonstrated, recovery after adequate treatment was fairly rapid ad of slow and indolent. The patient's general ition was always good, and at no time during his in hospital had he a rise of temperature or pulse-

asal infection of man with *Past. septica* has previously recorded on only two occasions: once by Topley Wilson (1946), and once by Hadorn (1938), who rted a case of meningitis, in a farmer, developing t months after a fracture of the skull involving the t frontal sinus; this patient also recovered.

SUMMARY

case of frontal-sinus infection with *Pasteurella septica* ported.

he organism was sensitive to penicillin in high entration.

The condition responded to adequate surgical treatment combined with vigorous penicillin therapy.

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SURVIVAL OF A BABY WEIGHING 24 OZ. AT BIRTH

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RESIDENT OBSTETRIC OFFICER, ST. THOMAS'S HOSPITAL, LONDON

THE birth of a baby, at the twenty-seventh week of pregnancy, weighing only 1 lb. 8 oz., which survived, seems worth recording.

On Sept. 20, 1945, a woman aged 23, who had received no previous antenatal care, was admitted to the gynæcological ward of St. Thomas's Hospital with the diagnosis of inevitable abortion. She was then twenty-seven weeks pregnant, her period of amenorrhœa coinciding with the abdominal findings. She had six years previously given birth to a normal full-time infant, and had had one miscarriage at the tenth week of pregnancy five years before. There were no signs of toxæmia, the membranes had ruptured the previous day, and there was a mild pyelitis. She complained of rhythmical abdominal pains, and shortly after admission a female child, presenting by the vertex, was delivered normally. The third stage was completed without incident, and there appeared to be no placental abnormality. The puerperium was uneventful, and the patient was discharged on the fourteenth day after delivery.

At birth this minute infant was vigorous, and respirations soon became established after the air passages had been cleared with a mucus catheter. She was then transferred to the nursery of the obstetric ward, and her weight was found to be 1 lb. 8 oz.

During the first three days she was fed by pipette two-hourly on glucose water with one minim of brandy to one drachm, and took her feeds well. The size of the feeds was gradually increased, and on the third day the infant was taking $1^1/_2$ drachms of 1 in 8 expressed breast-milk with glucose (1 drachm to 10 oz.) two-hourly. The strength of the feeds was gradually increased until on the tenth day the baby was taking 3 drachms of 1 in 3 expressed breast-milk.

The infant was completely cot-nursed, with a radiant-heat cradle and continuous oxygen in an oxygen tent. She was only removed from her cot once a week, when she was weighed. At the end of the first week she had maintained her birth-weight, and at the end of the second week she had gained $^3/_4$ oz.

On the twenty-sixth day regular brandy with each feed was discontinued, and on the thirtieth day she took her first feed of 5 drachms of boiled breast-milk from a Belcroy feeder.

Thirty-two days after birth a small abscess had developed on her right thigh at the site of a previous injection of 1 c.cm. of lobeline hydrochloride which had been given after a severe cyanotic attack after a feed. This abscess was incised and penicillin ointment applied. Penicillin 5000 units was injected intramuscularly every three hours for five doses. The infant was then taking 5 drachms of boiled breast-milk to which brandy had again been added.

The incision wound healed without incident, and on the forty-second day—i.e., six weeks after delivery—the infant weighed 2 lb. 2 oz. She gained a further 2 oz. by the end of the following week, by which time her feeds had been increased to 6 drachms of boiled breast-milk three-hourly from the Belcroy feeder. She occasionally had a slight blue attack after a feed, but usually tolerated her feeds well.

association between characters—e.g., absence of the macula and aniridia, or harelip and cleft palate—may be due to a common genetic or environmental origin. To establish linkage, the repulsion phase as well as that of coupling between the two characters must be observed.

References to parallel conditions known to animal geneticists are scattered freely through the text, and should specially interest those to whom such work is not readily accessible. Readers can be grateful indeed to the author for assembling the massive published work, and for his conscientious summaries of papers. The result is emphatically not a textbook suitable for teaching human genetics but it is of immense value treated purely as a work of reference.

Penicillin Therapy

Including Streptomycin, Tyrothricin and other Antibiotic Agents. (2nd ed.) John A. Kolmer, m.s., m.d., f.a.c.p., professor of medicine, Temple University. New York and London: D. Appleton-Century. 1947. Pp. 339. 30*s.*

Our knowledge of the antibiotics and their applications in therapeutics has reached a level where any book devoted to them must be either a symposium or a compilation. Professor Kolmer has chosen the latter, and the result justifies his preference. He describes the pharmacology and bacteriology of antibiotics in some detail, but the greater part of the book deals with their use in clinical medicine; in a useful and interesting chapter he discusses their employment in veterinary practice. He gives standard methods for laboratory control and assay but covers commercial production in general terms only. His references are well chosen and he treats with judgment subjects which are still open to debate. Published work of alarming proportions is here reviewed in reasonable space, and the book gains wherever the author has drawn on his personal experience—for example, in the chapter on methods of administration. The chapters on antibiotics other than penicillin will be specially welcome to English readers, since no other reasonably complete account has yet appeared.

Thorpe's Dictionary of Applied Chemistry

(4th ed.) Vol. vii. *Iodazide—Metellagic Acid.* Editor: M. A. Whiteley, d.sc., f.r.i.c. London: Longmans, Green. 1946. Pp. 629. 80*s.*

New volumes of the fourth edition of Thorpe's Dictionary continue to appear despite present-day difficulties. This, the first to be under the care of the new editorial board, contains like its predecessors much valuable stuff. The articles on iodine, vitamin K, keratin, lactic acid, lipins, isoelectric point, and membrane equilibria are specially noteworthy, while those on lard, margarine, and meat-extract are most informative, and the little treatise on liqueurs irresistible. Though there is much "pure" chemistry in the work, medical and biological chemistry are treated as important parts of "applied" chemistry; hospitals and universities may not realise this fully and an extra word or two in the title might help them. Moreover, short up-to-date summaries of the biochemistry of some organic compounds, and even of metals, might well be added, for the benefit of the biochemist, to the existing articles—for example, to malic acid, malonic acid, and magnesium in this volume. Since biochemical concepts are changing rapidly, it is inevitable that some of the biochemistry given should already be out of date. Finally, a firm line might be taken by the editors over the difficult question of the notation for configuration and optical rotation of organic compounds.

Practical Physiological Chemistry (12th ed. London: J. & A. Churchill. 1947. Pp. 1323. 50*s.*).—Mr. Philip B. Hawk, ph.d., with his new collaborators Mr. Bernard L. Oser, ph.d., and Mr. William H. Summerson, ph.d., has completed the latest revision of this important textbook. Many of the chapters have been written afresh, and all have been corrected in the light of modern knowledge. New sections have been added on the polarograph, isotopes, sulphonamides and antibiotics, the Warburg tissue-slice procedure, photometric analysis, electrophoretic fractionation of the plasma proteins, and new vitamins, new quantitative methods for analysis of blood and urine, and several other subjects.

New Inventions

AIDS TO BONE SURGERY

Brace-handle Screwdriver

Screwing home several screws in a bone witl ordinary screwdriver can be tiring and may add app ably to the length of an operation. This can be mitig by amputating the hand-piece of a screwdriver fitting a brace to the end (fig. 1). The screw-holding used here is that made by the London Splint Co.

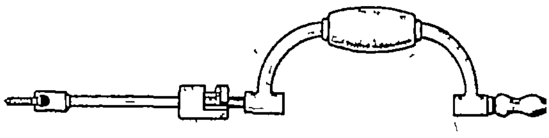

Fig. 1—Brace-handle screwdriver.

This brace-handle screwdriver has been used now nearly five years in a large series of bone-grafting plating operations. There are only two disadvanta First, if an ordinary Lowman clamp is used, it is diffi to insert the screws nearest the clamp, as the brac obstructed by its handle; an angled clamp overco this difficulty. Secondly, some screws may not fit screwdriver.

Apparatus for Estimating Screw Length

When a hole is being drilled in a bone for a screw wi power drill, it is helpful to know the moment when drill pierces the deep cortex. The apparatus illustr in fig. 2 does this in a simple manner.

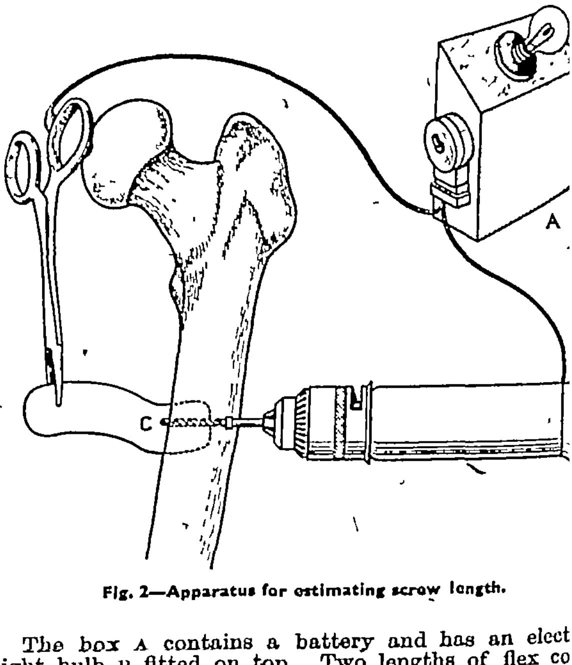

Fig. 2—Apparatus for estimating screw length.

The box A contains a battery and has an elect light bulb B fitted on top. Two lengths of flex co from the box; one is fitted to the drill handle, the ot to a retractor placed on the deep side of the bone. Wl contact is made between the drill point and the retrac at C, the bulb glows. A small rubber band, fitted o the drill before operation, is then moved down until i in contact with the cortex. The distance between t rubber band and the drill point is the length of scr required.

The screwdriver was made for me by Messrs. A. Hawkins & Co. Ltd., of New Cavendish Street, W and the screw estimator in the works department of t Royal Northern Hospital.

F. P. FitzGerald, m.b., f.r.c.s.i.
Surgeon to the Orthopædic Department,
Royal Northern Hospital, London.

Reviews of Books

Its Relation to Congenital Hemolytic Disease and Intragroup Transfusion Reactions

DITH L. POTTER, M.D., PH.D., assistant professor of thology, University of Chicago. Chicago: Year Book ublishers. London: H. K. Lewis. 1947. Pp. 344. 30*s.* 6*d.*

s not the least of the merits of this good little book it makes the nomenclature of the Rh and Hr subs quite clear. A general survey summarises the important aspects of the Rh factor, and a detailed n quotes published work. The survey, though 20 pages long, covers all the general reader needs to about Rh, without omitting any of the more licated aspects of the subject, such as the Rh oups, the place of Hr, and the rôle of blocking odies. The detailed section begins with a historical y of our knowledge of blood-groups and transfusion ions. The properties of Rh antigens and antibodies liscussed, and the schemes of Wiener and Fisher to in the inheritance and relation of the subgroups are set out with clear diagrams. Wiener's table of the bilities in cases of disputed parentage is reproduced. various schemes of nomenclature are compared, but ssor Potter rightly points out that for clinical cation it usually suffices to know whether a person's l is positive or negative when tested with the lard anti-D (anti-Rh$_0$) serum. Some intriguing es on racial incidence are given: the Basques have loubtful privilege of the highest proportion of Rh-tives (33·6%); in the Far East and Polynesia st 100% are Rh-positive; American whites are ly Rh$_1$ (CDe), American negroes Rh$_0$ (cDe), and nese Rh$_1$ Rh$_2$ (CDE); while chimpanzees' blood not react with Rh antigen at all. The way transn reactions are produced by Rh immunisation is oughly discussed, and it is noted that pregnancy uces immunisation much more effectively than mpatible transfusion. Potter does not consider that "biologic" test for anti-Rh agglutinins is justifiable that the blocking antibodies have been discovered; nond's slide technique is usually adequate. The olytic disease of infants is dealt with at length in ters detailing its ætiology, clinical forms, prevention, tment, and post-mortem findings. There is a final ter on technique and a bibliography of 794 references. book has many good illustrations, the style is easy readable, and it can be confidently recommended hose who want to know about Rh.

ical Emergencies

(3rd ed.) CHARLES NEWMAN, M.D. Camb., F.R.C.P. London: J. & A. Churchill. 1946. Pp. 117. 10*s.* 6*d.*

EDICAL emergencies are among the most dramatic lents in medical practice; for the general practitioner, ever, they are relatively rare. This little book gives what he needs—a brief account of the conditions what to do for them. All the commoner emergencies ch as poisoning, asphyxia, and coma—are covered, this new edition is on the whole well up to date, gh the rapid advance in our knowledge of penicillin already outstripped it in places: there is, for instance, reference to the use of penicillin in the treatment of nulocytosis, or of heparin in the treatment of mbophlebitis. The nikethamide group of drugs perhaps erve more mention than they receive, and a reference the rapid response of some resistant cases of asthma theophylline ethylenediamine would enhance the ue of the section on asthma. The statement that gestive failure is common in pneumonia" is surely eading. Taken as a whole, however, this is a book ch the practitioner will find it wise to keep by him.

entials of Neuro-Psychiatry

DAVID M. OLKON, S.B., A.M., M.D., associate professor of psychiatry, University of Illinois. London: H. Kimpton. 1945. Pp. 310. 22*s.* 6*d.*

N outspoken, prejudiced textbook like this is eshing, after the many tediously impersonal ations to conformity. Professor Olkon's prejudices y be recognised from his comment on psychodrama: ychiatry is suffering from so many isms, panaceas, dogmas, etc. that one more innovation does not actually do great harm"; and from the statement in his preface that "the many inconclusive doctrines, speculations as to mental operations, theoretical and rhetorical opinions as to mental modalities, and fanciful ideas as to how these arise," have been intentionally left out of his book. Changes in the capillary vessels of the skin have been studied by Dr. Olkon for many years; he devotes a long chapter to the description of his methods of observing these and the consequent findings, especially in schizophrenia. Though unconventional, his book is not eccentric; the psychiatry it teaches is intelligently, if narrowly, organised; and the reader is offered evidence and references for the numerous statements on unsettled or recently developed topics.

Human Genetics

R. R. GATES, D.SC., F.R.S., emeritus professor of botany, University of London. London: Macmillan. 1946. 2 vols. Pp. 1518. £5.

GENETIC factors in the ætiology of disease have, in the past, been more of academic interest than of practical significance to the doctor; but advances in knowledge of heredity in animals and man have lately been so rapid that medicine now depends on genetic principles in certain fields, notably in the treatment of some hæmatological and biochemical anomalies. No comprehensive, authoritative, accurate, and up-to-date account of the whole of human genetics is available at present, largely because the field is so enormous: an expert in serology, for example, would hesitate to write a textbook on inherited eye diseases, and a cytologist on neurological defects. Professor Gates has valiantly attempted to give a complete account of our knowledge in one book, albeit two volumes of over 700 pages each; but though the reader will find these a storehouse of references—some thousands of papers are abstracted in the text—he will search in vain for guidance in evaluating the work summarised.

Professor Gates approaches genetics from the standpoint of a botanist with exceptional knowledge of some polyploid species, and inevitably his outlook on medical problems is limited by lack of clinical and pathological experience. For example, taste deficiency for phenylthiourea, present in a third of the population, is classed as a hereditary disease of the nervous system; neurofibromatosis is described in the chapter on cancer; and the syndrome of tuberose sclerosis and adenoma sebaceum is treated as two separate entities—under skin and teeth abnormalities and under nervous diseases. Fortunately the excellent index compensates for this lack of coherence in arrangement—a defect which the author regrets in his introduction.

The views expressed by Professor Gates on questions of race biology are somewhat rigid. Eugenics, he says, has never contemplated mixture of races as a desirable future for mankind; and he supports this contention by stating that chromosome rearrangements have occurred in isolated races of man, as in different species of drosophila. In spite of his eminence as a biologist, medical readers not expert in the subject will be well advised to treat his generalisations on human genetics with reserve.

To take one example, a pedigree of epidermolysis simplex is shown and interpreted as an example of Y-chromosome inheritance from fathers to all their sons. However, a footnote reports that recently an unaffected female in the same family has had an affected son. This is explained by saying that the gene has crossed over on to the X-chromosome; but since the condition is, in any case, commoner in males than in females and sometimes skips a generation, it may be sex-influenced and not sex-linked at all.

Throughout the book too much attention is given to the possibility of crossing over between the X and Y chromosomes in man; and the fact that pedigrees of apparently the same condition are often on record, suggesting different types of inheritance, leads the author to the explanation that autosomal genes can become sex-linked by "simple" translocation. There is no reason to doubt that in man, as in other animals, quite different genes can give rise to similar end-results from the clinical aspect. Altogether, the question of linkage in human genetics is presented in a misleading manner. Thus,

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Of their 7 failures 5 were in patients who had been inadequately treated with penicillin before coming under observation. Their experience emphasises the lesson that full doses of penicillin must be given as early as possible in this disease. To await the classical picture is to court disaster. Constant watchfulness for the earliest manifestations, repeated blood-cultures in suspected cases, and the administration of full doses of penicillin for at least 4–6 weeks are the basic rules for the practitioner to follow if his patients with subacute bacterial endocarditis are to recover. But the best results will not be attained until every dental extraction and every respiratory infection in a patient with valvular disease of the heart are routinely treated with full doses of penicillin.

Statistics in Medicine

It is sixty years since Sir William Harcourt proclaimed that "we are all socialists now." A "real" socialist of that time said this was just a rhetorical falsehood; and even now there are men of mark, like Mr. Churchill and Lord Woolton, who are not whole-hearted socialists. But Sir William's flourish had a kernel of truth. If Lord Moran were to say of the fellows of the Royal College of Physicians, "we are all statisticians now," the president of the Royal Statistical Society might mutter "rhetorical falsehood!"; but, as Prof. Bradford Hill pointed out in a recent address,[1] our profession is at least more statistically minded than it was a generation ago; and whether we like it or not we doctors are confronted by problems which can only be solved, if they can be solved at all, by statistical methods.

The provision of statistical controls is much more difficult than many people think. As an example of the difficulties Professor Hill cited a series of cases of otitis media in which mastoidectomy was necessary in 15% of the cases where the patient had been treated with a sulphonamide but in only 9% where sulphonamides were not exhibited. This was a "natural" series; the patients were not sorted by lot into those who were or were not to receive sulphonamides; they were treated as, from judgment based on signs and symptoms, the doctor thought best. Hence one would expect a larger proportion of patients seriously ill in the treated series. This (when it is pointed out) is obvious. It may not be quite so obvious why tracing the children born to mothers suffering from rubella may give quite a different answer from that found by tracing back the mothers of children suffering from the congenital defect which there is good reason to think may depend on the maternal disease The second method may make it probable that the particular defect is only produced when the mother of the child had rubella early in the pregnancy; the first is needed to enable us to assess the practical importance of this liability —what proportion of children born under the disability of the mother suffer from the defects. Still more difficult is the control of tests of prophylactic measures, such as protective inoculation against whooping-cough. A mere mass comparison of results in families whose mothers volunteered with results in families whose mothers refused is not enough. There may, for instance, be differences in the size of far and therefore of exposure to risk.

Puzzles like these can be solved by the applic of common sense, which is a by no means con endowment. Indeed all that is meant by the pl is that no technical *statistical* knowledge is ne What is needed is an intelligent appraisal of possibilities that an answer to the question ask Did the treatment do good?—might be "Yes reasons other than the treatment. This app needs intelligence *and* medical knowledge of possibilities. That is why knowledge of the bilities should be first in line when a large experiment is planned. Of course technical stati knowledge is also important. A professional s tician may be able to tell much more quickly tha amateur whether the scale of a properly pla experiment is adequate to give a reliable answer the medical investigator has a sound knowled the technique of modern statistical analysis it make his work so much the more convincing. no medical man should be scared away from rese in his field—whether clinical or sociological—be he has no passion for algebra and eyes characte functions with an indifference bordering on avers

Nitrogen Mustards

"*Poison Gas Treatment for Cancer*" ran a hea in a recent daily newspaper.[1] Little has so far published in Britain about the therapeutic applica of mustard gas and related substances, because o veil of secrecy that has obscured all poiso research; but American research-workers seer have been quicker in casting off such restrictions, last year a good deal of their information was rele Thus, though the British work mostly remains bı in unpublished reports, it is possible to summ some of the scientific evidence behind the newspa startling announcement.

Experience in 1914–18 with mustard gas had sh that it was toxic to blood-forming tissues. In and succeeding years a group of closely allied pounds, the "nitrogen mustards," were being prep in factories in this country, and workers who exceptionally exposed to these substances or burnt by them showed a depressed white-cell co the lymphocytes being especially lowered, while s had a low granulocyte count and later anæ When the exchange of information between Bri and the U.S.A. began, these findings were pa across the Atlantic, and on both sides research the toxic effects was pressed on, beginning animals. The pharmacology and therapeutic use nitrogen mustards were discussed last year by Gil and Phillips [3] in America. Two substances of spe importance have emerged; their chemical names *tris*(β-chloro ethyl)amine hydrochloride and metl *bis*(β-chloro ethyl)amine hydrochloride These s stances—or rather their breakdown products—pro to have a special predilection for actively divic cells. Auerbach and Robson [3] experimented w the drosophila fruit-fly; in the adult fly the c organ with actively dividing cells is the gonad, nitrogen mustards were found to have a select

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[1] Statistics in Medicine. Read to the Manchester Statistical Society on April 16, 1947. Reprints from the hon. secretary of the society, 38, Mosley Street, Manchester.

[1] *Daily Worker*, March 8, 1947.
[2] Gilman, A, Phillips, F. S. *Science*, 1946, 103, 409.
[3] Auerbach, C., Robson, J. M. *Nature, Lond.* 1946, 58, 878.

THE LANCET

LONDON: SATURDAY, JUNE 28, 1947

Infective Endocarditis

It is four years since the FLOREYS[1] first reported that penicillin sterilised the blood in patients with subacute bacterial endocarditis. In spite of the war-time shortage of penicillin nearly 500 cases treated with penicillin have since been published. The immediate success of this form of therapy in a previously incurable condition naturally led to its enthusiastic but indiscriminate adoption, and it was not until controlled studies, such as that of the Penicillin Clinical Trials Committee of the Medical Research Council, established the optimum dosage, method of administration, and duration of treatment that consistent results were obtained. Subsequent reports have confirmed that penicillin controls the infection in a way that has never before been possible. KOLMER,[2] for instance, recorded a 68% recovery-rate among the cases so far reported—292 recoveries out of 25 cases—while in 34 unselected cases subsequently described by PRIEST and colleagues[3] 22 patients (5%) were free from evidence of active disease 13–35 months after treatment. The revolutionary change in outlook is well illustrated by SEABURY's[4] series of 165 cases seen at Ann Arbor between 1934 and 45. Of the 66 patients treated before the introduction of the sulphonamides none recovered; of the 53 patients treated with sulphonamides 4 recovered; of 13 treated with combined chemotherapy and pyretotherapy 2 recovered; whereas of 12 treated with penicillin 7 recovered. These numbers are small, but since they come from the same hospital they provide a fair comparison.

Opinion is still divided on the best method of administration. The Americans mostly favour continuous intravenous infusion.[2] PRIEST and colleagues[3] support this view because they found that in some patients blood-cultures were positive three hours after an intramuscular injection of penicillin, whereas with continuous intravenous infusion cultures were repeatedly negative. They claim that with this method venous thrombosis occurs only if the penicillin is dissolved in distilled water or 5% dextrose, and not if it is dissolved in isotonic saline. Even in America, however, the experts differ. Thus SEABURY[4] noted thrombophlebitis in all of 6 patients treated with a continuous intravenous drip, so he switched over to a continuous intramuscular drip; and THILL and MEYER[5] found three-hourly intramuscular injections satisfactory. In this country the intramuscular route, whether intermittent or continuous, is usually preferred; but continuous intravenous drip, where feasible, is probably best in severely ill patients, at least in the initial stages.

Next the total amount to be given and the duration of the course have to be decided. In the M.R.C. investigation CHRISTIE[6] found that of 19 patients receiving 1,000,000 units daily for five days all but one relapsed or died, whereas of 19 given 500,000 units daily for three to four weeks only 5 did so. As a result of further experience he recommends[7] that 500,000 units should be given daily for four weeks provided the causative organism is not more than ten times as resistant to penicillin as the Oxford staphylococcus. PRIEST and colleagues[3] advise a minimum of 500,000 units daily by intravenous drip for at least four weeks, and raise this to 1,000,000 units daily if the disease has lasted more than twelve weeks. The best results, in their experience, have been attained when the serum level is 100 or more times greater than the in-vitro inhibition level of the organism. If intermittent intramuscular injection is used, they recommend at least 800,000–900,000 units daily, divided into twelve or eighteen doses. Using a continuous intramuscular drip SEABURY gives not less than 500,000 units daily, or 2,000,000 units daily if positive blood-cultures persist after three days' treatment. There is general agreement that treatment must be continued for at least a month, and that neither sterilisation of the blood nor a normal temperature is a reliable guide to the adequacy of dosage. A normal leucocyte-count is not of much value in assessing success, but a persistently high or a rising count, in the absence of complications, is an indication of insufficient treatment, and if the leucocyte-count rises steadily after treatment has ended it should be reinstituted. A simultaneous rise in the sedimentation-rate is an additional strong indication for renewal of treatment in large doses.

Some other practical points arise out of the American reports. It seems that the penicillin-sensitivity of the infecting organism is a useful guide to dosage but of little significance in prognosis. Thus, PRIEST et al.[3] noted that there were 5 deaths among 12 cases in which the organism was inhibited in vitro by 0·06 unit of penicillin per c.cm. or less, whereas there were also 5 deaths among 9 cases in which the inhibition level was 0·07 unit per c.cm. or more. These observers found that a constant fluid intake led to less fluctuation in the serum concentration of penicillin, and they therefore limited their patients to 800 c.cm. of fluid daily, given at the rate of 100 c.cm. two-hourly from 7 A.M. to 9 P.M. In most cases nothing is gained by combining sulphonamides with the penicillin—indeed, PRIEST and colleagues say that sulphonamides are contra-indicated because of the risk of renal complications. On the other hand, sulphonamides will occasionally be of value, as when the causative organism belongs to the para-influenzal group. PRIEST cured one such case with penicillin plus sulphamerazine, but he and MCGEE[8] now look on streptomycin as the drug of choice in infections with gram-negative organisms insensitive to penicillin. Anticoagulant therapy adds little, if anything, to the value of penicillin. THILL and MEYER, after treating 22 cases, 13 of them with penicillin and dicoumarol and the remainder with penicillin alone, concluded that the occasional advantage of dicoumarol was outweighed by its disadvantages.

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[1] Florey, M. E., Florey, H. W. *Lancet*, 1943, i, 387.
[2] Kolmer, J. A. Penicillin Therapy, 2nd ed. London, 1947, p.146.
[3] Priest, W. S., Smith, J. M., McGee, C. J. *Arch. intern. Med.* 1947, 79, 333.
[4] Seabury, J. H. *Ibid*, p. 1.
[5] Thill, C. J., Meyer, O. O. *Amer. J. med. Sci.* 1947, 213, 300.
[6] Christie, R. V. *Lancet*, 1945, ii, 123.
[7] Christie, R. V. Penicillin, edited by Sir Alexander Fleming. London, 1946, p. 134.
[8] Priest, W. S., McGee, C. J. *J. Amer. med. Ass.* 1946, 132, 124.

Annotations

STORIES OF THE ROTUNDA

THE achievement of the Rotunda Hospital over two centuries—soon to be celebrated by an international congress—must always be linked with the memory of Dr. Bartholomew Mosse, whose genius and initiative made possible the foundation and development of the famous institution. In a book[1] which might well have been called "The Romance of the Rotunda," Mr. C. P. Curran describes Mosse's burning enthusiasm for this cause, which carried him along like a strong tide, despite many obstructions, to its fulfilment. The beginning of the eighteenth century in Ireland was not particularly encouraging to an idealist; but Mosse, returning from travel on the Continent, lost no time in establishing a hospital "for poor lying-in women" and found the way to pay for it. Himself a musician of no mean order, he conceived the happy idea of calling St. Cecilia to his aid, and in due course the finest vocalists and instrumentalists in Europe were engaged for a series of great concerts. In addition Mosse, ever on the alert to hold the public eye and ear, arranged for all manner of lighter entertainment, until Dublin became for the time the musical centre of these islands, while London languished in the shade. And Mosse did all this not for his own honour and glory but to further the growth of his hospital.

The Rotunda, with its fine architecture, is one of the sights of Georgian Dublin; and the round pillared hall, which gives it its name, has been the scene of concerts, lectures, and balls for two centuries—a constant fountain of income for the great charity beside it, and a means of keeping this charity prominently before the eyes of the citizens. The hospital itself, the first of its kind in Eire, and for years the largest maternity hospital in the British Empire, has been the training ground of thousands of medical men from all over the world. In a commemorative volume[2] written in honour of the bicentenary, Prof. O'Donel T. D. Browne gives a comprehensive picture of its history. Its constitution is peculiar: it is governed by a "master," who is already a recognised gynæcologist, and who is aided by two assistant masters whom he appoints, and who serve for three years. The master holds his post for seven years, and when he retires from it is usually appointed to the staff of one of the teaching hospitals of the city. Professor Browne, who has himself been an assistant master, gives a biographical account of all the masters, from Mosse to the present holder of the appointment, Ninian Falkiner. He relates the history of obstetrical advances over 200 years to the work of the hospital and to the wisdom, or otherwise, of the master at the time. In chapters on puerperal fever, operative midwifery, anæsthesia, and eclampsia we are given a valuable and accurate description of each advance, together with an unbiased account of the way in which it was received by the Dublin school. Naturally the record of advances in the treatment of eclampsia is particularly vivid, and Tweedy's pre-eminence gets the emphasis it deserves. His treatment, indeed, has been the main modern contribution of the Rotunda school to the saving of women in childbirth. The description of the early struggles of the hospital and its financial ups and downs is graphic, and running from those early days till recent times is the story of the fight against puerperal fever, which this maternity hospital like every other fought through the centuries—a fight which has been decisively won only in our own time.

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[1] The Rotunda Hospital—its Architects and Craftsmen. 2nd ed. Dublin: The Sign of the Three Candles. 1946. Pp. 49. 10*s*. 6*d*.

[2] The Rotunda Hospital, 1745–1945. Edinburgh: E. & S. Livingstone. 1947. Pp. 295. 42*s*.

GLUTAMIC ACID AND MENTAL FUNCTION

IN 1945 American workers showed that the ad
of the amino-acid *l*-(+) glutamic acid to the
enabled rats to learn a maze much quicker than
controls,[1] and it also increased the percentage of a
capable of overcoming an increasingly difficult se
obstacles in search of food.[2] The effect of glut
acid on mental function has since been tested in chil
and adolescents.[3] "A universally increased mental
physical alertness" had previously been observed
patients treated with glutamic acid[4] for petit ma
condition which seemed to be improved by
treatment, though the amino-acid has no effect
experimental convulsions.[5]

Zimmerman and his colleagues tested the effect
glutamic acid on nine patients aged 16 months to
years, seven of whom had convulsive disorders and
mental retardation without convulsions. These pati
were given verbal, motor, and personality tests be
and after a 6 months' course of glutamic acid.
dose ranged from 6 to 24 g. per day, with an aver
of 12 g. daily (4 g. t.d.s. by mouth). The subj
showed "impressive changes" in their intelligence sco
with an average increase of 8 in the intelligence quoti
after glutamic-acid therapy, with no negative deviat
at all. The results were regarded as highly signific
In all subjects sharp positive increments in mental
were reported after treatment, and in the low-g
defectives treated the rate of increase was faster
is expected in normal children. Thus three subj
gained 7, 14, and 16 months in mental age in th
months' period. Moreover, Rorschach records sho
that "glutamic acid has an effect on mental functio
which not only is reflected in verbal and performa
test scores but can be observed in rather basic persona
changes." Although the number of patients investig
was small and the period of test somewhat short,
suggested "that glutamic acid may have a gen
facilitating effect on mental functioning in hu
subjects." The glutamic acid sometimes caused gas
distress, and it should be noted that motor activit
increased by large doses of glutamic acid, produ
restlessness, overactivity, and sleeplessness.

The *l*-(+) glutamates are readily water-soluble
stances with a characteristic meat-like flavour.
sodium salt is manufactured and consumed as a
and condiment in China and Japan and to some ex
in the U.S.A. Numerous patents for the use of *l*-
glutamates in the food industry are in existence. Gl
mic acid occurs abundantly in the normal human
especially in milk, where it makes up 22% of the cas
and the greater mental alertness of school-child
receiving extra milk may possibly be connected
the effects of glutamic acid. A pint of milk cont
3–3·5 g. of glutamic acid, so the average dose used
Zimmerman and his colleagues (i.e., 12 g.) would
contained in only about 3–4 pints of milk.

The rôle of *l*-(+) glutamic acid in the metabol
of nervous tissue has also been studied. Weil-Malher
discovered in 1935 that this amino-acid is the only
oxidised directly by brain, and that the enzyme resp
sible is bound in the cell. But he doubted whet
glutamic acid is present in sufficient amounts in br
to compete with carbohydrate as a fuel. He theref
suggested that the enzyme (glutamic acid deamina

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[1] Zimmerman, F. T., Ross, S. *Arch. Neurol. Psychiat.* 1
51, 446 (see *Lancet*, 1945, ii, 408).

[2] Albert, K. E., Warden, C. J. *Science*, 1944, 100, 476.

[3] Zimmerman, F. T., Burgemeister, B. B., Putnam, T. J. *Ar*
Neurol. Psychiat. 1946, 56, 489.

[4] Price, J. C., Waelsch, H., Putnam, T. J. *J. Amer. med.*
1943, 122, 1153.

[5] Goodman, L. S., Swinyard, E. A., Toman, J. E. P. *Ar*
Neurol. Psychiat. 1946, 56, 20.

[6] Weil-Malherbe, H. *Biochem. J.* 1936, 30, 665.

on gametogenesis ; in the developing fly, many hose tissues were still growing, the effect was h more widespread. In normal adult man, the e-marrow and the lymphatic nodes are the most rtant sites of active cell division, so it is not ising that these are the tissues earliest affected itrogen mustards. All these facts suggested that nitrogen mustards might be active against pro- ating neoplasms. They were given to mice with splanted lymphosarcomata—and the tumours ppeared. The next step was to attempt the tment of human disease. This had to be done carefully because the mustards are powerful toxins and because they are very liable to cause mbosis at the site of injection Eventually a technique was worked out and the first results e been reported in America by Rhoads,[4] and by obson, Dick, and others.[5]

ethyl-*bis*(β-chloro ethyl)amine is the drug most n used. As a rule it is given in a dose of mg. per kg. body-weight intravenously ; to avoid mbosis—and excessive concentration—a rapidly ing saline drip is set up, and the dose, already olved in 10–20 c.cm. saline, is slowly injected ugh the saline delivery tube, taking 2–3 minutes ; course" is one daily dose for three or four days. re are various toxic effects. An early symptom usea and vomiting coming on within a few hours, some patients get this after every dose. The first d change is lymphopenia, and then the granulo- s are diminished ; with this dosage the anæmia uced should be only slight ; the platelet-count is n lowered. These effects are temporary and after ut five weeks hæmopoiesis is back to normal. So as the research has proceeded—the longest follow- s two years—it seems that doses of this nitrogen tard can be repeated without the danger of cing an irreversible aplasia of the blood-forming ues. Overdosage, or giving the drug in too centrated a form, is liable to cause serious destruc- of hæmopoietic and lymphatic tissues, and fatal stic anæmia may be the result.

itrogen mustard treatment has now been given to ents with several neoplastic diseases, but signifi- t success has been obtained only in diseases olving the blood-forming or lymphatic tissues. als with metastatic mammary and cervical carci- a and with melanosarcoma have not been ouraging, though Rhoads reports a temporary ission with "anaplastic carcinoma" of the lung. best results have been obtained in Hodgkin's ase, of which Dr. ApThomas and Dr. Cullumbine ort 21 cases in this issue. All their patients, even se with the most advanced disease, showed some efit in the three to eight months of observation. obson et al.[5] report 27 cases, in 8 of which the ient died without responding to mustard or X-ray atment, but the others showed significant reduction gland masses, including abdominal and thoracic nds ; enlargement of liver and spleen regressed, emia remitted, and the patients were greatly proved in general condition : in 4 patients response s obtained to mustard treatment when X rays had led. The effects lasted six to eight weeks, and then other course of two or three daily injections had to be given. With lymphosarcoma, 4 out of 6 patients had clinical remissions lasting three to eighteen months—a result comparable with that gained by X-ray treatment. Acute leukæmia is as unresponsive to nitrogen mustard as to other therapy. With chronic lymphatic leukæmia the results have not so far been as satisfactory as with X rays ; in chronic myeloid leukæmia the results have been variable, in some cases a remission lasting several months being obtained, while in others there was only transient symptomatic improvement although the leucocyte count was reduced. In polycythæmia vera nitrogen mustard treatment induced a lowering of the red-cell count and symptomatic improvement lasting a few months. The treatment had no effect in multiple myeloma.

In short, the results so far show that the nitrogen mustards are of no value in the treatment of carcinoma ; they will induce regression in some neoplastic or neoplasm-like conditions involving the blood-forming and lymphatic tissues, but these effects are temporary and the treatment must be repeated every few weeks or months—very like X rays. The best results have been in the treatment of Hodgkin's disease and perhaps polycythæmia vera. The mustards are dangerous toxic substances whose main effect falls on the hæmopoietic tissues, and the margin between safety and disaster does not seem to be very wide ; as Rhoads points out, the extent of this effect is the limiting factor in their use and it may exceed the effect on a tumour. They are emphatically not for general use, and their applications must for the present continue to be studied only in special clinics. Their importance lies in the fact that here are substances that in vivo break down liberating agents with a selective action on actively dividing tissue, and therefore on tumour tissue, and that it may be possible to obtain substances with a greater margin of safety—that is, with a still more selective action. If a safer substance cannot be found, the use of nitrogen mustards is likely to be confined to the palliation of cases of Hodgkin's disease in which X rays have already failed.

Rhoads, C. P. *J. Amer. med. Ass* 1946, 131, 656.

acobson, L. O., Spurr, C. L., Barron, E. S. G., Smith, T., Lushbaugh, C., Dick, G. F. *Ibid*, 1946, 132, 263.

Pensions Under the Act

In 88 pages the Minister of Health has presented to Parliament his superannuation scheme for the National Health Service. It is designed, he says, to provide benefits comparable to those obtainable by established civil servants under the Superannuation Acts, 1918–46, the major ones being a pension, a lump-sum retiring allowance, and a widow's pension. To secure these benefits, all members of the service (other than manual workers) will contribute 6% of their remuneration, as defined. Doctors employed by regional hospital boards, including specialists, will be entitled on retirement to a pension amounting to one-eightieth of their average remuneration for each year of service up to 40, and a retiring allowance amounting to three-eightieths. General practitioners will be entitled to a pension amounting to 1½% of their remuneration in each year of service—"remuneration" to include all payments made in respect of general medical, dental, or pharmaceutical services, less practice expenses—and a retiring allowance amounting to 4½%. Allowances are reduced by two-thirds where a widow's pension may be payable. Practitioners holding life-assurance policies may apply for exemption from the scheme, and as a contribution to the maintenance of their policies may receive from the Minister an amount equal to 8% of their remuneration.

REINFORCEMENT IN DIPHTHERIA PROPHYLAXIS

If the value of mass immunisation in the control of diphtheria still required proof it would be found in the recent statement of the chief medical officer of the Ministry of Health[1] that " of every 5 children suffering from diphtheria during the years 1942–45 inclusive 4 had not had an immunisation course, and of every 30 deaths from this disease in the same period 29 were of non-immunised children." But, ignoring the small percentage refractory to immunisation and those whose course may have been incomplete, there still remain children who, in spite of a full primary prophylactic course, do contract diphtheria—usually mild, but occasionally severe or even fatal if the infecting strain is highly virulent and diagnosis late. The immunity conferred by diphtheria prophylactics wanes with time, and although it is known that the virulent gravis and intermedius strains of *C. diphtheriæ* can sometimes break down the barrier of immunity as assessed by a negative Schick test, clinical diphtheria among the previously immunised is usually an indication that the level of antitoxic immunity has fallen dangerously low. Hence the importance of the reinforcing dose, or *injection de rappel*, of the prophylactic which will secure for the child immunised in infancy a high level of immunity at the time of school entry and throughout school life, with its greatly increased risks of infection.

In a circular letter to medical officers of health Sir Wilson Jameson suggests reinforcing doses at the age of 4 to 5 and again at 10 years. He points out that, during 1945, of 593 children who died of diphtheria only 36 were reported to have been immunised, and of these 36 about 30 had not received a reinforcing dose subsequent to primary immunisation in infancy. Current preparations of A.P.T., the prophylactic of choice for children, produce a high degree of immunity and cause fewer and less severe reactions than was usual in the past. But while primary immunisation may be reactionless, when used for reinforcement A.P.T. sometimes provokes unduly sharp reactions. Hence the chief medical officer suggests that for this purpose in children T.A.F. (which is less likely to cause reactions) might be preferable. Reinforcement doses of this prophylactic can now be obtained free of charge from the same sources as A.P.T.

NURSES FOR THE ELDERLY

Excluding its county boroughs, Kent has a population of some 125,000, and of these at least 2500 people, or about 2%, can be classed as chronic sick and are known to need institutional beds. Dr. Elliott,[2] the county M.O.H., says that last January over 800 patients were waiting for beds (the number has since risen to 928), and some 1800 were already in hospitals or institutions. He speaks of the nursing problem as being especially heavy, since about " 20% of the patients are incontinent both of urine and fæces and over half are bedridden." A recent study of work in the West Middlesex Hospital[3] suggests, however, that these particular nursing problems could be reduced : experience there has shown that with active treatment the number of bedridden patients among the chronic sick can be kept between 10% and 20%, and that patients can be trained back to continence much more often than is usually supposed. Lack of nursing staff, of course, hinders proper training of incontinent patients, as it hampers every part of the care of the chronic sick. The solution which comes at once to mind is a well-planned part-time nursing scheme ; but though part-timers are used to supplement the full-time nurses, Dr. Elliott believes that a scheme on the Gloucestershire lines—where the part-time workers are the staff, supplemented by full-timers—could not be applied as it stands to Kent. He estimates that if treatment were to provided for all who require it in the county—incl patients waiting for beds in sanatoria and hospitals, as well as the chronic sick—some 2000 to part-time nurses would be needed. With a county p tion of 125,000, however, this does not seem an o rageous figure ; it would be interesting to know many would be needed for the chronic sick alone. intensive campaign for part-timers has already launched, and will probably alleviate acute difficul especially if the newcomers are shown clearly that t value is recognised.

Dr. Elliott has a further proposal—that he middle-aged and elderly people should be called upon do more for " casualties arising in their own ranks. Experience has shown that older nurses have m sympathy with the aged than young ones, and that t bring more tact and insight to the care of the chro sick. We cannot go all the way with Dr. Elliott w he says that " the younger entrants to the n profession should be allocable mainly to the more stren ous and specialised aspects of nursing, and should, completion of training, undertake periodic duties of oversight and instruction of older and less able n and attendants who would be primarily engaged tending the chronic sick." This implies that nursing the chronic sick is unpleasant and suited only to infe nurses ; indeed, he describes it as " arduous, monotono and at times revolting." It might be instructive to h the comment of a sister in one of the chronic wards the West Middlesex Hospital on that string of adjectiv *Chronic-sick nursing, if properly done, is not only o of the most " strenuous and specialised " but also one the most engrossing and testing forms of nursing, suit certainly to the more mature but emphatically not the " less able " nurses and attendants.* The interest nurses in the care of such patients seems to be directl proportional to the interest of doctors in their acti treatment. As geriatrics begins to attract the more ab members of our profession, it is to be hoped that w and institutions for the aged will also become the reso of the abler of our nursing colleagues.

THE LISTER INSTITUTE

In their annual report just issued the governing bo of the Lister Institute of Preventive Medicine give impressive account of the work accomplished by the st headed by Dr. A. N. Drury, F.R.S., during the past ye The institute continues to house several independe units. The Medical Research Council's blood produ research unit, and its bacterial chemistry unit un Sir Paul Fildes, F.R.S., are still there, and accommodati has also been found for the council's blood-group resear unit, directed by Dr. R. R. Race, and for the bloo group reference laboratory of the Ministry of Heal This last, in the charge of Dr. A. E. Mourant, h concerned itself with the supply of standard A, B, and Rh blood-grouping sera, and it has been prepari to supply the rarer types ; it also undertakes the inves gation of difficult cases. Dr. S. T. Cowan has succeed Dr. R. St. John Brooks as curator of the Natio Collection of Type Cultures, which is still housed Elstree. During 1946 the collection supplied more th 7000 cultures to workers at home and abroad, a helped to re-establish culture collections in several the countries formerly occupied by the Germans.

A royal charter has been granted to the College Midwives, which will in future be known as the Roy College of Midwives.

Dr. Cecil Wall, consulting physician to the Londo and Brompton Hospitals, and archivist and past mast of the Society of Apothecaries, died in London o June 19 at the age of 77.

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1. Report of the Ministry of Health for the Year ended March 31, 1946. H.M. Stationery Office 1947.
2. Elliott, A. *Med. Offr*, May 17, p. 197.
3. *Lancet*, May 31, p. 760.

bably acts in vivo by catalysing the reverse reaction—mely, the synthesis of glutamic acid from ammonia d α-ketoglutaric acid, which in *turn* is known to e in carbohydrate metabolism (Krebs citric-acid le). Both the exogenous and the hypothetical ogenous supply of glutamic acid acquire some signifi- ce in relation to nervous metabolism through the k of Nachmansohn et al.,[7] who showed that the addi- of *l*-(+) glutamic acid to dialysed brain extracts eases the rate of acetylcholine formation 4–5 times, only other substance with a comparable effect being ic acid, which is interesting in view of Weil-Malherbe's rk. Zimmerman and his colleagues also assume that observed effects of glutamic acid are somehow ated to acetylcholine synthesis. However, like some er amino-acids such as aspartic, glutamic acid has en shown to be a sugar-former; though the hypothesis t glutamic acid acts on the central nervous system virtue of its hyperglycæmic action is weakened by e recent results of Klein and Olsen,[8] who found that transfer from blood to brain of *l*-(+) glutamic acid er intravenous injection is much less than that of cose.

PROSTITUTION IN FRANCE

THE shutting of the brothels in France by the decree April 13, 1946, was a confession of failure in the dical control of their inmates. The reasons for this ure are not far to seek. As Gounelle and Girault[9] int out, women in brothels were medically inspected ly twice a week, and tests of the genital secretions d of the blood were done only once in three months, ystem which must prove quite ineffective for women o might have forty clients each day and also might ape inspection by rapid moves from brothel to brothel. e proportion of known cases of venereal disease in ns traceable to brothels has been estimated at 40%, ough in 1942, for example, there were only 1500 nates of brothels as against 5000 registered and ,000 to 80,000 unregistered prostitutes working lependently.

The French had their first large-scale experience doing without brothels after the war of 1914–18, en their Army occupied the Rhineland, where German r did not allow brothels. The general incidence of nereal disease among soldiers remained steady at 6 per 1000, but in occupied territory the incidence s only 0·19–0·28 per 1000. In 1931, at Grenoble, e brothels were closed and the registration of prostitutes s also forbidden; but these measures were supple- ented by the creation of an anti-venereal social service, r the reclamation of prostitutes and the protection of ds, and by the provision of facilities for treatment ter working hours. There followed a remarkable crease in cases of primary syphilis, and, contrary to pectation, there was no increase in sexual offences. unelle and Girault conclude that it is not enough close the brothels. The displaced inmates must be red for and the public enlightened about venereal sease. Infectious contacts must be found and effective eatment supplied conveniently and if necessary free. arly diagnosis is essential, and the patients should tend general clinics to avoid the stigma which may tach to known special centres.

Opponents of the closure of brothels point to the large crease of venereal diseases in France since the decree 1946 was passed, but Gounelle and Girault show, om statistics of twenty large French towns, that the eep rise in incidence began in 1941. Blum[10] reports, wever, that only a small proportion of the registered prostitutes, who are still allowed to practise away from "maisons de tolerance," attend for their periodical medical inspection, and that admissions to St. Lazare have fallen off because arrested prostitutes are sent to the common gaols. The number of arrests has also fallen considerably, but among the women arrested there is a much higher incidence of infectious syphilis and soft sore.

INCIDENCE AND SIGNIFICANCE OF GLYCOSURIA

ONE of the many lessons that we have learned from the 1939–45 war is how ignorant we are of the incidence of disease and of the precise border between health and sickness. The incidence of glycosuria and its relationship to diabetes mellitus is a case in point. Most of the investigations hitherto reported have been done in the United States,[1] but two analyses of British findings—that of Lyall[2] and the one by Dr. Keeping and Dr. Lawrence in this issue—emphasise the uncertainty concerning the real significance of glycosuria. Comparison of these reports must not be pressed too far, for the conditions of the investigations varied considerably; they have all been based on the cases in which glycosuria was detected on routine examination in recruits for the Armed Forces, but in some series many cases of glycosuria had been excluded at a preliminary examination. The age and sex distributions also varied. The salient findings may be summarised as follows:

Reference	No. of cases of glycosuria	Percentage of—		
		Diabetes mellitus	Lag curve	Renal glycosuria
Blotner and Hyde[3] ..	367	56 6	.	9
Keeping and Lawrence	956	18	13 3	65
Lyall[2]	387	15	.	59 4
Peel and Peel[4] ..	115	37	10 4	40
Spellberg and Leff[5] ..	37	24 3	.	..
Wolman[6]	324	6 5	..	..

Thus in the American figures we have proportions of true diabetes mellitus among recruits with glycosuria ranging from 6·5% to 57%, while in Great Britain the range is from 15% to 37%. Among Lyall's 387 cases of glycosuria there were 94 cases which he described as either "borderline" or "doubtfully diabetic." He also included in his series 23 cases characterised by low blood-sugar values and persistent glycosuria even during fasting, for which he suggested the term "renal diabetes."

This mass of data clearly requires further analysis and correlation, but two important lines of research emerge. In the first place, those found to have glycosuria which is not definitely diabetic in origin should be carefully followed to determine whether they develop diabetes mellitus later in life. Secondly, diabetic experts in this country and America should pool their information so as to define criteria for the diagnosis of diabetes mellitus, renal glycosuria, the lag-storage curve (or oxyhyperglycæmia as it is sometimes called), and renal diabetes. The confusion in nomenclature is exemplified by the fact that most American authorities do not recognise the lag-storage curve as a separate entity. Clear indications should be given as to whether the blood-sugar estimations are based on the findings in capillary or venous blood; for, as Keeping and Lawrence point out, there is a significant difference between these two levels.

While the experts are clearing the ground there are two practical lessons for the clinician to bear in mind: that every case of glycosuria requires full investigation, and that only a minority of them will turn out to be diabetic in origin.

Nachmansohn, D., John, H. M., Waelsch, H. *J. biol. Chem.* 1943, 150, 485.

Klein, J. R., Olsen, N. S. *Ibid*, 1947, 167, 1.

Gounelle, H., Girault, P. *Pr. méd.* Jan. 18, 1947, p. 47.

See *Ibid*, March 8, 1947, p. 167.

1. See *Lancet*, 1944, ii, 794.
2. Lyall, A. *Quart. J. Med.* 1946, 15, 243.
3. Blotner, H., Hyde, R. W. *New Engl. J. Med.* 1943, 229, 885.
4. Peel, A. A. F., Peel, M. W. *Glasg. med. J.* 1941, 135, 141.
5. Spellberg, M. A., Leff, W. A. *J. Amer. med. Ass.* 1945, 129, 246.
6. Wolman, I. J. *Amer. J. med. Sci.* 1946, 212, 159.

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the comment of a sister in one of the chronic wa
the West Middlesex Hospital on that string of adjec
Chronic-sick nursing, if properly done, is not onl
of the most "strenuous and specialised" but also o
the most engrossing and testing forms of nursing, s
certainly to the more mature but emphatically n
the "less able" nurses and attendants. The inter
nurses in the care of such patients seems to be di
proportional to the interest of doctors in their
treatment. As geriatrics begins to attract the more
members of our profession, it is to be hoped that
and institutions for the aged will also become the
of the abler of our nursing colleagues.

THE LISTER INSTITUTE

In their annual report just issued the governing
of the Lister Institute of Preventive Medicine gi
impressive account of the work accomplished by the
headed by Dr. A. N. Drury, F.R.S., during the past
The *institute continues to house* several indepen
units. The Medical Research Council's blood pro
research unit, and its bacterial chemistry unit
Sir Paul Fildes, F.R.S., are still there, and accommod
has also been found for the council's blood-group res
unit, directed by Dr. R. R. Race, and for the b
group reference laboratory of the Ministry of He
This last, in the charge of Dr. A. E. Mourant,
concerned itself with the supply of standard A,
and Rh blood-grouping sera, and it has been prep
to supply the rarer types; it also undertakes the inv
gation of difficult cases. Dr. S. T. Cowan has succe
Dr. R. St. John Brooks as curator of the Nat
Collection of Type Cultures, which is still house
Elstree. During 1946 the collection supplied more
7000 cultures to workers at home and abroad,
helped to re-establish culture collections in sever
the countries formerly occupied by the Germans.

A ROYAL charter has been granted to the Colleg
Midwives, which will in future be known as the R
College of Midwives.

Dr. CECIL WALL, consulting physician to the Lon
and Brompton Hospitals, and archivist and past ma
of the Society of Apothecaries, died in London
June 19 at the age of 77.

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1. Report of the Ministry of Health for the Year ended March 31, 1946. H.M. Stationery Office. 1947.
2. Elliott, A. *Med. Offr*, May 17, p. 197.
3. *Lancet*, May 31, p. 760.

Special Articles

AMERICAN MEDICAL ASSOCIATION

CENTENNIAL MEETING

FROM A CORRESPONDENT

HE venue of this meeting, from June 9 to 13, was ntic City. Imagine Brighton or Blackpool, but larger scale; take away the promenade and substi- a wooden broadwalk of great width and enormous th devoted solely to pedestrians and those more d who prefer to be wheeled slowly in well-sprung, amatic-tyred, upholstered chairs; flank this broad- k on one side with a perfect sandy beach, large ntic rollers breaking in a froth of spindrift, tents, hers, and all the paraphernalia of the seaside including e mammoth piers, and on the other side with a s of low-built shops containing anything from the t expensive mink coats and jewellery to the apparatus the practical joker; intersperse these shops with erous luxury hotels, more reminiscent of Le Touquet Juan les Pins than our native hostelries; add a con- tion hall which appears to be larger than Olympia or White City; back the whole with a large and arently prosperous town with good shops, banks, boarding-houses: and you may get some idea of the osphere of the place.

tlantic City was chosen because at least 15,000 doctors, t of them accompanied by their wives, and some their families also, were to attend the meeting; wn used to accommodating a very large number of sient guests was the only possible location.

he convention hall was not much used for meetings; e were housed the exhibits of instrument manu- urers, publishers, and drug houses, in a display iniscent of the exhibitions seen at home. Here was the scientific exhibit, where by means of charts, oured transparencies, and other devices including tomical preparations some 1300 items were cleverly succinctly shown.

he American Medical Association had invited a large nber of distinguished guests, representing other dical associations and governments, to attend the eting. The British Medical Association was repre- ted by Dr. Guy Dain, Dr. Charles Hill, Dr. gh Clegg, and Dr. J. A. Pridham. Representatives ne from as far away as Syria, Saudi Arabia, and n; and distinguished clinicians and scientists from ny countries were to be seen wearing on their lapels golden medallion of the A.M.A. with the words nvited Guest" printed in gold on a green ribbon ow the medallion.

he programme of the section meetings covers some closely printed pages in the official manual; and it mpossible to do more than outline some of the titles the more important contributions, in full awareness t the selection may do less than justice to the efforts many men.

n the *section on internal medicine*, the chairman, T. Wearn, delivered a paper on the challenge of ctional disease; R. Fitz gave the centennial address the history of the specialty of internal medicine in the ited States; whilst H. D. Claro, of Chile, the section's eign guest, spoke on the contribution of the laboratory the differential diagnosis of jaundice.

In the *section on surgery*, Sir Heneage Ogilvie, the eign guest, opened the proceedings with a paper titled gastric surgery after one hundred years; he s followed by the chairman, A. Ochsner, who spoke carcinoma of the lung; and the centennial address s given by E. A. Graham, whose subject was a century American surgery. (In each section the centennial dress concerned American work in the section's specialty during the past hundred years.) After some eight other papers authorities from the surgical section and the section on gastro-enterology combined to give a wide-ranging symposium on peptic ulcer.

In the *section on obstetrics and gynecology*, J. E. Eyre, of Montreal, spoke on cervical cytology in the diagnosis of early cancer; E. A. Schumann delivered the centennial address; Alice F. Maxwell, the chairman, gave a paper entitled a medical inventory; the foreign guest, J. Heyman, of Stockholm, spoke on the comparability of material in evaluating results of radiotherapy of cancer of the uterine cervix.

The *section on ophthalmology* heard an address by Sir Stewart Duke-Elder, the foreign guest, witnessed a demonstration of new instruments, and among other matters received a communication from J. G. Bellows and C. J. Farmer on streptomycin in ocular infections.

The *section on laryngology, otology, and rhinology* were addressed by G. Ewart Martin, of Edinburgh, the foreign guest, on the present position of bronchœsophagology in Great Britain; they met under the chairmanship of J. Mackenzie Brown, who spoke on the future of oto-laryngology, and their centennial address was delivered by R. A. Fenton.

R. Debré, of Paris, lectured to the *pediatric section* on the deleterious results of overdosage of vitamin D. during infancy; E. P. Copeland gave the centennial address; and other subjects ranged from the management of tick typhus in childhood to rheumatic fever.

The *section on experimental medicine and therapeutics* received contributions which may eventually affect the practice of medicine in many specialties. R. A. Woodbury and his colleagues discussed asymatrine hydrobromide in the treatment of gastro-enteric hypermotility, and L. O. Jacobson the use of nitrogen mustards in the treatment of disease. Jacobson has found that the course of acute leukæmia and multiple myeloma is unaffected by these drugs, but that significant clinical remissions are produced in Hodgkin's disease, lymphosarcoma, chronic lymphatic and myelogenous leukæmia, and polycythæmia rubra vera. I. Snapper, in a paper on stilbamidine in the treatment of multiple myeloma, reported that whilst the drug might relieve pain it did not cure the disease. J. Luetscher and W. T. Longcope discussed B.A.L. therapy in arsenic and mercury poisoning, and F. M. Rackemann the use of anti-histamine drugs. C. Heymans, of Ghent, the foreign guest, contributed a paper on blood-pressure homeostasis and circulatory failure. The chairman, C. A. Dragstedt, spoke on idiosyncrasy to drugs.

In the *section on pathology and physiology*, besides a symposium on the present status of cancer research, papers were contributed by J. J. Moore, the chairman, on the practice of pathology; G. Liljestrand, of Stockholm, on regulation of the arterial pulmonary pressure; H. T. Karsner (centennial address); E. W. Schultz on viruses and virus diseases; and H. J. Corper and M. L. Cohn on various phases of the use of streptomycin in tuberculosis.

T. Alajouanine, of Paris, was the foreign guest in the *section on nervous and mental diseases*. S. Cobb gave the centennial address, and R. P. Mackay, the chairman, spoke on the Neurologist Looks at Discipline.

O. S. Ormsby delivered the centennial address to the *section on dermatology and syphilology*, and was followed by the foreign guest, R. M. B. MacKenna, who spoke on the international outlook in dermatology. The chairman, N. P. Anderson, in a paper on cysts, sinuses, and fistulas, did much to make simple a subject which is complicated in many books by traditional beliefs and muddled thinking. H. E. Michelson spoke on sarcoidosis, and amongst many other papers that by H. J. Templeton, C. J. Lunsford, and H. V. Allington on autosensitisation dermatitis may be referred to as confirming views first suggested by Whitfield in England.

The work of the *section on preventive and industrial medicine and public health* was made particularly interesting by a paper from S. Forssman, of Sweden, on comparative practices in industrial medicine in Sweden and in the United States, and by a symposium on the question of how scientific proof could be attained in workmen's compensation controversy.

In the *urological section* W. J. Kolff, of Holland, spoke on the artificial kidney (his apparatus was demonstrated in the scientific exhibition); G. Carroll, the chairman, discussed *Ps. aeruginosa* (*pyocyanea*) and related bacillary infections of the urinary tract; and F. S. Patch, of Montreal, the foreign guest, read a paper on epithelial metaplasia of the urinary tract.

The *section on orthopedics* was addressed by J. Valls, of Buenos Aires, on aspiration biopsy in the diagnosis of lesions of the vertebral bodies; by L. F. Bush and C. Z. Garber, who discussed storage in the bone-banks by "deep freeze" methods; and by E. W. Ryerson, who gave the centennial address. H. J. Seddon, of Oxford, contributed a paper on nerve lesions complicating certain closed bone injuries.

The *section on gastro-enterology and proctology* held a symposium on the pancreas, another on ulcerative colitis, and a third on gastritis and gastric neoplasms. The chairman, M. S. Kleckner, spoke on proctologic surgery of the large bowel; J. A. Bargen gave the centennial address; and J. McMichael, of London, the foreign guest, reviewed clinical and biochemical problems of liver disease as revealed by systematic biopsy studies.

G. W. Holmes gave the centennial address to the *section on radiology*; G. E. Gomez, of Colombia, South America, was the foreign guest and spoke on cardiac hypertrophy in residents of high altitudes.

The *section on anesthesiology*, under the chairmanship of C. F. McCuskey, considered many topics, and were addressed by A. R. Hunter, of Manchester, the foreign guest, on anæsthesia for operations within the vertebral canal.

E. Ashworth Underwood, of London, addressed the *section on miscellaneous topics* on the spread of the public-health movement, 1847–1947; and D. Y. Solandt, of Toronto, spoke on the relationship of physical medicine to industrial medicine; both were foreign guests.

General scientific meetings were held on June 9 and 10. G. W. Pickering, of London, addressed the first of these on the subject of hypertensive encephalopathy, and also took part in a panel discussion on the modern management of heart disease. H. J. Seddon gave a paper on nerve grafting in the limbs, and took part in a panel discussion on emergency surgery. Sir Howard Florey, F.R.S., spoke on new antibiotic agents and later discussed the development of bacterial resistance to antibiotics.

The foreign guests were royally entertained. Not only were their creature comforts tended in the spacious rooms of their hotels, but they were wined and dined with heart-warming cordiality by private groups, societies, and official bodies. On June 10, before an audience said to number 6000, they heard a concert given by the Philadelphia Festival Orchestra, in which a surprise item was a military march written by the new president of the American Medical Association, Dr. E. L. Bortz; they also watched the installation of Dr. Bortz, who read a most able paper on the work, aspirations, and policy of the association; and they were then individually introduced to the audience. The guests were awarded honorary fellowship of the association. On June 12 they dined with the Alpha Omega Alpha Honour Society, of which they were made honorary members; as the society has a limited entrance this is a greatly prized distinction. Later in the same evening, at the president's reception and ball, they had the pleasure of greeting the president's guests, shaking hands with hundreds of representatives of the American medical profession, their wives, and their families.

Doubtless some other convention is now being held in Atlantic City; doubtless the curving waves caress the vigorous bodies of other young Americans—honeymoon couples, the young, the middle-aged. The scientific exhibits and the technical exhibits are no doubt away in crates and cases. Medical controver longer echo through the meeting rooms. As Atlantic City is concerned, the Medical Conven over. But in the minds of those who attended will remain the memories of friendships made and re of hospitality on a scale seldom experienced, knowledge gained.

Reconstruction

LOCAL GOVERNMENT IN TRANSITIO

Sir RONALD DAVISON

OUR system of local government dates back to 1 and everyone agrees that it is in need of a drastic haul. Reform has been in the air for a long time; should now come down to earth. One part of the was entrusted in 1945 to the Local Government Bo Commission which is now beginning to show its and has published its first report.[1]

I do not envy Sir Malcolm Trustram Eve and five colleagues; they have a difficult job in re the jig-saw of areas. Their mere existence as a mission has aroused the worst passions of local coun and their chief officers. There is apprehension cupidity at all four levels of the hierarchy: the boro are preparing for war on their county councils, w urban and rural district councils are afraid of the cou boroughs and are jealous of one another. Money is the root of most of this—i.e., the desire to enl rateable values and keep rates down—but civic p comes in too. Most councillors at all four levels themselves ruling over a larger and nobler domain, they dislike the thought of being subordinated or redu in area. The great county boroughs (50,000 to 500, population) are the most aggressive; some of th have not even shrunk from asking that their fut boundaries should be enlarged eightfold or tenfold. face of all this, the commissioners are treading cautiou for they know that as soon as they make actual alterati of status and area they will have to face very str objections.

Civic patriotism is a curious emotion; I have he of one fervent Lancastrian who swore that he wo quit his home and his village if it was transferred the Yorkshire County Council: "I couldn't possi stand up to the Yorkshire winters," he said. In own district of Oxfordshire the urban district counci spending £600 on a plan for encroaching on its surrou ings, including my home, but the rural district cou is preparing to die in the last ditch rather than surren any territory. In my opinion it is the council rather than their constituents who feel all this bittern

One of the wise suggestions of the commission is t we should now get rid of this complicated hierar from non-county boroughs down to rural district counc In all of them the major functions, like education, run over their heads by the county councils. Ther nowadays very little difference between the powers duties and rateable values of non-county boroug urban districts, and rural districts. It is the ru authorities that have caught up on the small tow and henceforth, say the commissioners, all small town a county district councils should have the same sta and be known by a common title. Stimulated by n tasks in housing and coming duties in respect of th local hospitals under the National Health Service, county councils plus district councils and their sta are very much alive. This two-tier system of gove ment covers 97% of the area of England and Wales a 60% of the population. It is therefore at least important that any new reforms should work out w in these sectors of Britain as that they should do so the great county boroughs.

THE COUNTY BOROUGHS

At present it is the big cities and conurbations th get all the limelight; and they certainly get it in t

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1. See *Lancet*, May 3, p. 617.

ndary Commission's report. But strange to say, en our modern system of municipal government was structed in 1888, it was the new county councils—luding the mighty L.C.C.—that were to be the ured instrument of government. At that time, I ieve, only 6 of the largest British cities, including nchester, were held to qualify for county borough us with powers and duties equivalent to a county ncil. Yet today there are 83 county-borough coun-s, and 80 of these have demanded extensions of area. ere may also be 35 new all-purpose county boroughs, king 118 in all. The claim is that the county borough s proved to be the most convenient and efficient of forms of municipal administration, but that nearly of them are sadly overcrowded and have long over-t their borders, so that they want to rehouse or apture a large surplus population outside their present al boundaries, usually in a county district. It certainly ms wrong that an urban agglomeration should be titioned under various minor authorities; and still se that large conurbations, such as those centring on nchester, should be created into a solid block of parate county boroughs, ten or a dozen in number. n the other hand, what is to happen to the depleted nty councils when their richest districts are taken m them? In Lancashire the county's rateable value uld be reduced by two-thirds.

The commissioners offer various solutions, but un-ubtedly the one which attracts them most is the new ea which has emanated from the South Lancashire cities. he Manchester plan is to create a new kind of county uncil, rather like the L.C.C., embracing all the urban eas and working on the two-tier principle. All major rvices like education and highways would fall to the rong central council, while enough powers and duties ould be left to the individual boroughs to keep them ely and democratic—again very much like London th its county council and its borough councils.

CHANGES AND CHANCES

All these new plans for urban and rural administration re tentative at present. What are the chances of their eing realised?

Some of the adumbrated changes will call for new gislation of a rather thorny kind, and I cannot see e present Government seeking such a troublesome ddition to their overcrowded programme. Then there s vital interrelation between all this and the emerging licies of the Ministry of Town and Country Planning. ew trunk roads, new housing, and the relocation of dustry—all these will give rise to new boundary roblems and will affect the status of certain local uthorities. What about the schemes for new towns at tevenage, Crawley, and elsewhere? These are a big dventure and novelty, each with (in time) 50,000 habitants decanted from Croydon, Mitcham, and such-ke boroughs. The creation of new communities on e lines of Welwyn may become fashionable in the rth as well as in the south.

Finally, money being the king-pin in this as in ther reform projects, there are now to be substantial odifications of the block grants from the Treasury. he Boundary Commission should, of course, be able to evise their decisions, but they have not yet got power o do so under an interval of ten years. Altogether t looks as if "interim reforms" were going to be he order of the day for some years to come.

But something more vital than changes of boundaries nd statutory powers will be needed before our local overnment is really reformed. We need a far more ctive civic life among the citizens—instead of leaving bcal affairs to small exclusive groups of councillors or ould-be councillors and their friends. I lived in London uring the 1930's and the war, and the only times I ad any real contact with my borough council and mayor were, first, when we started occupation centres or the unemployed in 1934, and, second, when we were ll enrolled as air-raid wardens or firewatchers. It seems lmost as if nothing but danger and disaster will stir up the civic consciousness of the citizens of this country as a whole. Active democracy in the neighbourhood and street is even more necessary in times like these.

Modern Care of Old People

V

INDEPENDENT DWELLINGS

MANY old people, especially women, are well enough to look after themselves, and like to keep their independence. Some local authorities are providing for these by including two-roomed bungalows or flats in their new housing estates; and some almshouses offer very much the same sort of accommodation.

Bungalows

In Trowbridge, Wiltshire, the urban district council has three housing estates, two already complete and one now in the building; and in each of these provision has been made for old people. In the first estate, which dates from 1935, there are 10 bungalows among the 154 houses, and in the second 20 bungalows among 214 houses. The third estate will have 144 houses with 12 bungalows among them. It is interesting to see how practical experience over the years has led the council to modify the design and equipment of these small neat homes.

In the first estate the semi-detached bungalows contain a living-room, bedroom, kitchen-scullery, cupboard-larder, bathroom, indoor water-closet, and indoor coal-house. The front door, set back in a porch, opens directly into the living-room, into which the kitchen and bedroom doors also open. Though the fireplace is at the opposite end of the room from these three doors, the arrangement is bound to be a little draughty. In some of the living-rooms there is a cooking-range, in others an ordinary open fireplace; in either case there is also a gas-cooker in the kitchen and a gas-copper in the bathroom, which besides being used for household washing will feed the bath with hot water when required. There is no direct hot-tap to the sink, but the copper is easily accessible from the kitchen, and a kettle can be boiled quickly on the cooker or the range. The bedroom has its own fireplace. Coals must be delivered to the coal-house through the back door (a door closes off the kitchen). There is little room for the storage of bulky objects—such as tin baths, washing-boards, and the like—which are therefore liable to find their way into the bath. Each bungalow has a fair-sized garden-plot at the back—perhaps on the whole rather too large for the average old person to manage, though most of the plots are well kept, either by the resident or a son or friend, and used for growing vegetables. These early bungalows were placed at corner sites in the housing estate, set quietly back from the other houses—an arrangement which proved to be a mistake: the old people like to watch who comes and goes up the street, and complain if they are out of eyeshot.

In the estate now being built the small drawbacks of the earlier bungalows have been corrected. The bungalows have been built in terraces, facing a main road, though set back behind wide grass verges. The old people can thus watch what goes on without being directly on top of the traffic. The garden-plots are smaller, better suited to their strength. A porch shelters the front door of each bungalow, and helps to shut off draughts, while the bedroom door, instead of opening into the living-room, opens into the kitchen. Thanks to a special type of hearth, the living-room fire heats water, and the hot-pipe carrying this to the kitchen and bathroom warms an airing cupboard on the way. The kitchen and bathroom still have both a gas-cooker and gas-copper, so the resident is not obliged to light a fire in order to get water for the wash-tub. The coal-house can be fed through an outside shutter, the coals being shovelled into the scuttle through a hatch inside the house. The larder is to be of brick instead of wood, and each bungalow has a roomy brick storehouse alongside, which in the far future might be converted into that favourite convenience, an outside wash-house.

The occupants of bungalows pay a rent of 2*s.* 6*d.* a week, which also covers rates. They are mostly women, but in a few bungalows old couples are living comfortably. Sometimes the council has found it possible to move a widow or an old couple into one of the bungalows from a house which has become too large for them. In one case a three-bedroom house vacated by a widow received instead a family of six—four children and their parents—who had been living in one room.

It has not so far been possible to provide any special care for these old people when they fall ill: they have to depend on friendly neighbours and the district nurse, being transferred to the infirmary when things go badly wrong. They are fortunate however in the human friendly interest taken in them by the local authority's officers, who, if hospital treatment becomes necessary, go round and reassure them about the sanctity of their homes in their absence, and who come in and lend a hand, until the expert arrives, with such domestic disasters as burst pipes and smoky chimneys. Such estates probably need a resident nurse and an adequate home-helps scheme; and this is under consideration.

Almshouses

Though modern almshouses are often structurally excellent, it is not often possible to equip them on the same scale as the municipal bungalows just described. Some good examples seen at Devizes serve to demonstrate this. A group of 12, 8 of which were built in 1910 and 4 in 1925, are administered by St. Mary's Church and Poor Lands Charity. Set round a pleasant well-kept lawn they are neat and strong little cottages of red brick. In the porch of every house stands a stout wooden garden seat, capable of taking two; and from one side of this porch the door opens directly into a living-room which is connected by an arch, usually curtained, with a small bedroom-recess. The hearth is fitted with a cooking-range, and there is also a gas-cooker in the small kitchen-scullery at the back. There are no bathrooms in these houses, but each has its indoor water-closet and coal-house, and there is a good brick larder and a roomy built-in dresser. The back door opens on to a tiny strip of asphalt which serves as an airing ground to the cottages backing on to it. Those residents who like gardening have a share in maintaining the borders, and there are good patches of kitchen-garden in two corners. The residents pay no rent, and are given free coal and wood in winter; they seem comfortable and satisfied. When ill they are treated by their own doctor.

Close to this community is another group of almshouses, belonging to the Devizes Municipal Charities, built on the same plan, and differing in only small particulars of equipment: the bench in the porch, for example, is missing, and instead of a range in the living-room there is an open fire with an oven above it—not a very satisfactory affair for the cook, since the heat, it seems, is ill distributed; the gas-cooker in the kitchen makes this of little account, however. These occupants, too, live rent-free, and seem well pleased with the convenience of their homes.

Dr. Frederick Hall, M.O.H. of Lancashire since 1936, has been appointed president of the Society of Medical Officers of Health.

Major-General Raymond W. Bliss has been appointed surgeon-general of the U.S. Army in succession to Major-General Norman Kirk, who is retiring. During the late war General Bliss acted as military observer in London, and later made extensive tours of the Pacific areas. He was an observer at the atom bomb tests at Bikini.

In England Now

A Running Commentary by Peripatetic Correspo

THE near approach of Henley and the sight of
boys rowing made me wonder whether I would
son to a rowing school. When I was at the uni
I enjoyed rowing tremendously, and I do not think
is anything to compare with the thrill of stro
well-balanced eight in a race at Henley—the
before the gun goes, the spring off the stretcher in
short first stroke, the quick second, then the long
with the crew getting into their stride. The feel
that slim shell racing over the water is rather like
where you speed down the mountainside on two
of board, but it is greater because you are one of a
and a team which answers to your every thought, spur
with that desperate ten or lengthening out to hold
other crew while they spurt. It was all very marvell
but there were also the dreary days of practice throu
the winter, especially those Mondays when nothing
right and the coach was unsparing.

Now rugby, on the other hand, gave pleasure
every game, even an ordinary game on a dull, wet
and cup finals can be very thrilling, so I would like
son to play rugby and to row; but rowing takes
one's whole time, and a general education in all sp
should come first, before there is any question of tak
up a specialty. The same with shooting—it was
fun shooting for the Armitage inter-hospital cup on
four Wednesdays in June, but did the "possible"
600 yards make up for never once having seen
Derby, which in those days was always run on
Wednesday?

Looking back on it, I think a little of everythi
you fancy does you most good.

* * *

It is extraordinary what excuses I can find for
having my daily dip while on holiday. I don't kn
about the currents round the Scillies; I must find
softer rock to undress on; after all it's only June
it's two hours earlier than the clocks say; I'm sure
wrong to bathe so soon after breakfast; the water
be warm in another hour; heavens, it's one o'clo
and if we don't go back now we'll be late for lun
and there's certain to be new potatoes and probab
cream. But tomorrow I really will go in.

* * *

A colleague of ours who is an expert in the breedi
of pure-strain mice has recently been transferred
other duties. After years of careful expert work
had produced a near-perfect strain, but his love of th
perfection was so great that he flatly refused to all
them to be mated.

* * *

Having for six years coaxed patients into undergoi
insulin therapy for the good of their health, I thoug
I would try it myself for fun, just to see what it f
like. I started off much too casually, reckoning
taking the customary three injections of ten units befo
meals, and had my first injection administered by
sister half an hour before breakfast.

It stung like a hornet, and for a good twenty-fi
seconds I was clenching my teeth and stamping round
small circles before it wore off. Breakfast was eat
without any undue enthusiasm, and I wondered if a
subsequent injections were going to be as painfull
ineffectual. Two and a half hours later, however, whe
self-imprisoned in the darkroom where I had just place
a couple of X-ray plates in the developer, I came ove
most peculiar. All my limbs quivered tensely as if
had just driven 100 miles flat out in a small car;
broke into a cold sweat and was filled with apprehensio
growing almost to panic. It got worse. The slow
moving hand of the luminous clock told me that m
X-ray plates had the choice of being somewhat unde
developed or—if I passed right out—of being utterl
ruined. The latter would apply also to the darkroo
door when someone eventually noted my absence fro
circulation. I made a choice I have never regretted

It is evident from table I that the modified test is much more sensitive than the standard Wassermann, being in fact comparable to the standard Kahn.[5] In the smaller series of cases treated with 'Mapharside' the difference between the results with the modified Wassermann and the standard Kahn are not statistically significant. Since the mapharside course was intensive, lasting on the average 30 days, it is reasonable to suppose that similar results would be obtained in patients treated intensively with penicillin. (I was not in a position to do Wassermann tests when penicillin therapy was introduced for syphilis.)

From table II it may be seen that not only is there an increase in the number of reactive sera detected when the modified Wassermann test is used but also in the number of agreements with the Kahn test. Further, in the cases treated with arsenic and bismuth, the number of sera which gave a positive Kahn reaction but a negative modified Wassermann was balanced by a similar number in which the reverse held. (The results from the smaller number of mapharside-treated cases show a similar trend.)

The reasons for these divergences are not always clear but may include the following:

1. Slight day-by-day variation in the sensitivity of the tests are inevitable in a complex biological reaction, such as the Wassermann, when carried out under routine conditions, and differences in the fixability of different samples of complement are a potent cause of such variation. The Kahn test is influenced, among other conditions, by the laboratory temperature; both the sensitivity and the specificity of the test are lessened by air temperatures lower than 21°C, which are usual in British laboratories.
2. Subjective errors which are due to the difficulty of maintaining over a period of time a constant assessment of the strength of minimal reactions (both the Kahn and the Wassermann show a more or less continuous change in intensity from positive to negative).
3. Neither test is strictly quantitative: the Wassermann because of the impossibility of measuring slight changes in complement activity at complete hæmolysis or complete inhibition of hæmolysis,[6] and the Kahn because of the high lipoid content of the antigen (added to render the test more sensitive) so that in weaker reactions a disproportionately large amount of the precipitate consists of lipoid.[7] In view of this lack of a linear relationship between strength of reaction and antibody content, it is not surprising that the results from the two tests do not always tally when tested in parallel.

It would, therefore, appear an advantage to carry out a sensitive complement-fixation test in addition to a satisfactory precipitation technique such as the standard Kahn, not only for their differing intrinsic ranges of sensitivity but also to compensate for any possible daily variation.

The use of strictly quantitative tests—e.g., the Wassermann reaction based on readings at 50% hæmolysis and the micro-estimation of antibody nitrogen in the specific precipitation—would probably record a parallel drop in reactivity as a result of treatment and thus indicate the essential oneness of the antibody concerned.

Liverpool. A. O. T. VAUGHAN.

BLOOD ENZYMES AND ACTIVITY OF PENICILLIN ESTERS

SIR,—The observations of Dr. Ungar (March 15) on the presence of penicillin-esterase in the blood of mice and rats, and its absence in the blood of man and the rabbit, can perhaps be related to the earlier classification of mammals into blood-maltase-positive and blood-maltase-negative groups.[8] Contrary to expectations, the similarity breaks down for the guineapig, which is a blood-maltase-negative animal (Compton) and a blood-penicillin-esterase-positive animal (Ungar). When one turns to the classification of Stedman, Stedman, and White of animal bloods in terms of positive and negative choline-esterase content, the findings are for the most part reversed: man bel their blood-positive group, as does also the while the rabbit, the rat, and to all intents the belong to their negative group. The rabbit's is negative on all three classifications.

How are these facts to be interpreted and reco The conventional answer is that they are exp of the varying enzymic make-up of the respectiv the chemical constitutions of the several substrates envisaged as constant.

These data suggest other possibly more useful m tions of the penicillin molecule.

Alexandria, Egypt. ARTHUR ÇO.

DIPHTHERIA IMMUNISATION

SIR,—These notes, referring to a medical st now aged 22 years, are of some interest. The v events are narrated in chronological order.

Nov. 9, 1945, primary Schick test positive ++.

First Course.—Nov. 16, given T.A.F. 0·5 c.cm. Dec. 5, 1 c.cm. Dec. 12, T.A.F. 1 c.cm. Feb. 2, 1946, T.A.F. 1 c

Second Course.—Dec. 3, 1946, Schick test positive. T.A.F. 0·5 c.cm. Dec. 17, T.A.F. 1 c.cm. Feb. 2, 1947, test positive. Feb. 18, Schick test positive. The t repeated to exclude pseudo reaction as control hac omitted on previous test. Antitoxin content of blood le 1/1000 unit per c.cm.

Third Course.—Feb. 25, A.P.T. 0·1 c.cm. March 3, 0·5 c.cm. April 1, Schick test negative. Antitoxin con blood 1/10 unit per c.cm.

The interesting features of this case are: (1) the to produce a negative Schick reaction with a con tively large amount of T.A.F. (5 c.cm.) plus the stin action of three Schick tests; (2) the rapid ap response to a relatively small amount of A.P.T. (0·6 as evidenced by the development of a negative reaction within three weeks and a considerable in in the antitoxin content of the blood; and (similarity between this case and another prev reported by me[1] in which there was a persistent l response to T.A.F., followed by a rapid conversion 0·6 c.cm. of A.P.T.

I am indebted to Miss M. Barr, M.SC., of the We Physiological Research Laboratories, for carrying ou necessary titrations.

J. C. SAUNDEF
City Hall, Cork. Medical Officer of He

EMPIRICAL TESTS OF LIVER FUNCTIO

SIR,—Having worked on serum-proteins,[2] I was interested in the article by Dr. Maizels in your iss Sept. 28, 1946 (p. 451). I have estimated, in more tha cases of endocrine, liver, or hæmopoietic disease total and partial concentrations and the water-bi power of the serum-proteins. The water-binding p was estimated as the colloid pressure exerted by 1 g 100 c.cm. of the actual albumin-globulin mixture i serum. The correlation between this reduced c pressure (R.C.P.) and the concentration of the se proteins can be expressed mathematically. My fin were compared with those in more than 100 no controls.

I agree with Dr. Maizels that a lowering of the alb globulin ratio is less common in obstructive jau than in parenchymatous liver damage, but this good only in the first weeks, and sometimes only first few days, of all pathological conditions associ with jaundice. In the later stages of obstructive jaur the ratio decreases; hence in a jaundice 3 or 4 w old quantitative protein estimations are not a r criterion in the differential diagnosis. Moreover, fact that physiological values of total and partial pro concentrations vary within a fairly wide range les still further the diagnostic value of changes in the ratio.

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[5] Kahn, R. L. Kahn Test, Baltimore, 1928.
[6] Gilbert, R., Maltaner, E. Diagnostic Procedures and Reagents (American Public Health Association), 1945, p. 338.
[7] Gilbert, R., Maltaner, E. *Ibid*, p. 324.
[8] Compton, A. *Biochem. J.* 1921, 15, 681.

[1] *Lancet*, 1940, i, 946.
[2] Podhradszky, L. *Acta med. scand.* 1940, 104, 137; *Klin. W* 1940, 19, 1261; 1942, 21, 134, 544; *Orv. Közl.* 1943, 14, 1944, 30, 603.

this country. The possibilities of ergothioneine being used clinically[1] and of its being free from toxicity were of great interest to clinicians informed of the initial experimental work. In the long view, however, much was expected of radioactive iodine by mouth in thyrotoxicosis; and I certainly saw some impressive results.

London, W.1. S. L. SIMPSON.

VENEREAL DISEASE IN BRITISH WEST AFRICA

SIR,—I was interested in your annotation of May 17. My own experience is limited to Nigeria, where I served with the R.A.M.C. for eighteen months. During that time (in 1945–46), it was the policy of the higher authorities to board native troops out of the Army if they were proved sufferers from "chronic gonorrhœa." This soon became widely known and was exploited, mainly by the more educated who wished to get out of the Army and into a civilian job before their brothers returned from Burma to flood the labour market.

Many cases of gonorrhœa then presented themselves for treatment and were admitted to hospital. All denied that it was their first attack and they invariably gave a history of anything from one to ten attacks. Few of them knew their own ages, but the approximate date of the first attack gave one a fair idea of how old they were. They were treated with sulphonamides, to which they were invariably resistant, then by hyperpyrexia, and finally with penicillin. At the end of treatment they usually had as much urethral discharge as on admission. Although no definite proof was ever obtained I am convinced that whenever a test-of-cure smear was to be taken from a patient who had undergone treatment he would reinfect himself from another patient more recently admitted.

Getting these people "V.D.-conscious" is going to be a very considerable task. It is impossible to promote this consciousness among the uneducated; in West Africa, therefore, the standard of general education must be greatly improved before any hope can be entertained of conquering the V.D. problem.

LIKITA.

CLIMATE AND RHEUMATISM

SIR,—During the last years of the late war I was M.O. of the first-aid post in the Chislehurst caves. These are huge artificial excavations in chalk and consist of two parts, one of which is damp and rather warm, the other damp and cool.

Though this shelter was occupied nightly for years by up to 14,000 people, and the first-aid post was frequented for medical treatment of minor ailments, I cannot remember a single person coming for treatment of rheumatism. Indeed people said they lost their rheumatism there.

I slept myself for several months in surroundings where the walls were dripping wet, and got neither colds nor symptoms of rheumatism. My 3-months-old baby also had no ill effects from sleeping underground in the dampness, though we were careful each time to take the bedding home and air it properly.

Leicester. G. FINKENSTEIN.

ESTIMATION OF VITAMIN C IN LEUCOCYTES

SIR,—In connexion with my paper of May 31 (p. 750) on the adaptation of Roe and Kuether's method to the estimation of vitamin C in leucocytes, I should explain that when I started my work in March, 1946, owing to inaccessibility of certain journals and abstracts I was obliged to rely on the latest available volumes of the *Quarterly Cumulative Index Medicus* for relevant references and I was unaware of recent or contemporary work of a similar character, apart from the original publications of Butler and Cushman (1940) and Roe and Kuether (1943). I can only assure Dr. Sinclair and Mr. Lloyd that the lapses they mention were unavoidable in the circumstances. I should also like to say that I employed the term "microprocedure" referring to the 15–25 mg. of the leucocyte sample and not to the blood-volume from which it was obtained.

London. P. C. CONSTANTINIDES.

CEREBRAL ANGIOMATA

SIR,—The report by Mr. Kidd and Dr. (May 31) of two cases of familial cerebral an most interesting.

The paper alludes to "the probability of tendency in the formation of some angiomata. suggest that such a condition has long been in the syndrome known as Rendu-Osler-Web or hereditary hæmorrhagic telangiectasia? I order angiomata may involve all tissues; an lesions and hæmorrhages, though not an essenti have been reported.

Unfortunately Kidd and Cumings do not whether angiomata elsewhere than in the b found or searched for, especially on the muc same applies to the family history: hæmorrh where than into the brain may be overlook attention is not paid to the possibility occurrence.

Namur, Belgium. G

ISAACS-LUDWIG ARTERIOLE

SIR,—In your issue of June 21 Dr. Barcla colleagues plead for the name of Isaacs to be with that of Ludwig in the designation of t vessel which is usually referred to as " arteriole." None will deny that the early tr of physiologists, Bowman, Isaacs, and Ludwig in the modern era of renal physiology. welcome the name of Isaacs, the American being coupled with that of Ludwig so as better the memory of an eminent physiologist whos less well known in Europe; for, while it is fairly appreciated that the work of these three leaders began independently, it may not be realised tha work (1857) preceded the classic maceration-d of Henle (1862) and Schweigger-Seidel (1865) seems a doubtful honour to have as a memor anomalous vessel of no physiological significan

None will deny that this arteriole does exi since so much attention has been attached to from debate concerning its existence and now it tion, it is more than ever necessary to reiterat is a rare anomalous arteriole of no physiologic cance. By way of requiem may I quote description as it is contained in the Sydenha of Stricher's *Human and Comparative Histolo* vol. II, p. 89)?

> ". . . a *few* of these very numerous vasa before they reach the spherical extremity of th tubule, give off a very fine branch, that im breaks up into capillaries, through which the bl into the capillary plexus investing the urinar Every vas afferens alike, whether it has previo off branches, or remained undivided, turns to o spherical dilatations of the urinary tubule, and the wall opposite to the commencement of the canal or neck."

May I repeat that Ludwig fully understood Bowman (1842), that "All the blood of the ren (with the exception of a small quantity distri the capsule, surrounding fat, and the coats of t vessels) enters the capillary tufts of the bodies" in relation to the special function of f and that Ludwig's was the brilliant conceptio filtration-reabsorption theory of urine formation.

In recent years, detailed studies of the renal ci in animals, in normal and pathological conditio in the human kidney in like diseased states, lea confirm that the renal circulation is primarily glo

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J. F. HEG

North Middlesex County Hospital.

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[1] Lawson, A., Rimington, C. *Lancet*, May 3, p. 586.

Parliament

ON THE FLOOR OF THE HOUSE

:hancellor of the Exchequer was able this week some concessions to taxpayers. The exemption ances for Territorial training from income-tax arious kinds of gas and electric cooking utensils ing cooking stoves—from purchase-tax is . The plea for the exemption of medicines and and surgical appliances put forward by Mr. was not accepted because to do so would lose sury £9 million; but the Financial Secretary out that there is a long list of essential and rugs which are exempt from taxation, and so y surgical necessities, including instruments, surgical dressings, bandages, and hospital . The plea for the exemption of toothbrushes by the roadside despite the touching plea by Bromley-Davenport: "Surely social democracy anced sufficiently . . . for toothbrushes to be as a universal necessity rather than as a luxury idle rich." Another exemption from taxation stbins, but here the question arose whether ise should cater for those "dustbin snobs" ins have *lids*. Anyway, the Chancellor impartended his blessing to all classes of dustbin.

esday was devoted to Scottish Housing, and ide the Sassenach who puts his nose into a lebate. But when it came to the Opposition a vote against the Government to a division enachs public-spiritedly came forward in support.

housing has been and is worse than English, o the present about 8500 permanent and 17,000 ry houses have been built, and the temporary is popular house in Glasgow. So even if Scotland ing all it wants to do it is still getting along.

finance and housing to foreign affairs is not big jump as it sounds. Mr. Bevin, fresh from to Paris to consult the French government "Marshall plan"—which is not a plan but a on of financial coöperation—hoped to receive ws before he made his speech at the end of the

The question Europe is asking is—are there ngs to the Marshall offer? Is the U.S.A. content improve economic conditions generally or must nform to rules laid down by the U.S.A.? The re then that some general coöperation will come he Marshall proposals—but there may be a lot gling about the details.

MEDICUS, M.P.

FROM THE PRESS GALLERY

Purchase-tax on Drugs

he *committee stage of the Finance Bill* in the of Commons on June 17 Mr. H. LINSTEAD moved endment remitting entirely purchase-tax from ies and medical and surgical appliances. At drugs and medicines manufactured or prepared, han essential drugs "of an exceptionally costly er," bore tax at $16^{2}/_{3}\%$ whether the medicines ought over the counter or prescribed by a and this, Mr. Linstead declared, had given anomalies. For example, a substance like n, chloroform, or bicarbonate of soda if in its ordinary form did not bear the tax, en prepared for medicinal use the purchaser had the tax. Again, a drug such as penicillin, which empted from the tax by a Treasury order at a hen it was exceptionally costly, was still tax-free ter the cost had been reduced, while streptomycin, had not been added to the order because it was ew, was still bearing a substantial tax. Only ay he had heard of a patient who had paid in se-tax £23 for streptomycin.

Linstead urged that a purchase-tax on medicines ally a tax on sickness. The Government spokesould probably say that if it were merely a question licines prescribed by doctors, or medicines bought public, the Treasury would not be anxious to e tax retained, and attention might be drawn large trade in proprietary medicines. But surely if the proprietary medicine industry was suitable for control on grounds of public health, that control should be a direct one through the Ministry of Health and the accident of taxation should not be used. Even if the State was going to pay in a year or two for most of the medicines, and most of the expenditure of hospitals, it was still a clumsy device to go through the whole of an industry's machine in order to take money out of one pocket and put it in another.

Dr. S. JEGER said the two classes of people on whom the tax fell were doctors and chemists. Doctors, who were notoriously bad calculators, did not usually increase their fees by the amount of the purchase-tax, but chemists who dispensed or sold drugs over the counter could always pass on the tax to the customer. The consumption of medicine was far higher among the poorer people, and to that extent the purchase-tax on drugs and medicines was practically a working-class tax.

Mr. GLENVIL HALL, financial secretary to the Treasury, replied that to accede to Mr. Linstead's request would cost the revenue £9 million, and that showed how impossible it was for the Government to accept the amendment at this time. The tax fell mainly on ready-made preparations—pills and such-like—about which there could be a division of opinion. So far as these medicines and drugs were subject to tax it could not be said that they were essential to the life of the community. The vast bulk of medical and surgical appliances were already exempt from tax, and those which were not exempt could not be said to be particularly applicable to use in the hospitals or in the sick-room. If once a proprietary remedy for a particular disease like asthma was allowed to be sold free of tax the door was opened for claims on behalf of other proprietary remedies for the same complaint. The amendment was withdrawn.

Enforcement of the Penicillin Bill

On June 18 at the committee stage of the Bill the following new clause was moved by the Government:

> *The Pharmaceutical Society of Great Britain shall have* power to enforce the provisions of this Act, and for that purpose may employ the inspectors appointed by them under section 25 of the Pharmacy and Poisons Act, 1933, but nothing in this section shall be construed as authorising the society to institute proceedings in Scotland for any offence under this Act.

The duty of enforcing the provisions of the Pharmacy and Poisons Act, 1933, Mr. J. EDWARDS, parliamentary secretary to the Ministry of Health, explained, was placed on the Pharmaceutical Society, which for that purpose employs pharmacists as inspectors, and the society has a similar duty under the Pharmacy and Medicines Act, 1941. It therefore seemed reasonable that they should also be able to enforce the provisions of the *Penicillin Bill, though this, of course,* would be entirely without prejudice to the general duty of the police to enforce the law.

Venereal Disease in the Army

Replying to a question standing in Lord MORAN's name, Lord NATHAN gave the following quarterly rates for venereal disease in the Army.

QUARTERLY RATES PER 1000 STRENGTH: JANUARY, 1946 TO MARCH, 1947

	1946				1947
	1st	2nd	3rd	4th	1st
United Kingdom ..	7·7	8·7	9·6	6·8	5·3
B.A.O.R.	30·4	41·3	44·6	41·8	30·0
C.M.F.	33·3	39·5	35·6	31·5	22·8*
M.E.L.F.	4·1	9·4	9·4	7·6	6·3*
S.E.A.L.F.	37·6	37·2	37·2	32·0	31·2*
B.C.O.F.	—	—	59·6†	102·6	61·9*

* Quarterly rates based on January-February only.
† Quarterly rates based on August-September only.

QUESTION TIME

Streptomycin Supplies

Lieut.-Commander G. BRAITHWAITE asked the Minister of Health whether he was satisfied that adequate supplies of streptomycin were reaching this country for the use of hospitals and general practitioners.—Mr. A. BEVAN replied: The merits of this drug have not yet been established and it is still under clinical trial by the Medical Research Council. The only supplies which have been obtained by the Government are for the purpose of these trials. Commander BRAITHWAITE: In view of the increasing broadcast appeals for streptomycin and in view of the fact that it is apparently readily obtainable from drug stores in the United States, may I ask whether the shortage here is in any way due to our dollar difficulties, or is it through opposition in high medical quarters?—Mr. BEVAN: There is no restriction on the dollar side to the purchase of whatever amount of streptomycin is necessary for the tests, but in view of the fact that this drug has not yet been proved, I am very glad to know that it cannot be obtained in drug stores in this country.

Mr. W. SHEPHERD: As these appeals cause a great deal of alarm, cannot the Minister do something to stop them?—Mr. BEVAN: I have made an announcement in the House deploring these appeals for drugs which are not properly tested beforehand. I regret very much that the B.B.C. is giving facilities for these appeals. Dr. S. TAYLOR: Is the Minister aware that in the United States the sale of streptomycin is not through drug stores and that it is controlled by the National Control Council there as it is here?

Certification of the Insane

Mr. G. WALLACE asked the Minister if he would review, with a view to early amendment, the regulations regarding the certification of the insane.—Mr. BEVAN replied: As soon as opportunity permits, it is intended to undertake a restatement of the law relating to mental treatment.

Mr. S. S. AWBERY: Is the Minister aware that a person who has been certified finds it almost impossible to get release even when he has recovered from his sickness, and that even after the visiting magistrates have recommended release it takes six months before the patient is released from the institution, and then only with a six months' licence?—Mr. BEVAN: I am afraid I cannot accept what appears on the face of the supplementary question, and I would warn hon. Members that this is a very difficult thing indeed, and they ought not to take things at their face value, because there is such pressure on institutions for additional accommodation that I cannot believe that superintendents keep anybody there longer than is necessary.

Institutions for Mental Defectives

Mr. WALLACE asked the Minister if he would set up a committee of inquiry into the conduct and administration of institutions and hospitals for the mentally deficient.—Mr. BEVAN replied: These institutions and hospitals (which for the most part will be taken over in the new health service) are subject to regular inspection, and I am not aware of the necessity for setting up a committee of inquiry.

Sir RALPH GLYN: In view of the overcrowding now existing in a great many of these places, and the difficulty of building, will the Minister have a survey made to show the bad effect which this overcrowding has on the patient?—Mr. BEVAN: I am well aware of that, and I think hon. Members will know that even if we had additional buildings, we would not be able to make use of them, because we have not enough staff. When the new health service is in operation, I hope we shall be able to make far better use of existing accommodation.

Mr. D. L. LIPSON: In view of the general concern over this matter, will the Minister give an assurance to the House that the report which he has received from his inspectors will not justify any serious cause for anxiety in regard to the conditions in the majority of these institutions?—Mr. BEVAN: I am well aware that conditions in these institutions are not anything like as good as we would like them to be, and it is because of the overcrowding and the lack of nursing and domestic staff. We are doing our utmost to build up the staffs and we are having some success.

Report on Proprietary Medicines

Mr. C. N. SHAWCROSS asked the Minister whether he had considered the report on the subject of proprietary medicines submitted to him by the Pharmaceutical Society of Great Britain; and what steps he proposed to take to implement the society's recommendations.—Mr. BEVAN replied: given the report preliminary consideration. The recommendation would involve legislation, for wh afraid there is no early prospect.—Mr. SHAWCRO not the Minister agree that this is a matter of far- importance which becomes ever more urgent with the of a national medical service?—Mr. BEVAN: I ag is of the utmost importance, but there are very large of matters of great importance that are also awaiting tion, and it is a question of priority. I can assure friend that it is always present in my mind.

Mr. L. J. SOLLEY: Can the Minister make this available to members?—Mr. BEVAN: I believe it is a document, and therefore I cannot promise to make able.—Mr. SOLLEY: Could not the Minister app society to ascertain whether they would object to the tion of the report so that members could study it in of the national interests involved?—Mr. BEVAN: certainly make inquiries.

Free Lavatory and Toilet Facilities

Mr. V. McENTEE asked the Minister if, as a m encouraging cleanliness and improving public health, he arrange to make a reasonable grant to local authorit provided, as a public service, the free use of lavat wash-basin facilities with soap and towels in publ veniences for men and women.—Mr. BEVAN replied no power to make such grants.

Mr. HEATHCOAT AMORY asked the Minister whether, interest of public hygiene, he would encourage local aut to extend the provision of washing facilities in public lav including free access to water and basins.—Mr. replied: It would not be appropriate at the present when the essential materials are in short supply, to local authorities to provide additional washing f in public conveniences. They already have full discre provide such facilities free of charge.

College for the Deaf

Mr. EDWARD EVANS asked the Minister of Education progress had been made in the provision of a county for deaf adolescents; and if he would make a state Mr. G. TOMLINSON replied: The Sheffield local edu authority has agreed to provide a boarding county col sufficient size to meet the needs of all deaf adolescents be the ages of 16 and 18.

Allowances for the Tuberculous

Mr. E. G. WILLIS asked the Minister of Health what the operation of the National Insurance Act would upon the tuberculosis allowances scheme.—Mr. JOHN ED replied: The increased sickness benefits payable unde Act will be available to the tuberculous in common with sick persons. The question of further financial help o lines of the present scheme is being considered in conn with the National Assistance Bill which is to be intro next session.

Meals for School-children

Mr. G. R. CHETWYND asked the Minister of Educati he would give the number of school-children receiving dinners, dinners on payment, and no dinners, respecti and the number of schools providing free dinners, dinne payment, and no dinners.—Mr. GEORGE TOMLINSON repl Last October there were, in round numbers, 340,000 chil in grant-aided primary and secondary schools who rece free dinners, 1,920,000 who had dinners on payment, $2^1/_2$ million who did not receive dinner at school. Din were being provided at over 24,000 out of 29,000 schoo departments, and it may be assumed that at practicall of these free dinners were available in case of need.

Food for Germany

Mr. PETER FREEMAN asked the Secretary of State Foreign Affairs what increased amounts of food had been allocated to Germany to meet the serious shorta and what is the present calorific value of the amount being actually received per head.—Mr. E. BEVIN repl A special emergency allocation of cereals, equivalent 137,000 tons of flour, will increase the expected arrival cereals for human consumption in the Combined Zones the equivalent of about 400,000 tons of flour in both J and July. The average daily caloric value of the ra actually available to normal consumers was slightly less th 1000 calories in May and is likely to remain at about t level in June.

invited to one of Howard Humphris's dinners was an event not easily forgotten. A gourmet (not a gourmand), he delighted in entertaining his friends with rare and delicate foods and wines. Equally at home on the Continent, he appeared to know where the most delicate and best cooked meals could be obtained."

Dr. Humphris married Miss Ethel Marion Hesketh, who survives him. He died at Bath on June 17.

DONALD JAMES MACKINTOSH

C.B., M.V.O., M.B., LL.D. GLASG.

Colonel D. J. Mackintosh, who died on June 12 at the age of 85, was medical superintendent of the Western Infirmary, Glasgow, from 1892 to 1937. During his long period of office he took a prominent part in hospital planning and earned an international reputation as an expert in design and equipment. A pioneer in the development of X-ray apparatus, he worked hard to establish radiology as a hospital department, and he made important contributions to the layout and equip*ment of operating-rooms.*

He qualified in medicine at the University of Glasgow in 1881, and after holding a resident post at the Glasgow Eye Infirmary joined the staff of Belvidere Fever Hospital. His career in hospital administration began with his appointment in 1890 to the Victoria Infirmary, of which he was the first medical superintendent, and two years later he became medical superintendent of the Western Infirmary. He was largely responsible for the organisation and equipment of the Scottish National Red Cross Hospital at Kroonstadt during the South African war, and when the Territorial Army was formed he became lieut.-colonel commanding the 3rd Scottish General Hospital. Later he was A.D.M.S. in the Lowland Division, and in 1914 he was appointed to supervise the organisation and administration of all military hospitals in the Glasgow area.

Mackintosh's capacity for organisation gave direction to his voluntary work. He was chairman of the council of the St. Andrew's Ambulance Association from 1911 until 1914 and he was made a vice-president in 1920. For many years he was vice-chairman of the General Nursing Council in Scotland as well as chairman of the Scottish board of the Royal College of Nursing. An original member of the British Hospitals Association, he was the first honorary secretary and afterwards chairman of the council. In 1929 he was appointed by the Secretary of State for Scotland to the Central Liaison Committee for Voluntary Hospitals, and he was invariably called upon to give expert evidence before any commission investigating hospital problems. The many hospitals which sought his advice at times of construction and reconstruction included the Glasgow Royal Infirmary, the General and Children's Hospitals at Nottingham, Falkirk and District Royal Infirmary, and North Staffordshire Royal Infirmary. He was also one of the most active members of the board of management of the Glasgow Royal Maternity and Women's Hospital. These services brought him many honours. He was a companion of the Order of the Bath, a member of the Victorian Order, and a knight of grace of the Order of St. John of Jerusalem. In 1912 the University of Glasgow conferred on him the honorary degree of LL.D., and he was also a deputy lieutenant of the county of the city of Glasgow.

"In the days when medical superintendents really governed," writes a colleague, "Colonel Mackintosh was recognised as a disciplinarian. His bark was ferocious. In making his way along the corridors of the Western *Infirmary he looked like a battleship escorted by a* flotilla of destroyers. He had an uncanny knack of discovery followed by the discomfiture of the law-breaker. It may be said that he lacked certain graces, and his exterior was undoubtedly formidable. Behind all this lay a Highland spirit, loyalties that were life-long, and as high standards for himself as he set for others. On looking back over the years thousands of residents and nurses will remember the super with kindliness and admiration, and few with rancour."

Dr. Mackintosh is survived by his wife and daughter. His son, Donald Mackintosh, was killed in action in France in 1917, and was posthumously awarded the Victoria Cross.

SIR ALMROTH WRIGHT

Prof. D. W. Carmalt-Jones writes from New
"I have heard privately of the death of S
Wright, but the journals with his obituary n
not yet arrived in this country. As an old
deeply in his debt, I should like to add my tr
memory at this long range, before it is too
will have been made of his career and of the ho
him, titular and academic, and of his servic
preventive and curative medicine, of his
intellect, his technical ingenuity and skill, h
trative gifts, his versatility, perhaps even of h
of his controversial vigour—maybe of his 'b
its suggestions of Mr. Dick's *Memorial.* On
however, is less well known and is probabl
recorded, but has always been to me most cha
and important, and that is his influence on his

"Provided one kept within the four corne
doctrines accepted there, the most outspoken
was prevalent and encouraged in the laborato
was generally expressed in the most un
language. Wright used to say: 'This lab. is a
as all the world ought to be.' It was nothing of
it was a benevolent despotism. The rule of
though it was never stated, was that the wo
day must be done in the day, and that by the
workers, not by the technicians. I write of fo
ago and the early days of the opsonic index,
main work was done at night. Things often we
a whole batch of slides had to be scrapped and
repeated. No-one ever thought of postponing
following day; we stayed on till the job was
the results entered up. It might be thought
that Wright was a martinet. Nothing of the
never heard him give an order; the work was
be done, and we should as soon have thought o
it unfinished as of going without our breakfasts.
who, without orders given, kept a team of yo
out of their beds till past midnight several times
and for years on end, had some remarkable qu

Public Health

The Mental-health Service

THE Minister of Health has announced t
functions of the Board of Control, other than
a quasi-judicial nature, are to be transferred
as from July 1. A mental-health division of the
of Health, to which the appropriate membe
officers of the board are transferred, has been esta

He has also sent to the appropriate bodies a
outlining the form which the proposals of local
authorities for administering their mental-health re
bilities should follow. These duties will invol
appointment of duly authorised officers who wi
the initial steps in providing care and treatm
persons suffering from mental illness. Former re
officers with experience in this work (which in
is to be divorced entirely from the poor-law) a
part-time use of psychiatric social workers, spec
authorised for this purpose, are recommended.
care of mental defectives, ascertainment, the pr
of supervision, institutional care or guardianshi
training and occupation for those not in instit
are involved. Arrangements for care and aft
should also be considered.

While the supervision of mental patients or
or boarded out, and of mental defectives on licen
ultimately the responsibility of the hospital or instit
coöperation between local authorities and regional
may save man-power, scarce in this as in other fie

Effective arrangements will involve consultatio
continued contact between local health autho
the regional hospital boards (who will provide
services of specialists), and hospital management
mittees. So far as local health authorities are conc
in future, responsibility both for the mentally ill an
mental defective will be exercised through the s
tory health committee, advised by the medical office
health. The committee are advised to appoint a me
health subcommittee to draft their proposals and u
take the subsequent detailed administration. A mo